Arm® CoreLink™ CMN-600 Coherent Mesh Network

Revision: r3p2

Technical Reference Manual

arm

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Arm® CoreLink™ CMN-600 Coherent Mesh Network

Technical Reference Manual

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Release Information

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Product Status

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Contents
Arm® CoreLink™ CMN-600 Coherent Mesh Network Technical Reference Manual

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Preface

This preface introduces the *Arm® CoreLink™ CMN-600 Coherent Mesh Network Technical Reference Manual*.

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About this book

This book is for the Arm® CoreLink™ CMN-600 Coherent Mesh Network product.

Product revision status

The r*x*p*y* identifier indicates the revision status of the product described in this book, for example, r*1*p*2*, where:

r*x* Identifies the major revision of the product, for example, r1.

p*y* Identifies the minor revision or modification status of the product, for example, p2.

Intended audience

This book is written for system designers, system integrators, and programmers who are designing or programming a *System-on-Chip* (SoC) that uses Coherent Mesh Network CMN-600.

Using this book

This book is organized into the following chapters:

Chapter 1 Introduction
This chapter describes the CMN-600 product.

Chapter 2 Functional description
This chapter describes the functionality of the CMN-600 product.

Chapter 3 Programmer's model
This chapter describes the programmer's model.

Chapter 4 SLC memory system
This chapter describes the SLC memory system.

Chapter 5 Debug trace and PMU
This chapter describes the *Debug Trace* (DT) and *Performance Monitoring Unit* (PMU) features.

Chapter 6 Performance optimization and monitoring
This chapter describes performance optimization techniques for use by system integrators, and the *Performance Monitoring Unit* (PMU).

Appendix A Signal descriptions
This appendix describes the CMN-600 I/O signals.

Appendix B CXLA I/O signals
This appendix includes I/O signals that support CXLA configuration.

Appendix C Revisions
This appendix describes the technical changes between released issues of this book.

Glossary

The Arm® Glossary is a list of terms used in Arm documentation, together with definitions for those terms. The Arm Glossary does not contain terms that are industry standard unless the Arm meaning differs from the generally accepted meaning.

See the *Arm® Glossary* for more information.

Typographic conventions

italic
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bold
: Highlights interface elements, such as menu names. Denotes signal names. Also used for terms in descriptive lists, where appropriate.

`monospace`
: Denotes text that you can enter at the keyboard, such as commands, file and program names, and source code.

`monospace`
: Denotes a permitted abbreviation for a command or option. You can enter the underlined text instead of the full command or option name.

`monospace italic`
: Denotes arguments to monospace text where the argument is to be replaced by a specific value.

`monospace bold`
: Denotes language keywords when used outside example code.

`<and>`
: Encloses replaceable terms for assembler syntax where they appear in code or code fragments. For example:

```
MRC p15, 0, <Rd>, <CRn>, <CRm>, <Opcode_2>
```

SMALL CAPITALS
: Used in body text for a few terms that have specific technical meanings, that are defined in the *Arm® Glossary*. For example, IMPLEMENTATION DEFINED, IMPLEMENTATION SPECIFIC, UNKNOWN, and UNPREDICTABLE.

Timing diagrams

The following figure explains the components used in timing diagrams. Variations, when they occur, have clear labels. You must not assume any timing information that is not explicit in the diagrams.

Shaded bus and signal areas are undefined, so the bus or signal can assume any value within the shaded area at that time. The actual level is unimportant and does not affect normal operation.

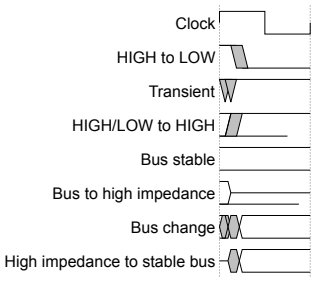

Figure 1 Key to timing diagram conventions

Signals

The signal conventions are:

Signal level
: The level of an asserted signal depends on whether the signal is active-HIGH or active-LOW. Asserted means:
- HIGH for active-HIGH signals.
- LOW for active-LOW signals.

Lowercase n
: At the start or end of a signal name, n denotes an active-LOW signal.

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Additional reading

This book contains information that is specific to this product. See the following documents for other relevant information.

Arm publications

This book contains information that is specific to this product. See the following documents for other relevant information:

Table 1 Arm publications

Document name	Document ID	Licensee only
Arm® AMBA® AXI and ACE Protocol Specification	IHI 0022	N
Arm® AMBA® CXS Protocol Specification	IHI 0079	N
Arm® AMBA® Low Power Interface Specification Arm® Q-Channel and P-Channel Interfaces	IHI 0068	N
Arm® AMBA® 4 AXI4-Stream Protocol Specification	IHI 0051A	N
Arm® AMBA® 5 CHI Architecture Specification	IHI 0050	N
Arm® Architecture Reference Manual ARMv7-A and ARMv7-R edition	DDI 0406	N
Arm® Architecture Reference Manual Armv8, for Armv8-A architecture profile	DDI 0487	N
Arm® Reliability, Availability, and Serviceability (RAS) Specification Armv8, for the Armv8-A architecture profile	DDI 0587	N
Principles of Arm® Memory Maps White Paper	DEN 0001	N
Arm® CoreLink™ CMN-600 Coherent Mesh Network Configuration and Integration Manual	100613	Y
Arm® CoreLink™ CMN-600 Coherent Mesh Network User Guide	101402	Y
Arm® iBEP User Guide	PJDOC-1779577084-27474	Y

Other publications

Table 1 Other publications

Document name	Document ID	Licensee only
JEDEC Standard Manufacturer's Identification Code	JEP106, *http://www.jedec.org*	N
Cache Coherent Interconnect for Accelerators CCIX Base Specification Revision 1.0 Version 0.9	-	N

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Feedback

Feedback on this product

If you have any comments or suggestions about this product, contact your supplier and give:

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- The product revision or version.
- An explanation with as much information as you can provide. Include symptoms and diagnostic procedures if appropriate.

Feedback on content

If you have comments on content then send an e-mail to *errata@arm.com*. Give:

- The title *Arm CoreLink CMN-600 Coherent Mesh Network Technical Reference Manual*.
- The number 100180_0302_01_en.
- If applicable, the page number(s) to which your comments refer.
- A concise explanation of your comments.

Arm also welcomes general suggestions for additions and improvements.

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Chapter 1
Introduction

This chapter describes the CMN-600 product.

It contains the following sections:

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1.1 About CMN-600

The CMN-600 product is a scalable, configurable coherent interconnect that is designed to meet the *Power, Performance, and Area* (PPA) requirements for Coherent Mesh Network systems that are used in high-end networking and enterprise compute applications.

CMN-600 is a scalable mesh interconnect with 1-64 processor compute clusters.

You can configure CMN-600 using the Arm Socrates™ system IP Tooling platform. Socrates is an environment for the configuration of Arm IP. Using Socrates, you can configure the following CMN-600 characteristics:

- Custom interconnect size and device placement
- Optional *System Level Cache* (SLC). For more information about the features of the SLC memory system, see *4.1 About the SLC memory system* on page 4-1086.

CMN-600 supports Arm AMBA 5 CHI Issue B, including the following features:

- Far Atomic operations
- Cache-stashing to improve data locality
- Direct data transfer to reduce latency

CMN-600 also supports AMBA 5 CHI Issue C, including the following features:

- Separate Read Data and Comp Responses for DMT
- Combined CompAck with WriteData

CMN-600 provides system-level alignment by providing the following system functionality:

- *Quality of Service* (QoS)
- *Reliability, Availability, and Serviceability* (RAS)
- *Debug and Trace* (DT)

CMN-600 is compatible with the following types of IP:

- *Dynamic Memory Controller* (DMC)
- *Generic Interrupt Controller* (GIC)
- *Memory Management Unit* (MMU)
- Armv8.0 and Armv8.2 processors

CMN-600 provides an optional *Coherent Multichip Link* (CML) feature. CML is compliant with the CCIX standard and allows you to support up to four SoCs in a coherent system.

The following table shows the protocol nodes and devices that a system that is built using CMN-600 can contain.

Table 1-1 Supported protocol nodes and devices

Protocol node or device	Description
Fully coherent Requesting Node (RN-F)	A fully coherent master device that supports: • CHI Issue A • CHI Issue B • CHI Issue C **——— Restriction ———** All RN-Fs must be of the same type. ———
I/O coherent Requesting Node (RN-I)	An I/O-coherent master device. This CHI bridge device acts as an RN-I proxy for one or more AXI or ACE-Lite master devices that connect to it.
I/O coherent Requesting Node with DVM support (RN-D)	An I/O coherent master device that supports acceptance of *Distributed Virtual Memory* (DVM) messages on the Snoop channel.

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Table 1-1 Supported protocol nodes and devices (continued)

Protocol node or device	Description
Fully coherent Home Node (HN-F)	A device that acts as a Home Node for a coherent region of memory. HN-Fs accept coherent requests from RN-Fs and RN-Is, and generates snoops to all applicable RN-Fs in the system as required to support the coherency protocol.
I/O coherent Home Node (HN-I)	A device that acts as a Home Node for the slave I/O subsystem, responsible for ensuring proper ordering of requests targeting the slave I/O subsystem. HN-I supports AMBA AXI and ACE-Lite protocols.
I/O coherent Home Node + DVM Node (HN-D)	A device that includes an HN-I, a *Debug Trace Controller* (DTC), *DVM Node* (DN), *configuration node* (CFG), Global Configuration Slave, and the *Power/Clock Control Block* (PCCB). ——— **Restriction** ——— Only one HN-D is allowed per CMN-600 instance. ———
I/O coherent Home Node + DTC (HN-T)	An HN-I with a built-in DTC and ATB.
CHI Slave Node (SN-F)	A device which solely receives CHI commands, limited to fulfilling simple read, write, and CMO requests targeting normal memory.
SBSX	A CHI bridge device that converts and forwards simple CHI read, write, and CMO commands to an AXI or ACE-Lite slave memory device.
CXG	A *CCIX Gateway* (CXG) device bridges between CHI and CXS (CCIX port).

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1.2 Compliance

The CMN-600 product is compliant with the *AMBA® 5 CHI Issue B Architecture Specification*.

CMN-600 also supports the *AMBA® 5 CHI Issue C Architecture Specification*.

AMBA® 5 CHI architecture

The CMN-600 product implements the following architecture capabilities:

- Fully compliant with CHI interconnect architecture
- Non-blocking coherence protocol
- Packet-based communication
- Four channel types:
  - *Request* (REQ)
  - *Response* (RSP)
  - *Snoop* (SNP)
  - *Data* (DAT)
- Credited end-to-end protocol-layer flow control with a retry-once mechanism for flexible bandwidth and resource allocation
- Integrated end-to-end *Quality-of-Service* (QoS) capabilities

For more information, see the *Arm® AMBA® 5 CHI Issue B Architecture Specification*.

CCIX architecture

The CML CCIX implementation is compliant with *Cache Coherent Interconnect for Accelerators CCIX Base Specification Revision 1.0 Version 0.9* dated October 20, 2017.

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1.3 Features

The CMN-600 product provides the following key features:

- Highly scalable mesh network topology that is configurable up to an 8 × 8 mesh
- Custom mesh size and device placement
- Supports a programmable *System Address Map* (SAM)
- Supports up to 64 RN-F interfaces for CHI-based compute clusters, accelerators, graphic processing units, or other cache coherent masters. These interfaces also provide *Component Aggregation Layer* (CAL).
- Supports up to 16 memory controllers
- Supports up to 32 RN-Is with up to three ACE5-Lite ports each (96 total)

  ——— **Note** ———

  Extra devices are supported by using more levels of interconnect hierarchy, such as the CoreLink NIC-450 Network Interconnect Controller.

  ———————————

- Two 256-bit data channels, one for each direction
- DVM message transport between masters
- QoS regulation for shaping traffic profiles
- A *Performance Monitoring Unit* (PMU) to count performance-related events
- High-performance distributed *System Level Cache* (SLC) and *Snoop Filter* (SF) up to 64 HN-Fs with CAL and cache sizes of 0-256MB total
- The HN-F includes an integrated *Point-of-Serialization* (PoS) and *Point-of-Coherency* (PoC) and its SLC (also referred to as Agile System Cache) can be used both for compute and I/O caching
- SF with up to 256MB of tag RAM for increased coherency scalability consisting of up to 64 partitions (one per HN-F)
- Up to eight HN-Is, each with an ACE-Lite master port
- Supports *Device Credited Slices* (DCSs) used for register slices at device interfaces, allowing flexibility in device placement
- Supports *Mesh Credited Slices* (MCSs) used for X-Y register slices, allowing flexibility in mesh floorplanning
- Support for *Component Aggregation Layer* (CAL) for device interface port expansion
- Support for *CAL Credited Slices* (CCSs), allowing flexibility in mesh floorplanning in configurations that use the CAL
- *On-Chip Memory* (OCM) allows for the creation of CMN-600 systems without physical DDR memory
- RAS features including transport parity, optional data path parity, *Single-Error Correction and Double-Error Detection* (SECDED) ECC, and data poisoning signaling
- Supports up to four CCIX ports, which support one, two, or three CCIX links for chip-to-chip coherent communication. Each CCIX port has a CXS interface that transports CCIX TLP.
- Support for *Address Based Flush* (ABF)
- Support for way-based SLC partitioning
- Support for source-based way locking
- AXI4-Stream support
- Support for CCIX Slave Agent in CML mode
- Support for 256 RN-I read tracker entries
- Support for atomics in RN-I
- Increased support for hashed and non-hashed regions in SAM

This section contains the following subsections:

- *1.3.1 CXS property support* on page 1-17.
- *1.3.2 CCIX property support* on page 1-17.
- *1.3.3 CHI feature support for CML* on page 1-17.

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1.3.1 CXS property support

This section provides CXS information.

The following table contains CXS property settings.

Table 1-2 CXS property support

Property	Support
TX/RX CXSDATAFLITWIDTH	256
TX/RX CXSMAXPKTPERFLIT	2
TX CXSCONTINUOUSDATA	True
RX CXSCONTINUOUSDATA	False
TX/RX CXSERRORFULLPKT	True
TX/RX CXSDATACHECK	None
TX/RX CXSREPLICATION	None

1.3.2 CCIX property support

This section provides CCIX information for CML support.

The following table contains CCIX property settings for CML.

Table 1-3 CCIX property settings for CML

Property	Permitted values	Support
NoCompAck	True, False	False
PartialCacheStates	True, False	False
CacheLineSize	64B, 128B	64B
AddrWidth	48b, 52b, 56b, 60b, 64b	48b
PktHeader	Compatible, Optimized	Both
MaxPacketSize	128B, 256B, 512B	All
NoMessagePack	True, False	Both, the default is True

——— Restriction ———

The following CCIX features are not supported:

- Memory expansion. HN-Fs and their associated SN-Fs must be on the same chip
- Snoop chaining outbound
- CCIX snoop multicast, inbound and outbound
- Snoop broadcast outbound

———————————

1.3.3 CHI feature support for CML

This section provides CHI information for *Coherent Multichip Link* (CML) support.

The following table contains CHI support for CML settings.

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Table 1-4 CHI support for CML

CHI feature	CML support		Comments
	Local	Remote	
Coherency	Yes	Yes	-
Ordering	Yes	Yes	-
Atomics	Yes	Yes	-
Exclusive Accesses	Yes	SMP Mode Only	Remote Support. Only RN-F exclusives are supported and can only target HN-F. In non-SMP mode, any read exclusive access is downgraded to a non-exclusive read and write exclusive is terminated at CXRA and Non-data Error response is sent.
Cache Stashing	Yes	No	-
DVM Operations	Yes	SMP Mode Only	-
Error Handling			
- Response Error	Yes	Yes	-
- Data Check	Yes	No	-
- Poison	Yes	Yes	Mandatory for CMN-600
QoS			
- Request	Yes	Yes	-
- Snoop	Yes	No	-
Data Return from Shared Clean	Yes	No	-
Direct Cache Transfer (DCT)	Yes	No	Local support includes local RN-F sending data directly to CCIX gateway block
Direct Memory Transfer (DMT)	Yes	No	Local support includes local SN-F sending data directly to CCIX gateway block
I/O Deallocation Transactions	Yes	Yes	-
CleanSharedPersist CMO	Yes	Yes	-
Prefetch Target	Yes	No	Remote Support. This request is intended to target SN and therefore is not expected at CXRA.
Trace Tag	Yes	SMP Mode Only	-
System Coherency Interface (**SYSCOREQ** and **SYCOACK**)	Yes	Yes (using s/w bits)	-
Partial Cache State	Yes	No	CXRA, inside CML block, does not accept the following requests and responses: • WriteBackPtl • WriteCleanPtl • SnpRespDataPtl*
Streaming and Optimized Streaming of Ordered WriteUniques	Yes	No	WriteUnique* request with Request Order and ExpCompAck attributes set, RN must send the CompAck when it receives a Comp response for that write request. The RN must not create any dependencies on other outstanding writes.
CHI-A RN-F	No	No	CML configurations do not support CHI-A RN-F nodes

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CML requirement

Each CML port requires a minimum of one request and one data credit more than the total number of reservations. This number is enabled through the CXRA configuration control register, por_cxg_ra_cfg_ctl.

This requirement applies to each enabled CCIX link at a given CCIX port. For example, by default all the reservations are enabled in the SMP mode. Therefore, a minimum of four request and four data credits are required to be granted per CCIX link. Certain traffic types, such as QoS-15, use these credentials to make progress in a loaded system. For more information, see the configuration register *por_cxg_ra_cfg_ctl* on page 3-956.

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1.4 Interfaces

The CMN-600 can be configured with various interfaces.

The following figure shows the interfaces of the CMN-600 product.

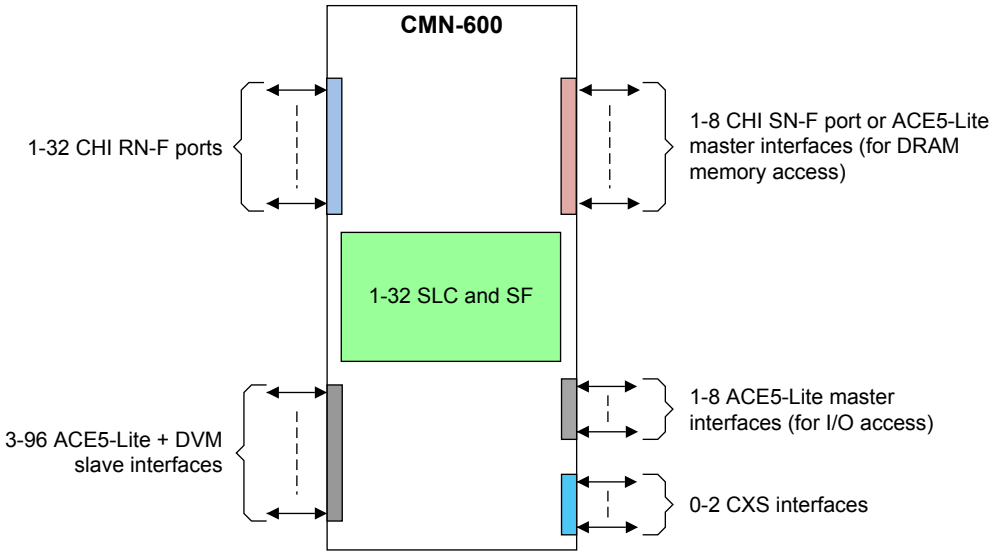

Figure 1-1 CMN-600 interfaces

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1.5 Configurable options

The basic structure of CMN-600 is a configurable rectangular grid that is composed of network routers that are known as *Crosspoints* (XPs) and CHI-compliant devices.

Each XP connects horizontally and vertically to other XPs, creating a two-dimensional mesh structure. Each XP has two ports for connecting CHI-compliant devices.

CMN-600 provides several configurable parameters that can be configured to meet system requirements. You can use Socrates Tooling to initially auto-populate the devices throughout the mesh. You can then refine the mesh design and device placement using the following guidelines.

To configure the CMN-600, perform the following steps:

1. System component selection. In this step, system components are determined, including:
   - Number and type of processors
   - I/O interfaces
   - Number of HN-Fs
   - Amount of SLC
   - Memory interfaces

   For more information, see *1.5.1 System component selection* on page 1-21.
2. Mesh sizing and top-level configuration. This step includes specifying the following:
   - Number of rows and columns
   - Global configuration parameters

   For more information, see *1.5.2 Mesh sizing and top-level configuration* on page 1-23.
3. Device placement and configuration. This step involves:
   - Placement of devices and credited repeater slices between XPs based on floorplan requirements
   - Configuration of devices

   For more information, see *1.5.3 Device placement and configuration* on page 1-26.

This section contains the following subsections:

1.5.1 System component selection

This section describes CMN-600 system component selection.

Request Nodes

Request Nodes (RNs) reside outside of the mesh and connect to CMN-600 ports.

Requesting masters with coherent caches (processors, GPUs, or processing elements with internal coherent caches) are referred to as RN-F devices. They connect directly to the CMN-600 interconnect mesh using a CHI RN-F port.

I/O-requesting masters without coherent caches connect to CMN-600 RN-I bridge devices using ACE-Lite ports. Examples of I/O-requesting masters include I/O masters, processing elements without internal caches, or processing elements with internal caches that are not hardware coherent. The RN-I bridge device is located between the ACE-Lite interface and the internal CHI interface. Each RN-I bridge device has three ACE-Lite interfaces.

A single I/O-requesting master can be connected directly to a CMN-600 ACE-Lite port. Alternatively, multiple masters can share a single ACE-Lite port by connecting through external AMBA interconnect components. To determine if I/O masters share 1-3 ACE-Lite ports or an RN-I, designers must consider traffic bandwidth requirements and physical floorplan trade-offs.

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Home Nodes

In CHI, each byte of address space is assigned to a single *Home Node* (HN). That HN is responsible for handling all memory transactions that are associated with that address.

There are two types of HN devices within the CMN-600 system:

HN-F

HN-F device instances are the HNs for all coherent memory. HN-Fs also support non-coherent memory accesses. Memory that is mapped to an HN-F targets DRAM. Each HN-F can contain an SF and an SLC slice. The amount of SLC required determines the number of HN-Fs.

The total SLC size that is required divided by the number of HN-F instances determines the recommended SLC size for each HN-F instance. Generally, each HN-F partition has the same SLC size.

Note

The amount of SLC and number of HN-Fs are configured separately.

Tip

The optimal total SF size is twice the total exclusive cache size for all RN-Fs. For example, for a 32MB RN-F total cache size, the recommended SF size is 64MB.

HN-I

HN-I device instances are the HNs for all memory that targets an ACE-Lite slave device or subsystem. HN-I does not support coherent memory. However, Cacheable transactions can be sent to HN-I. Each HN-I instance contains a single ACE-Lite master port to send bus transactions to one or more slaves through an AMBA interconnect. The total ACE-Lite master bandwidth requirement, and physical placement of slave peripherals, determines the number of HN-I instances that are required.

There are HN-I types with extra functionality. These types are:

HN-T HN-I that has a debug trace controller.
CMN-600 can have zero or more HN-I and HN-T instances.

HN-D HN-I that has a debug trace controller, DVM node, and configuration slave.
CMN-600 must have exactly one HN-D instance.

CML interfaces

The CMN-600 interconnect supports up to four CXS (CCIX port) interfaces. A CXG device bridges between CHI and CXS, and contains CCIX *Request Agent* (RA) proxy and *Home Agent* (HA) proxy functionality. The CXG device also contains CXS *Link Agent* (LA) functionality, which is external to the CMN-600 hierarchy.

Memory interfaces

The CMN-600 interconnect supports two types of memory interface ports:

CHI SN-F port
Connects a native memory controller, such as the CoreLink DMC-620 Dynamic Memory Controller, that complies with:

- CHI Issue B
- CHI Issue C

AXI port
Connects an AXI memory controller using an SBSX bridge. For more information, see *1.5.2 Mesh sizing and top-level configuration* on page 1-23.

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1.5.2 Mesh sizing and top-level configuration

The size of the CMN-600 mesh primarily depends on the number of connected devices.

The minimum required number of XPs is equal to the number of devices divided by two (rounded up). Also, the product of the X and Y mesh dimensions must be greater than or equal to the required number of XPs. For example, if seven XPs are required, a 2 × 4 or 4 × 2 mesh would suffice.

The following table lists the device types that CMN-600 supports.

Table 1-5 Supported device types

Device	Name	Description
RNI	Request Node I/O.	A non-caching Request Node that bridges I/O master requests from 1-3 AXI or ACE-Lite interfaces.
RND	DVM Request Node.	An RN-I node that can accept DVM messages on the Snoop channel.
RNF_CHIA	Request Node Full with built-in SAM. CHI Issue A compliant.	CHI Issue A compliant processor, cluster, GPU, or other Request Node with a coherent cache and a built-in SAM.
RNF_CHIA_ESAM	Request Node Full without a built-in SAM. CHI Issue A compliant.	CHI Issue A compliant processor, cluster, GPU, or other Request Node with a coherent cache but without a built-in SAM.
RNF_CHIB	Request Node Full with built-in SAM. CHI Issue B compliant.	CHI Issue B compliant processor, cluster, GPU, or other Request Node with a coherent cache and a built-in SAM.
RNF_CHIB_ESAM	Request Node Full without a built-in SAM. CHI Issue B compliant.	CHI Issue B compliant processor, cluster, GPU, or other Request Node with a coherent cache but without a built-in SAM.
RNF_CHIC	Request Node Full with built-in SAM. CHI Issue C compliant.	CHI Issue C compliant processor, cluster, GPU, or other Request Node with a coherent cache and a built-in SAM. **Note** This node type is not listed in the Socrates IP Tooling software. It is achieved by selecting the RNF_CHIB node type and setting the global `CHIC_MODE_EN` parameter.
RNF_CHIC_ESAM	Request Node Full without a built-in SAM. CHI Issue C compliant.	CHI Issue C compliant processor, cluster, GPU, or other Request Node with a coherent cache but without a built-in SAM. **Note** This node type is not listed in Socrates IP Tooling software. It is achieved by selecting the RNF_CHIB_ESAM node type and setting the global `CHIC_MODE_EN` parameter.
HNF	Home Node Full.	A fully coherent Home Node, typically configured with SLC, SF, or both.
HNI	Home Node I/O.	A device that acts as a Home Node for the slave I/O subsystem, responsible for ensuring proper ordering of requests targeting the slave I/O subsystem. HN-I supports AMBA AXI or ACE-Lite.
HNT	Home Node I/O with debug trace control.	An HN-I with a built-in debug trace controller.
HND	DVM Home Node.	An HN-I with a built-in debug trace controller, *DVM Node* (DN), *Configuration Node* (CFG), Global Configuration Slave, and the *Power/Clock Control Block* (PCCB).
SNF	Slave Node.	A memory controller consisting of a native CHI SN interface.

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Table 1-5 Supported device types (continued)

Device	Name	Description
SBSX	CHI to AXI or ACE-Lite bridge.	A CHI to AXI or ACE-Lite bridge that allows an AXI or ACE-Lite memory controller to be connected to CMN-600.
CXG	CHI to CXS (CCIX port) bridge.	A CHI to CXS (CCIX port) bridge that enables CML. **Note** It comprises two entities: • Internal CXRH device, including RA and HA functionality inside the CMN-600 hierarchy. • External CXLA device.

The following table shows configurable options for mesh size.

Table 1-6 Configurable mesh options

Parameter	Description	Values	Requirements
Mesh X dimension	Number of mesh columns	1-8	The following mesh configurations are not supported: • 1 × 1 • 1 × 2 • 2 × 1
Mesh Y dimension	Number of mesh rows	1-8	
MCSX count	Number of credited slices on an XP-XP mesh link in X dimension	0-4	This count is per link and can be different for each link.
MCSY count	Number of credited slices on an XP-XP mesh link in Y dimension	0-4	This count is per link and can be different for each link.
DCS count	Number of credited slices on a device-XP link	**Without CCS** 0-4 **With CCS** 0-2	This count is per link and can be different for each link.
CCS count	Number of credited slices on a CAL-XP link	0-2	This count is per link and can be different for each link.

The following table shows configurable options for top-level configuration.

Table 1-7 Configurable global parameters

Parameter	Description	Values (Default)	Requirements
`PA_WIDTH`	System Physical Address width	34, 44, or 48 (48)	In a system that contains RNF_CHIA or RNF_CHIA_ESAM devices, a value of 48 is not supported.
`CHIC_MODE_EN`	CHI.C mode enable	0 or 1	-
`R2_ENABLE`	Enables CMN-600 r2 features.	1	This parameter is always set.
`REQ_ADDR_WIDTH`	Width of Address field in REQ flit	44 or 48 (48)	In a system that contains RNF_CHIA or RNF_CHIA_ESAM devices, a value of 48 is not supported.

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Table 1-7 Configurable global parameters (continued)

Parameter	Description	Values (Default)	Requirements
REQ_RSVDC_WIDTH	Width of RSVDC field in REQ flit	4 or 8 (8)	-
DATACHECK_EN	Data Check (data byte parity checking) enable	0 or 1 (False)	-
FLIT_PAR_EN	Flit parity enable	0 or 1 (True)	-
NUM_REMOTE_RNF	Number of RN-Fs for CML configurations on all remote chips combined	0-64 (0)	-
RNSAM_NUM_ADD_HASHED_TGT	Number of additional hashed target IDs supported by the RN SAM, beyond the local HN-F count. For configurations where HN-F CALs are present, refer to sections: • *HN-F with CAL support in the RN SAM* on page 2-117 • *64 hashed targets in the RN SAM*	0, 2, 4, 8, 16, or 32 (0)	-
RNSAM_NUM_NONHASHGROUP	Number of Non-Hashed regions that are supported by RN SAM	8 or 20 (20)	-

The following table shows configurable options for component counts.

Table 1-8 Configurable component counts

Feature	Parameter	Description	Values	Requirements
Processor resources	Number of RN-Fs	The number of RN-Fs in the system. RN-Fs can be one of the following types: • RNF_CHIA • RNF_CHIA_ESAM • RNF_CHIB • RNF_CHIB_ESAM • RNF_CHIC • RNF_CHIC_ESAM	**Without CAL** 1-64 **With CAL** 2-64	All RN-Fs must be of the same type. If CAL is present, the number of RN-Fs must be even, and the RN-F type must be RNF_CHIB, RNF_CHIC, RNF_CHIB_ESAM, or RNF_CHIC_ESAM.
I/O resources	Number of RN-Is	The number of RN-I instances in the system.	0-32	At least one RN-I or RN-D must be present. The total count of RN-Is and RN-Ds must not exceed 32.
	Number of RN-Ds	The number of RN-D instances in the system.	0-32	
	Number of HN-Is	The number of HN-I instances in the system. This count includes the HN-D which is always present.	1-8	-
Debug resources	Number of DTCs	The total number of Debug Trace Controller domains.	1-4	The number of DTCs must not exceed the number of HN-Is.

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Table 1-8 Configurable component counts (continued)

Feature	Parameter	Description	Values	Requirements
System cache	Number of HN-Fs	The total number of HN-F instances in the system. The number of HN-Fs referred to by a given cache group (hashed entry in the SAM) must be a power of two.	**Without CAL** 1-32 **With CAL** 2-64	For more details, refer to *Chapter 4 SLC memory system* on page 4-1085. **Note** When CAL is present, the number of HN-Fs must be even.
Memory resources	Number of SN-Fs	The number of SN-Fs (CHI interfaces).	0-16	At least one SN-F or SBSX must be present. The total count of SN-Fs and SBSXs must not exceed 16.
	Number of SBSXs	The number of SBSX instances (AXI interfaces).	0-16	

1.5.3 Device placement and configuration

After you have enumerated the devices and determined the mesh dimensions, you must specify the placement of each device, or node, in the mesh.

While there are no constraints on the mesh location of a device, floorplanning and performance constraints drive the optimal device placement. These considerations are outside the scope of this document.

To configure individual CMN-600 devices, use the options in the following tables.

Note

When CAL is present, both devices that are connected to it must be configured identically.

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Table 1-9 Configurable options for RN-F and SN-F ports

Parameter	Description	Values (Default)	Comments
DEV_POISON_EN	Data poison enable.	0 or 1 (1)	Applies to RN-F ports only. Must be set to 0 for RNF_CHIA or RNF_CHIA_ESAM devices.
DEV_DATACHECK_EN	Data check (end-to-end data byte parity) enable. **Note** If global parameter DATACHECK_EN==0, you must set DEV_DATACHECK_EN=0.	0 or 1 (0)	Applies to RN-F ports only. Must be set to 0 for RNF_CHIA or RNF_CHIA_ESAM devices.
RXBUF_NUM_ENTRIES	Number of receive flit buffers inside CMN-600 on this port. To achieve full bandwidth operation, this number must equal the CHI credit return latency (in cycles) for flit transfers from RN-F or SN-F to the interconnect. **Note** The credit return latency is one cycle in the interconnect. This value must be added to the credit latency in the RN-F or SN-F to arrive at the total credit return latency.	2-4 (3)	The minimum value of two corresponds to a credit return latency of one cycle in the interconnect and one cycle in the RN-F or SN-F.

Table 1-10 Configurable options for RN-I and RN-D devices

Parameter	Description	Values (Default)	Comments
AXDATA_WIDTH	Data width on AXI/ACE-Lite interface	128 or 256 (128)	-
NUM_WR_REQ	Number of Write Request Tracker entries	4, 16, 24, 32 or 64 (32)	-
NUM_RD_REQ	Number of Read Request Tracker entries	4, 32, 64, 96, 128, or 256 (32)	If NUM_RD_BUF is at least 128, NUM_RD_REQ must be the same value. NUM_RD_REQ must be greater than or equal to NUM_RD_BUF.
NUM_RD_BUF	Number of Read Data Buffers	4, 16, 24, 32, 64, 96, 128, or 256 (24)	A value greater than 64 instantiates RAM for data buffer.
AXDATAPOISON_EN	Data poison enable on AXI/ACE-Lite interface	0 or 1 (0)	-
FORCE_RDB_PREALLOC	Force Read Data Buffer pre-allocation.	0 or 1 (0)	-

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Table 1-11 Configurable options for HN-F devices

Parameter	Description	Values (Default)	Comments
SLC_SIZE	Size of system cache	0KB, 128KB, 256KB, 512KB, 1MB, 2MB, 3MB, or 4MB (2MB)	-
SF_SIZE	Size of SF Tag RAM	512KB, 1MB, 2MB, 4MB, or 8MB (4MB)	-
SLC_TAG_RAM_LATENCY	Latency of system cache Tag RAM	1-3 cycles (2)	Valid Tag:Data RAM latency combinations: • 1:2 • 2:2 • 3:3
SLC_DATA_RAM_LATENCY	Latency of system cache Data RAM	2-3 cycles (2)	
NUM_ENTRIES_POCQ	Number of entries in the POCQ tracker	32 or 64 (32)	-

Table 1-12 Configurable options for HN-I and HN-D devices

Parameter	Description	Values (Default)	Comments
NUM_AXI_REQS	Number of Request Tracker entries	8, 32, or 64 (32)	-
AXDATA_WIDTH	Data width on AXI/ACE-Lite interface	128 or 256 (128)	-
AXDATAPOISON_EN	Data poison enable on AXI/ACE-Lite interface	0 or 1 (1)	-
DVM_V8_1_EN	Enable Armv8.1-A DVMs.	0 or 1 (1)	Applies to HN-D devices only.

Table 1-13 Configurable options for SBSX devices

Parameter	Description	Values (Default)	Comments
AXDATA_WIDTH	Data width on ACE-Lite/AXI interface	128 or 256 (128)	-
AXDATAPOISON_EN	Data poison enable on ACE-Lite/AXI interface	0 or 1 (1)	-
NUM_DART	Number of Tracker entries	64 or 128 (64)	-
NUM_WR_BUF	Number of write buffers	8 or 16 (8)	-

Table 1-14 Configurable options for CXG devices

Parameter	Description	Values (Default)	Comments
RA_NUM_REQS	Depth of Request Tracker	64, 128, or 256 (256)	The number of outstanding requests that an RA can have. This number should be based on the round-trip latency of a request completing on a remote chip.
RA_NUM_RDBUF	Depth of Read Data Buffer	16, 24, or 32 (16)	The number of CHI read data flits that can be stored in the RA CHI link layer buffer to handle any mesh uploads stalls. For a smaller configuration, the value of 24 is recommended. For a larger configuration, the value of 32 is recommended.
RA_NUM_WRBUF	Depth of Write Data Buffer	16, 24, or 32 (24)	The number is based on the round-trip latency of the DBID to data response on CHI. This number can be based on the size of the mesh.
RA_NUM_SNPREQS	Depth of Snoop Tracker	64, 128, or 256 (128)	The number of outstanding snoop credits that are assigned to remote HAs.

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Table 1-14 Configurable options for CXG devices (continued)

Parameter	Description	Values (Default)	Comments
RA_NUM_SNPBUF	Depth of Snoop Data Buffer	16, 24, or 32 (32)	The number of outstanding CHI snoops to local RN-Fs, including a snoop data buffer per entry.
HA_NUM_REQS	Depth of request tracker	128, 192, or 256 (192)	The number of CCIX request credits that are assigned or given to remote RAs. Also, the number of outstanding CHI requests to local CHI HNs.
HA_NUM_WRBUF	Depth of Write Data Buffer	96 or 128 (96)	The number of CCIX data credits that are assigned or given to remote RAs.
HA_NUM_SNPREQS	Depth of Snoop Tracker. This value indicates the number of outstanding snoop requests that HA can have on CCIX.	96, 128, or 256 (96)	The depth of the Snoop Tracker. The value indicates the number of outstanding snoop requests that an HA can have on CCIX.
HA_NUM_SNPBUF	Depth of Snoop Data Buffer	16, 24, or 32 (24)	The number of CHI snoop data flits that can be stored at the HA CHI link layer buffer to handle any mesh uploads stalls. For a smaller configuration, the value of 24 is recommended. For a larger configuration, the value of 32 is recommended.
HA_SSB_DEPTH	This depth indicates the maximum number of remote snoop requests from the local chip that can be sunk at this HA.	96, 128, or 256 (96)	This value must be greater than or equal to the value of HA_NUM_SNPREQS.
DB_FIFO_DEPTH	FIFO depth in CXLA Domain Bridges (CXDB, PDB)	6 or 8 (8)	-

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1.6 Test features

The CMN-600 product includes several test features.

For information about the test features, see the *Arm® CoreLink™ Coherent Mesh Network Configuration and Integration Manual (CIM)*.

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1.7 Product documentation and design flow

The CMN-600 product manuals support the design flow process.

Documentation

The following documentation supports the CMN-600 product:

Technical Reference Manual

The *Technical Reference Manual* (TRM) describes the functionality, and how functional options affect the behavior of CMN-600. It is required at all stages of the design flow. The choices that you make in the design flow can mean that some behavior that is described in the TRM is not relevant. If you are programming the CMN-600 product, contact:

- The implementer to determine:
  - The build configuration of the implementation
  - What integration, if any, was performed before implementing the CMN-600 product
- The integrator to determine the pin configuration of the device that you are using

Configuration and Integration Manual

The *Configuration and Integration Manual* (CIM) describes how to integrate the CMN-600 product into an SoC. It includes a description of the pins that the integrator must tie off to configure the macrocell for the required integration. The CIM also describes:

- The available build configuration options and related issues in selecting them
- How to configure the *Register Transfer Level* (RTL) with the build configuration options
- How to integrate RAM arrays
- How to run test patterns
- The processes to sign off the configured design

The Arm product deliverables include reference scripts and information about using them to implement your design. Reference methodology flows supplied by Arm are example reference implementations. Contact your EDA vendor for EDA tool support.

User Guide

The *User Guide* describes how to use Socrates Tooling to configure and integrate a custom mesh interconnect.

——— **Note** ———

The User Guide is part of the Socrates Tooling product download bundle.

———————————

Design flow

CMN-600 is delivered as synthesizable RTL. Before it can be used in a product, it must go through the following processes:

Implementation

The implementer configures and synthesizes the RTL to produce a hard macrocell. This process includes integrating RAMs into the design.

Integration

The integrator connects the implemented design into an SoC. This process includes connecting a memory system and peripherals.

Programming

Programming is the last process. The system programmer develops the software that is required to configure and initialize the CMN-600 product, and tests the required application software.

Each process can:

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- Be performed by a different party
- Include implementation and integration choices that affect the behavior and features of the CMN-600 product

The operation of the final device depends on:

Build configuration
The implementer chooses the options that affect how the RTL source files are pre-processed. These options usually include or exclude logic that affects one or more of the area, maximum frequency, and features of the resulting macrocell.

Configuration inputs
The integrator configures some features of the CMN-600 product by tying inputs to specific values. These configurations affect the start-up behavior before any software configuration is made. They can also limit the options available to the software.

Software configuration
The programmer configures the CMN-600 product by programming particular values into registers. The register configuration affects the behavior of the CMN-600 product.

——— **Note** ———

This manual refers to IMPLEMENTATION DEFINED features that are applicable to build configuration options. A reference to a feature that is included means that the appropriate build and pin configuration options are selected. A reference to an enabled feature means one that software has also configured.

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Chapter 2
Functional description

This chapter describes the functionality of the CMN-600 product.

It contains the following sections:

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2.1 Components

CMN-600 is made up of various types of devices, including router modules, CHI nodes, and bridges. The components that you require depend on the requirements of your system and some are optional or only used if certain requirements are met.

CMN-600 can be integrated into a complete SoC system that includes devices that this section does not describe.

This section contains the following subsections:

2.1.1 Crosspoint

The *crosspoint* (XP) is a switch or router logic module. It is the fundamental component building block of the CMN-600 transport mechanism.

The CMN-600 mesh interconnect is built using a set of XP modules. The XP modules are arranged in a two-dimensional rectangular mesh topology. Each XP can connect to up to four neighboring XPs using mesh ports, that are shown as dashed lines in the following figure. Each XP also has two device ports for connecting devices, P0 and P1.

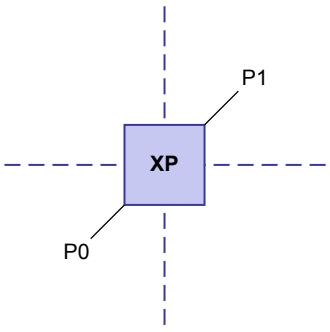

Figure 2-1 Crosspoint

Each XP supports four CHI channels for transporting flits across the mesh from a source device to a destination or target device:

- *Request* (REQ).
- *Response* (RSP).

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- *Snoop* (SNP).
- *Data* (DAT).

The maximum size for the CMN-600 mesh is 64 XPs arranged in an 8 × 8 grid. Each XP in the grid is referenced using an (X,Y) coordinate system. (0,0) represents the bottom-left corner, and a maximum coordinate of (7,7) represents the upper-right corner. The following figure shows the maximum 8 × 8 mesh configuration with some (X,Y) coordinate values.

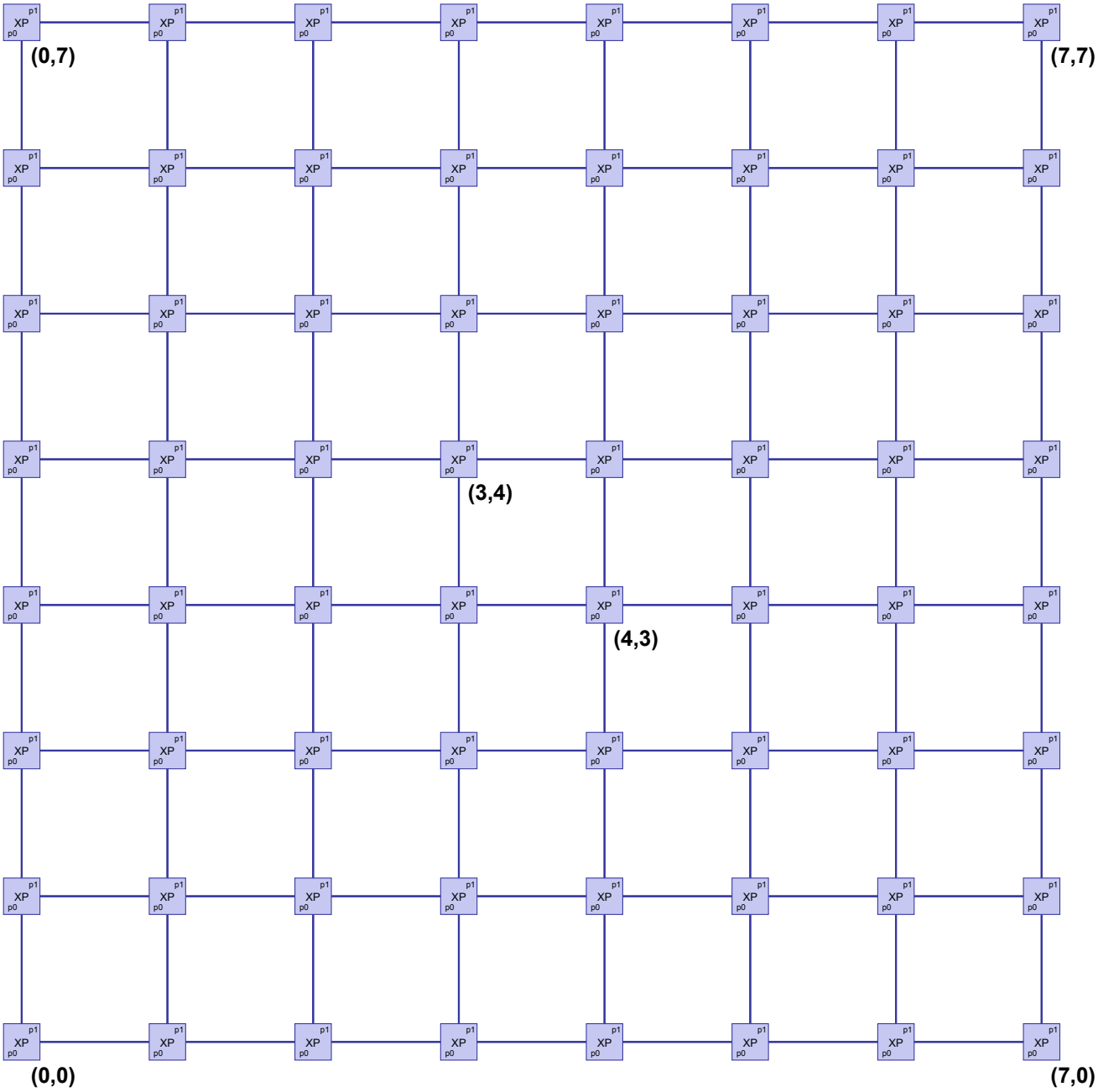

Figure 2-2 8 × 8 maximum mesh configuration

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The following figure shows an example 6 × 6 mesh configuration, with devices attached to XP ports.

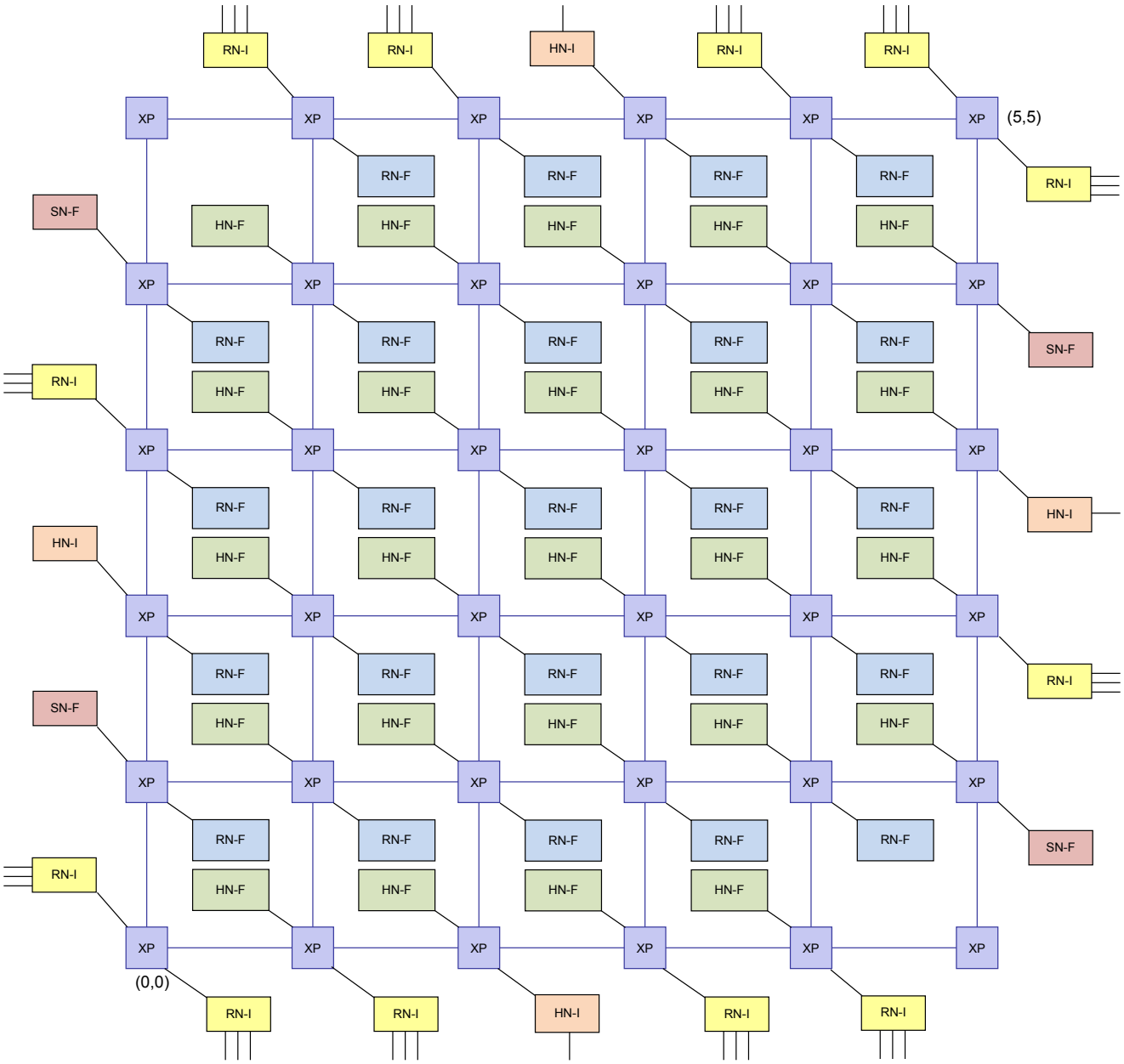

Figure 2-3 Example 6 × 6 mesh configuration

Note

The x and y coordinates of an XP are also known as the XID and YID respectively.

2.1.2 I/O coherent Request Node

The *I/O-coherent Request Node* (RN-I) connects I/O-coherent AMBA masters to the rest of the CMN-600 system.

An RN-I bridge includes three ACE-Lite or ACE-Lite-with-DVM slave ports.

The RN-I bridge can act as a proxy only for masters that do not contain hardware-coherent caches. There is no capability to issue snoop transactions to RN-Is.

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2.1.3 Fully coherent Home Node

The *Fully coherent Home Node* (HN-F) is responsible for managing part of the address space.

The HN-F consists of the following:

System Level Cache (SLC)
The *System Level Cache* (SLC) is a last-level cache. The SLC allocation policy is exclusive for data lines, except where sharing patterns are detected and pseudo-inclusive for code lines, as indicated by the RN-Fs. All code lines can be allocated into the SLC on the initial request.

Combined Point-of-Serialization (PoS) and Point-of-Coherency (PoC)
The combined *Point-of-Serialization* (PoS) and *Point-of-Coherency* (PoC) is responsible for the ordering of all memory requests sent to the HN-F. Ordering includes serialization of multiple outstanding requests and actions to the same line, and request ordering as required by the RN-F.

Snoop Filter (SF)
The *Snoop Filter* (SF) tracks cachelines that are present in the RN-Fs. It reduces snoop traffic in the system by favoring directed snoops over snoop broadcasts when possible. This approach substantially reduces the snoop response traffic that might otherwise be required.

Each HN-F in the system is configured to manage a specific portion of the overall address space.

The entire DRAM space is managed through the combination of all HN-Fs in the system.

Note

The HN-F is architecturally defined to manage only well-behaved memory. Well-behaved memory refers to memory without any possible side effects. The HN-F includes microarchitectural optimizations to exploit this architectural guarantee.

2.1.4 I/O coherent Home Node

The *I/O coherent Home Node* (HN-I) is a Home Node for all CHI transactions targeting AMBA slave devices.

The HN-I acts as a proxy for all the RNs of CMN-600, converting CHI transactions to ACE5-Lite transactions. The HN-I includes support for the correct ordering of Arm device types.

The HN-I does not support caching of any data read from or written to the downstream ACE5-Lite I/O slave subsystem. Any cacheable request that is sent to the HN-I does not result in any snoops being sent to RN-Fs in the system. Instead, the request is converted to the appropriate ACE5-Lite read or write command and sent to the downstream ACE5-Lite subsystem.

Caution

If an RN-F caches data that is read from or written to the downstream ACE5-Lite I/O slave subsystem, coherency is not maintained. Any subsequent access to that data reads from or writes to the ACE5-Lite I/O slave subsystem directly, ignoring the cached data.

2.1.5 SBSX

The *AMBA 5 CHI to ACE5-Lite bridge* (SBSX) enables an ACE5-Lite slave device such as a CoreLink DMC-400 Dynamic Memory Controller, to be used in a CMN-600 system.

2.1.6 CXG

A CXG device bridges between CHI and CXS (CCIX port).

A CXG device contains:
- *CCIX Request Agent* (CXRA) proxy and *CCIX Home Agent* (CXHA) proxy functionality.
- *CXS Link Agent* (CXLA) functionality which is external to the CMN-600 hierarchy.

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2.1.7 Configuration node

The *configuration node* (CFG) is co-located with the HN-D node and handles various CMN-600 configuration, control, and monitoring features.

The CFG carries out the following functions:

- Configuration accesses.
- Error reporting and signaling.
- Interrupt generation.
- Centralized debug and PMU support.

The CFG includes the following elements:

- Ports to collect error signals from CHI components within CMN-600.
- A configuration bus which connects to all the nodes to handle internal configuration register reads and writes.

The CFG does not have a dedicated CHI port. It shares a device port with the HN-D node in the mesh.

2.1.8 Power/Clock Control Block

The *Power/Clock Control Block* (PCCB), co-located with the HN-D node, provides separate communication channels. These channels pass information about the power and clock management between the SoC and the network.

The PCCB acts as an aggregator to convey information between the SoC and the other CMN-600 components, in the following manner:

1. The PCCB receives transaction activity indicators from other relevant CMN-600 components and conveys that information to the external power and clock control units.
2. The PCCB receives power or clock control management requests from the external power or clock control units. Where applicable, it conveys that request to the relevant CMN-600 components.
3. The PCCB waits for the appropriate responses from the relevant CMN-600 components, and conveys an aggregated response to the external power and clock control units.

The PCCB does not have a dedicated CHI port. It shares a device port with the HN-D node in the mesh.

2.1.9 System Address Map

All CHI commands must include a fully resolved network address. The address must include a source and target ID. Target IDs are acquired by passing a request address through a *System Address Map* (SAM). The SAM effectively maps a memory or I/O address to the target device.

The SAM functionality is required for each requesting device. The SAM consists of two logical units:

RN SAM Allows each RN to map addresses to HN-F, HN-I, HN-D, and HN-T target IDs. The RN SAM supports generation of *Memory Controller* (MC) target IDs, which can be used to issue PrefetchTgt operations from the RN directly to the MC.

HN-F SAM Maps addresses to MC target IDs.

CMN-600 has software-configurable SAM blocks which allow a single implementation of CMN-600 to support programmable mappings of addresses to HNs and SNs.

The SAM functionality is required for each requesting device.

2.1.10 Debug and Trace Controller

The *Debug and Trace Controller* (DTC) controls distributed *Debug and Trace Monitors* (DTM) and generates time stamped trace using the ATB interface.

The DTC performs the following functions:

- Generates event or PMU-based interrupts.
- Receives packets from DTM and packs them into ATB format trace.
- Time stamps trace with SoC timer input.

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- Generates alignment sync for the ATB trace output.
- Handles ATB flush requests.
- Handles debug and Secure debug external requests.
- Provides a consistent view of distributed and central PMU counters.
- Handles PMU snapshot requests.
- Generates interrupt **INTREQPMU** assertion on overflow of PMU counters.

2.1.11 QoS regulator

CMN-600 supports end-to-end *Quality-of-Service* (QoS) which guarantees using QoS mechanisms that are distributed throughout the system.

The QoS provision uses the QoS field in each RN request packet to influence arbitration priority at every QoS decision point. The QoS field is then propagated through all secondary packets issued by a request packet. RNs must either:

- Self-modulate their QoS priority depending on how well their respective QoS requirements are met.
- Use the integrated QoS regulators at ingress points to CMN-600.

It is possible to include non-QoS-aware devices in the system, but still have these devices meet the QoS modulation requirement of the QoS architecture. To meet this requirement, CMN-600 includes inline regulators that perform the QoS functionality without the requesting device requiring any awareness of QoS. A *QoS Regulator* (QR) provides an interstitial layer between an RN and the interconnect. The QR monitors how the bandwidth and latency requirements of the RN are met, and does in-line replacement of the RN-provided QoS field. The QR adjusts the QoS field upwards for higher priority in the system and downwards for lower priority.

2.1.12 Component Aggregation Layer

The *Component Aggregation Layer* (CAL) allows up to two RNF_CHIB, RNF_CHIB_ESAM, or HNF devices to be connected to a device port on the XP.

Both devices must be of the same type and must be configured identically. Additionally, CAL must be used consistently across all devices of the same type in the interconnect. For example, if an HN-F requires a CAL, then all HN-F instances in the interconnect must be connected to the XP using a CAL.

The following figure shows a sample CAL configuration.

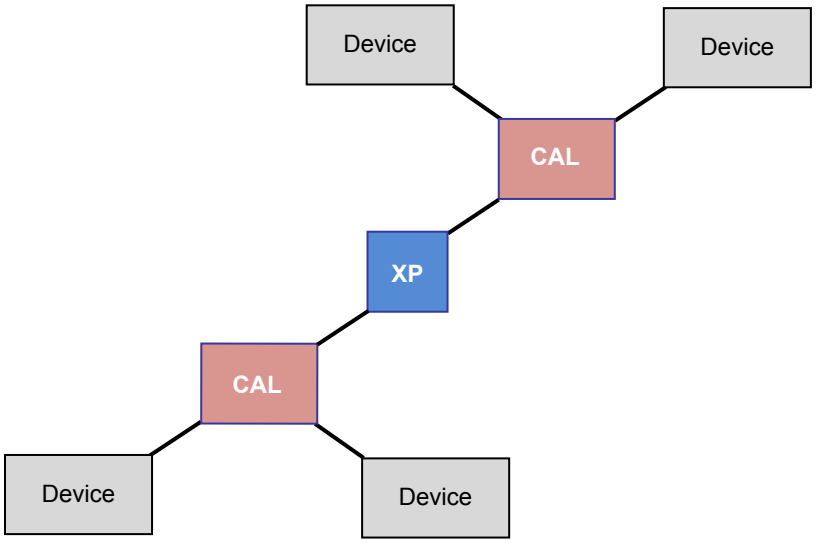

Figure 2-4 CAL sample configuration

2.1.13 Credited Slices

You can configure various optional credited register slices in your CMN-600 system. These Credited Slices can help with timing closure.

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Credited Slices enable synchronous but higher latency communication at any point in the system.

CMN-600 includes the following optional Credited Slices:

Mesh Credited Slice
Placed between XPs. For more information, see *2.1.14 Mesh Credited Slice* on page 2-42.

Device Credited Slice
Placed between a device and a CAL, or a device and an XP. For more information, see *2.1.15 Device Credited Slice* on page 2-42.

CAL Credited Slice
Placed between a CAL and an XP. For more information, see *2.1.16 CAL Credited Slice* on page 2-43.

The slices are simple repeater-flop structures that are applied across the entire communication boundary. The supported number of Credited Slices of each type is specified in *1.5.3 Device placement and configuration* on page 1-26.

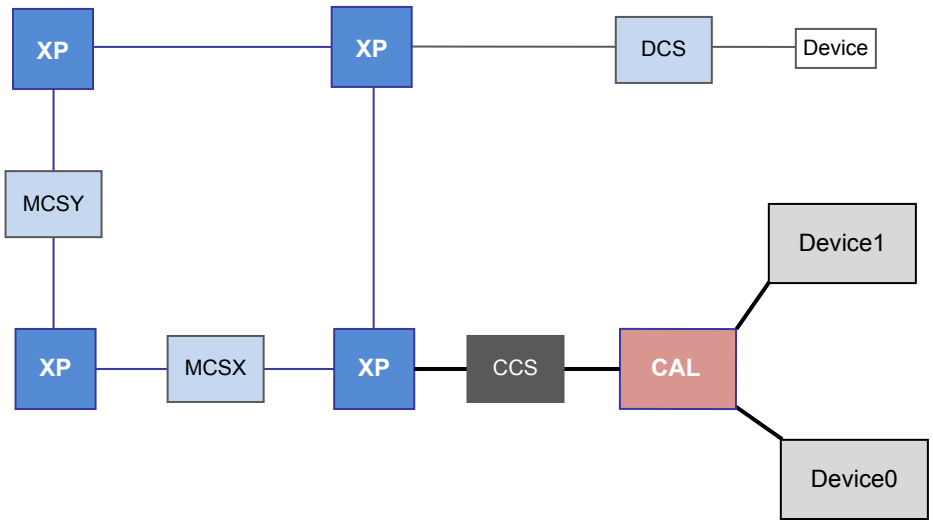

Figure 2-5 Example MSCX, MSCY, CCS, and DCS configuration

The following figure shows a full mesh and device topology with MCS and DCS.

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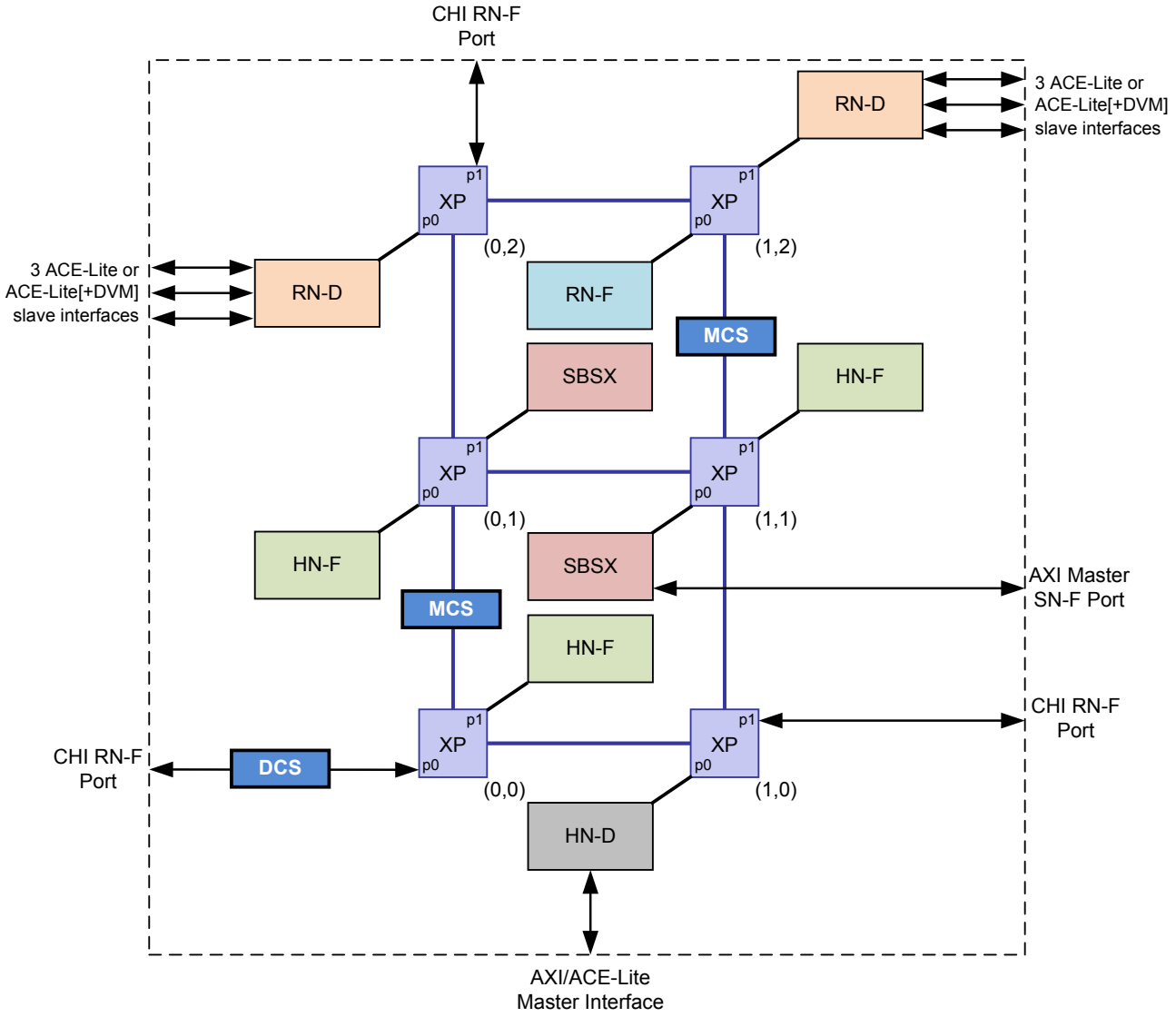

Figure 2-6 CMN-600 system with MCS and DCS

2.1.14 Mesh Credited Slice

You can configure one or more *Mesh Credited Slices* (MCSs) between CMN-600 XPs. MCSs are optional register slices that can help timing closure in a CMN-600 system.

The CMN-600 mesh can operate with a single cycle of latency between XPs. However, depending on the fabrication process and the distance between XPs, a single-cycle XP-XP connection might limit frequency. In this case, one or more MCSs can be added to lengthen the XP-XP links. Register slices add link transfer latency, but also allow certain CMN-600 implementations to run at higher frequencies.

Each MCS on an XP-XP link adds an extra cycle between XPs. One to four MCSs can be added to any link between XPs.

An MCS that is placed between adjacent XPs in the same row is called an MCSX. Similarly, an MCS that is placed between adjacent XPs in the same column is called an MCSY.

2.1.15 Device Credited Slice

You can configure one or more *Device Credited Slices* (DCSs) on a link between a device and an XP. DCSs help with timing closure in a CMN-600 system.

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DCSs are optional register slices that you can add to your CMN-600 configuration. You can add up to four DCSs on any link between a device and an XP.

2.1.16 CAL Credited Slice

You can configure up to two CCSs on the link between a CAL and an XP.

——— **Restriction** ———

When CCS is used, the number of DCSs on the upstream link between the device and the CAL is limited to a maximum of two.

———————————

2.1.17 CHI Domain Bridge

The *CHI Domain Bridge* (CDB) bridges two CHI interfaces that operate in two different clock domains, power/voltage domains, or both.

For more information about the CDB, see the *Arm® CoreLink™ Coherent Mesh Network Configuration and Integration Manual (CIM)*, which is only available to licensees.

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2.2 System configurations

You can configure CMN-600 to meet system requirements.

The following figure shows a 1 × 3 mesh for a small system configuration that contains single instances of RN-F, HN-F, RN-D, SN-F, and HN-D.

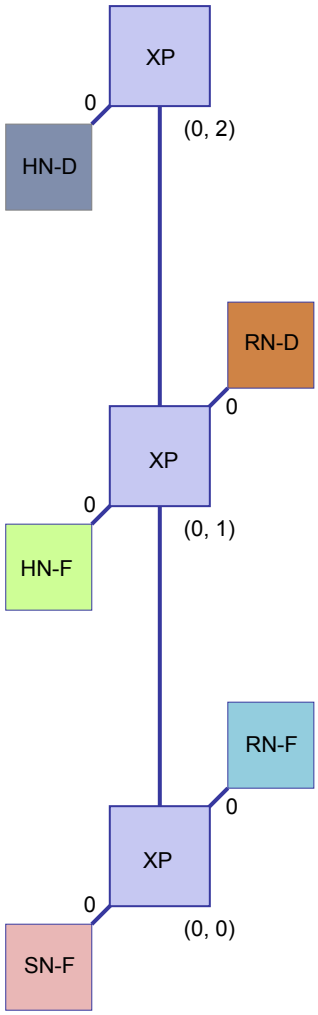

Figure 2-7 Mesh example 1 × 3

The following figure shows a 4 × 2 mesh for a medium system configuration with single and multiple instances of RN-F, HN-F, RN-D, SN-F, and HN-D.

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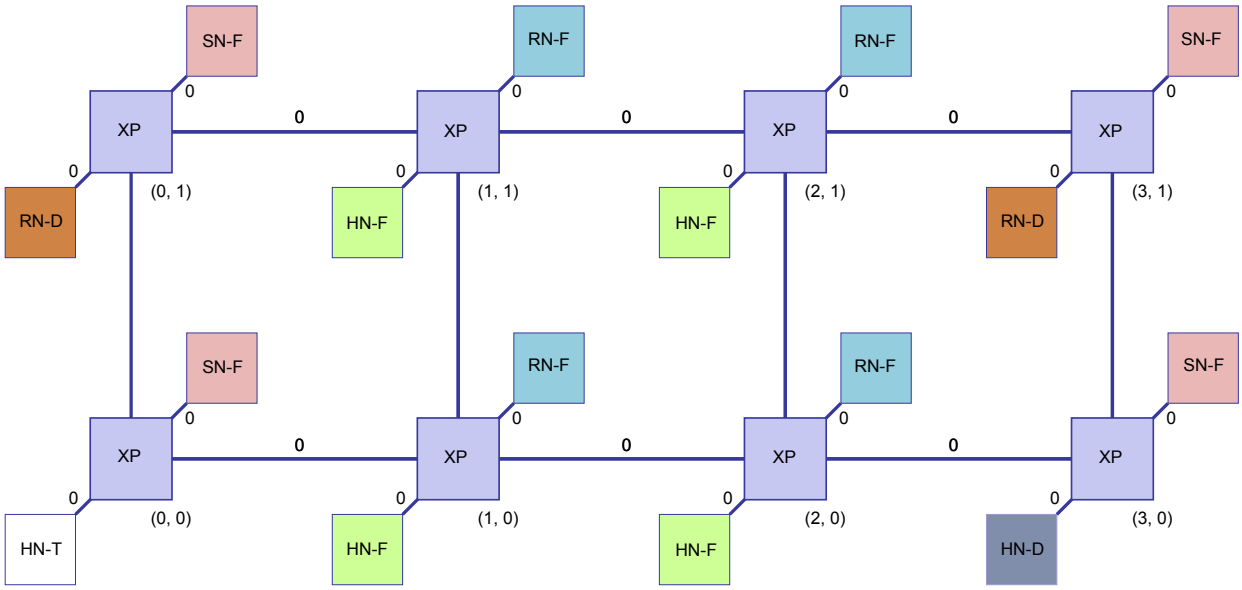

Figure 2-8 Mesh example 4 × 2

The following figure shows a 3 × 5 mesh for a large system configuration with multiple instances of RN-F, HN-F, RN-D, HN-I, SN-F, and HN-D.

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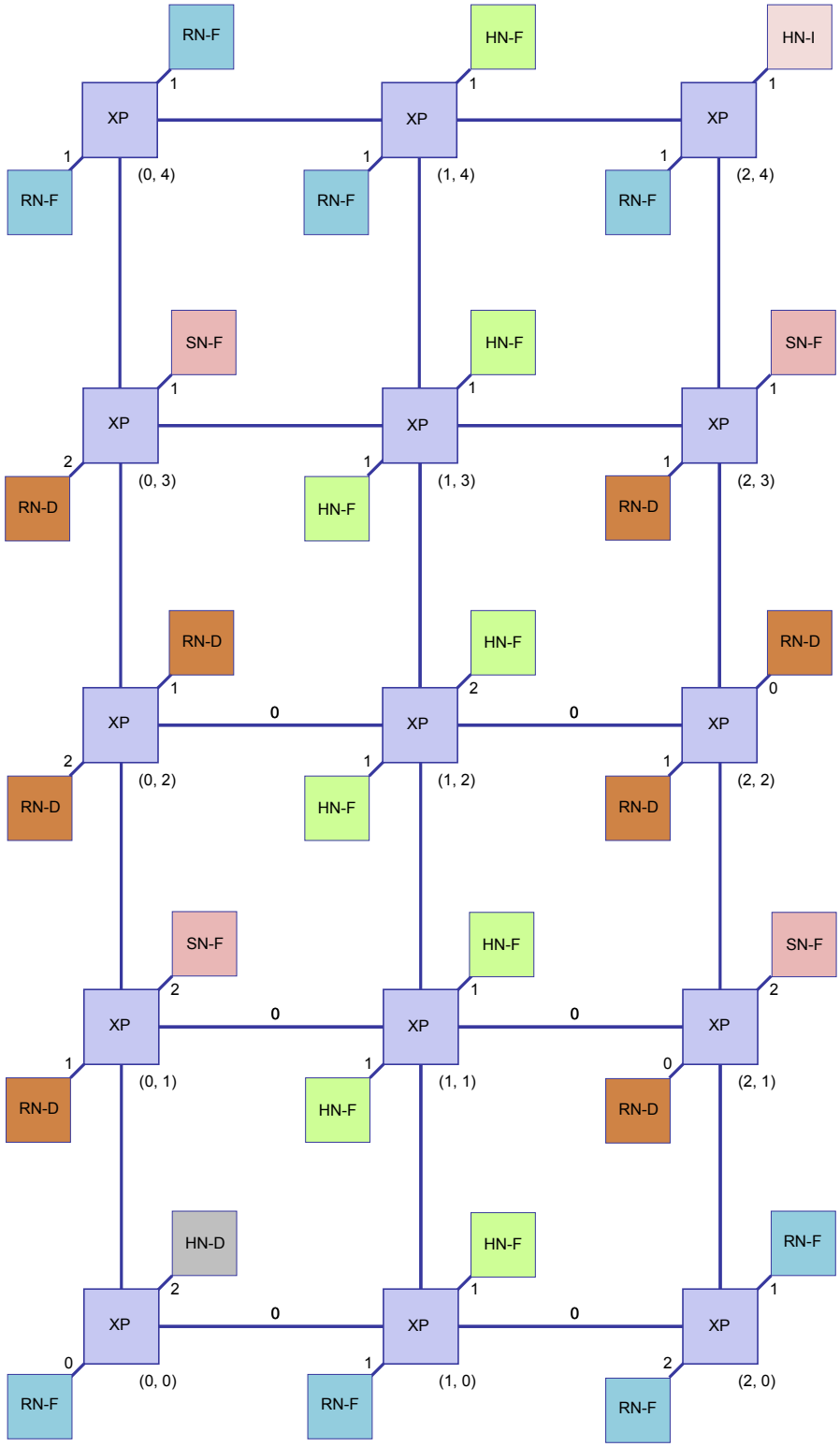

Figure 2-9 Mesh example 3 × 5

The following figure shows a 4 × 2 mesh for a medium system configuration with RN-F and HN-F CAL, shown by the gray areas.

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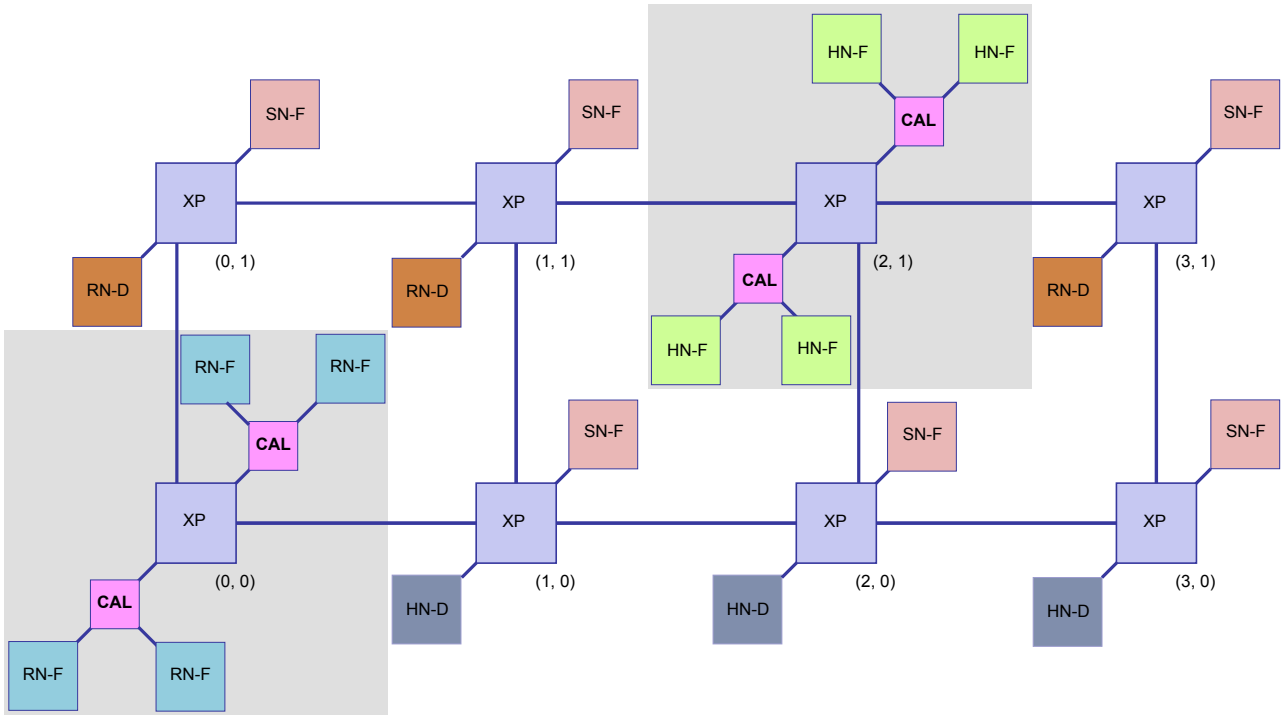

Figure 2-10 Mesh example 4 × 2 with CAL

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2.3 CML system configurations

The CML system configuration examples contain a single CXG instance and a double CXG instance. There are also topology examples that show three simplified CCIX and CML topologies.

This section contains the following subsections:

2.3.1 Example CML system configurations

There are two example CML system configurations included. One example shows a 4 × 2 CML mesh with a single CXG instance, the other example shows a 4 × 2 CML mesh with two CXG instances.

Single CML system configuration

This configuration is an example of a 4 × 2 CML mesh with a single CXG instance.

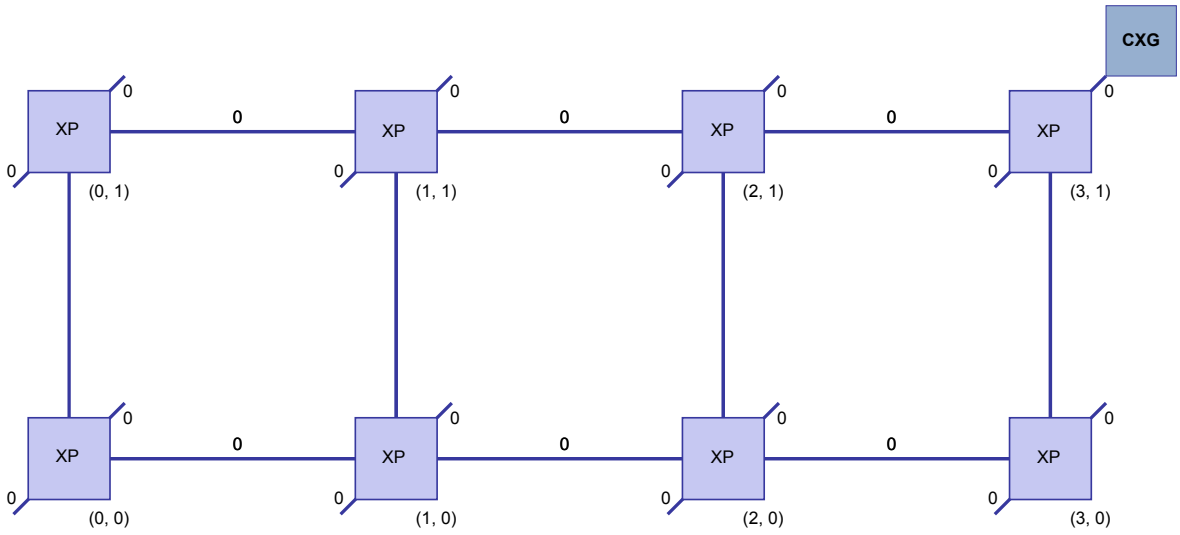

Figure 2-11 4 × 2 single CML mesh example

Double CML system configuration

This configuration is an example of a 4 × 2 CML mesh with two CXG instances.

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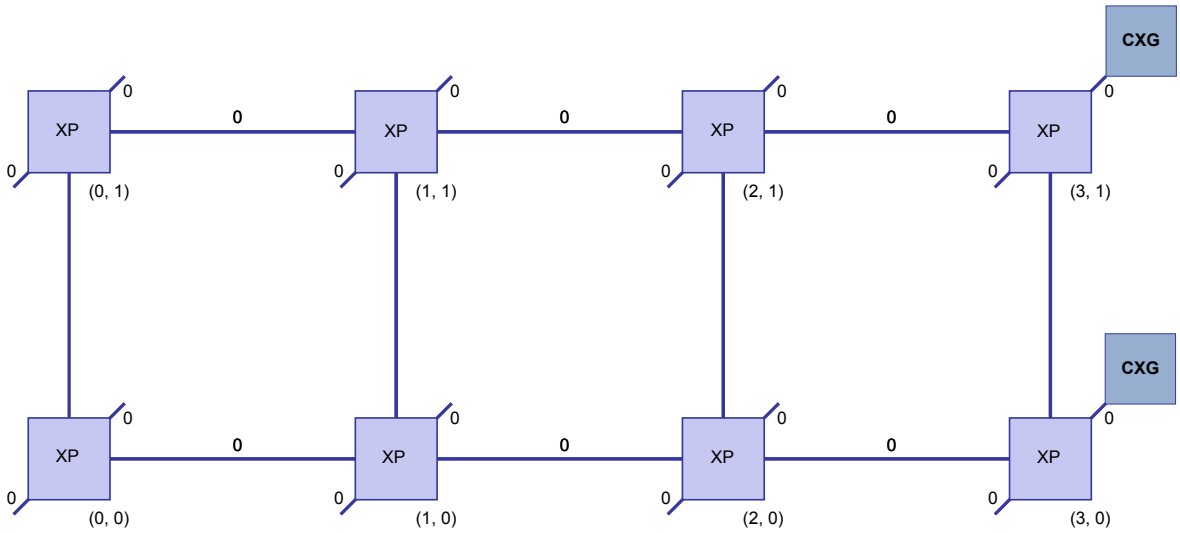

Figure 2-12 4 × 2 double CML mesh example

Related concepts

2.3.2 CCIX topology examples on page 2-49

2.3.2 CCIX topology examples

These example topologies show three simplified CCIX and CML topologies. The topologies reflect a two socket system with single CCIX port connection and port aggregation, and a three socket system with PCIe switch.

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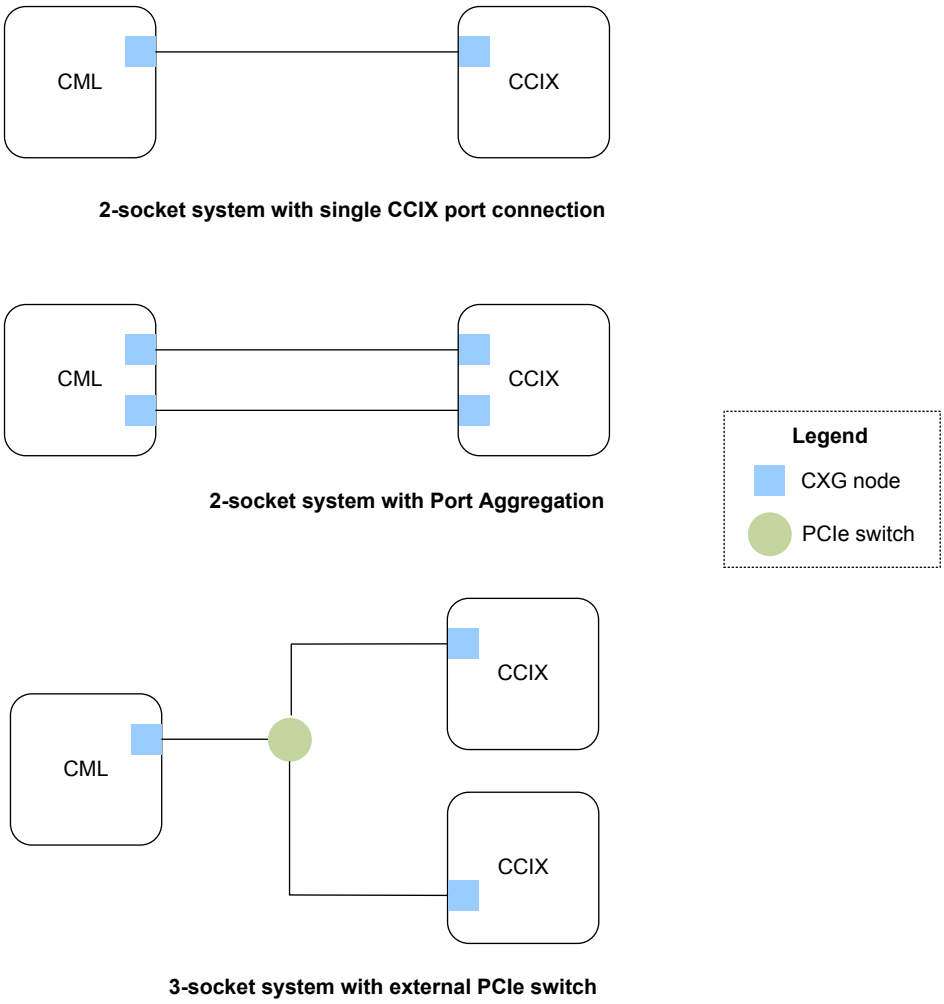

Figure 2-13 CCIX topologies

CXG device components

A CXG device bridges between CHI and CXS, and contains CCIX *Request Agent* (RA) proxy and *Home Agent* (HA) proxy functionality. The CXG device also contains CXS *Link Agent* (LA) functionality, which is external to the CMN-600 hierarchy.

The following figure shows a simple CXG block diagram.

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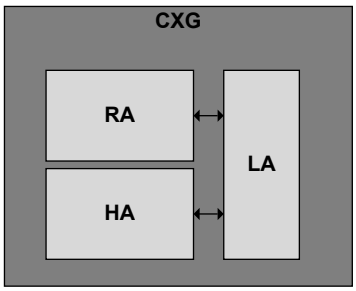

Figure 2-14 CXG block diagram with RA, HA, and LA

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2.4 Node ID mapping

The physical position of a device in the mesh determines the node ID mapping.

The following details determine the physical position of a device in the mesh:

1. The X coordinate of its XP.
2. The Y coordinate of its XP.
3. The XP device port (0 or 1) that it connects to.

The device node ID is mapped to (X, Y, Port, `0b00`).

Note

1. The bit widths of the X and Y parameters depend on the configured size of the mesh.
2. The naming convention for I/O signals uses decimal values of the node ID. For example, `RXREQFLIT_NIDxxx` uses `xxx` values in decimal.

The node ID size depends on the X and Y dimensions of the CMN-600 mesh. The larger of the X and Y dimensions determines the size, as the following table shows.

Table 2-1 Node ID size selection

X mesh dimension	Y mesh dimension	Node ID size
4 or less	4 or less	7 bits
5-8	8 or less	9 bits
8 or less	5-8	

The following tables contain the different node ID formats.

Table 2-2 7-bit node ID format

[6:5]	[4:3]	[2]	[1:0]
X position	Y position	Port	`0b00`

Table 2-3 9-bit node ID format

[8:6]	[5:3]	[2]	[1:0]
X position	Y position	Port	`0b00`

The following figure shows a CMN-600 system with 7-bit node IDs in (X, Y, Port, DeviceID) format.

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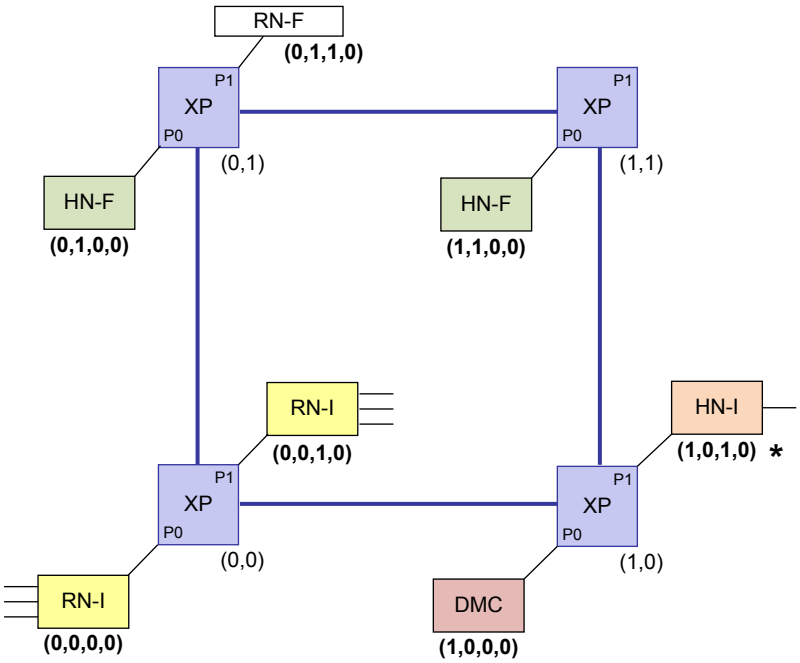

Figure 2-15 Example system with 7-bit node IDs

Example 2-1 7-bit node ID format

For the HN-I connected to XP (1,0), the node ID reads as (1,0,1,0).

This format is equivalent to (`0b01`, `0b00`, `0b1`, `0b00`) or `0x24`.

If CAL is present, the two devices that are connected to the CAL are assigned consecutive node IDs. One device is assigned NodeID[1:0]=`0b00` and the other device is assigned NodeID[1:0]=`0b01`.

The following figure shows a CMN-600 system with CAL and 7-bit node IDs in (X, Y, Port, DeviceID) format.

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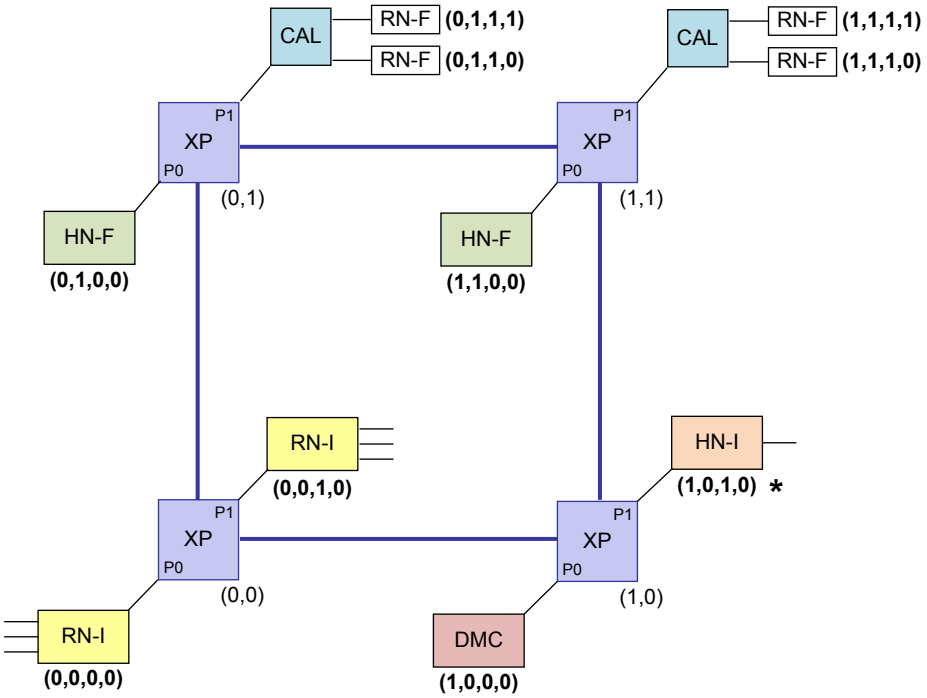

Figure 2-16 Example system with 7-bit node IDs and CAL

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2.5 Discovery

Discovery is a software algorithm that is used to discover the configuration of CMN-600.

Software uses the discovery mechanism to identify:

- The CHI node ID and logical ID corresponding to all node types.

  Note

  The valid logical node types are DVM, Global CFG, DTC, HN-F, HN-I, RN-D, RN SAM, RN-I, SBSX, and XP. There are other node types for extra functionality:

  CML CXRA, CXHA, and CXLA.

- Whether a discovered node is internal or external to CMN-600.

The following figure shows an example configuration. In the example, after discovery, software should have enough information to know the location of the following components:

- Global configuration registers
- Configuration registers for each XP
- Configuration registers for the HN-F
- Configuration registers for the RN SAM corresponding to the RN-F

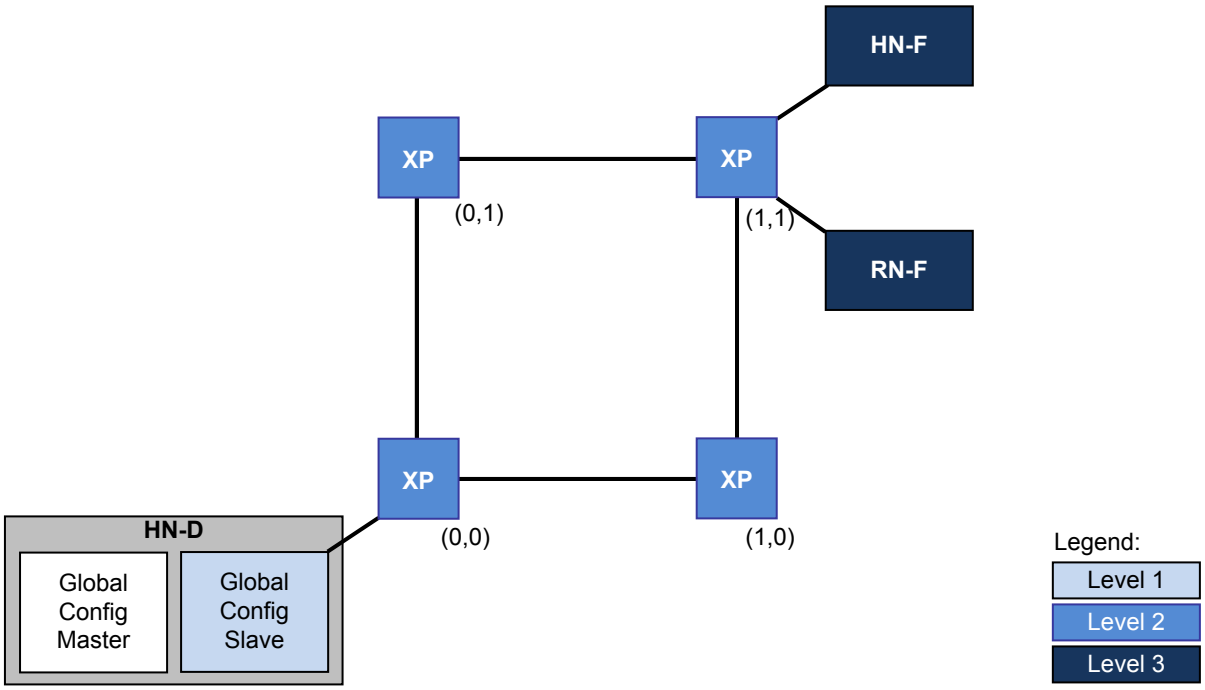

Figure 2-17 2 × 2 register tree example

This section contains the following subsections:

2.5.1 Configuration address space organization

This section contains configuration address space organization information. It describes two system addresses, PERIPHBASE and ROOTNODEBASE, that are required for this process.

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PERIPHBASE

The starting address of the range that all CMN-600 configuration registers are mapped to.
For a system where both the X and Y dimensions are four or less:

- This address should be aligned to 64MB
- The maximum size of the address range is 64MB

For a system where one of the X or Y dimensions is greater than four:

- This address should be aligned to 64MB
- The maximum size of the address range is 64MB

ROOTNODEBASE

The address to the Root Node where the discovery process can start. The configuration registers at ROOTNODEBASE contain global and configuration information, and the first level of discovery information for the system components.

Discovery determines specific addresses for individual system blocks that have IMPLEMENTATION DEFINED register spaces, as the following figure shows.

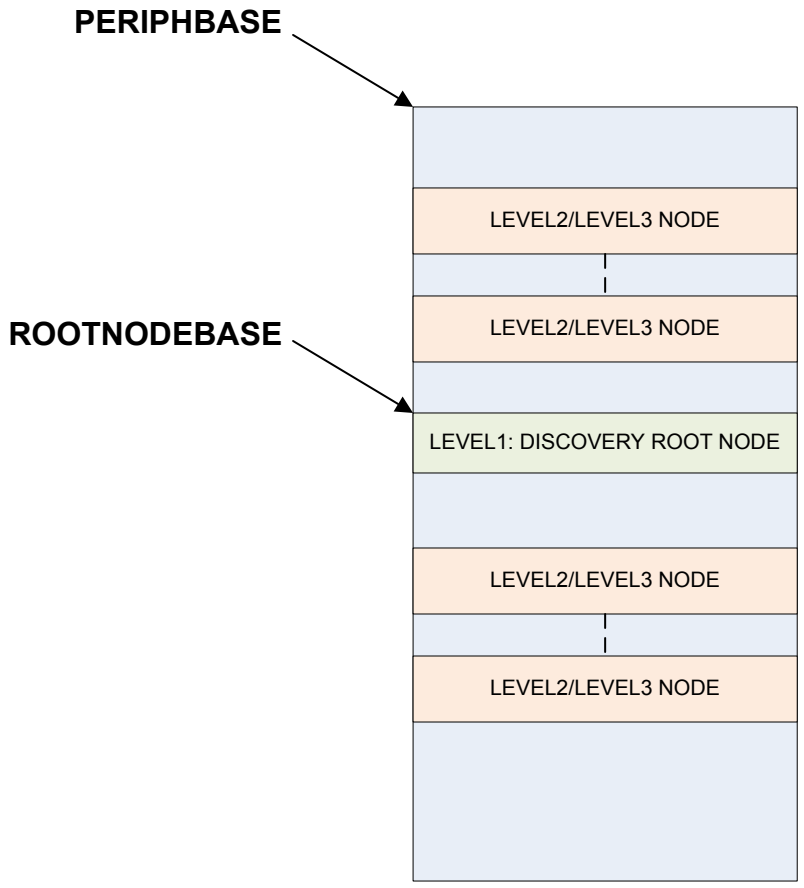

Figure 2-18 PERIPHBASE and ROOTNODEBASE addresses

CMN-600 supports 4B and 8B software-accessible registers. Register organization consists of software using 32b and 64b register reads.

All registers are organized into several register blocks as nodes. A node:

- Is a register block with the size of 16KB
- Is associated with a logical block in the design
- Has implementation-specific information and configuration for that block

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The different types of nodes are:

General Contains device information and has children.

Leaf Contains device information, such as configuration data, but has no children.

Pure hierarchy Has children but contains no device information.

If a node has more than one child, the node provides:

- The number of children
- A pointer to each child

The following figure shows an example for the ROOTNODEBASE structure.

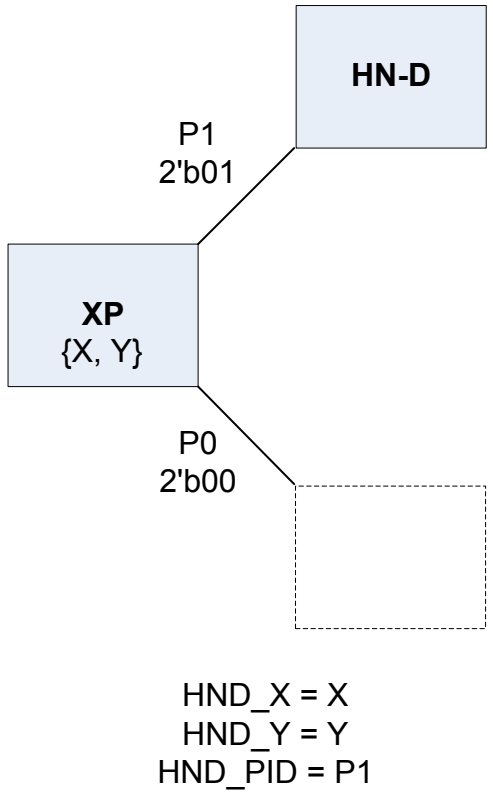

Figure 2-19 ROOTNODEBASE pointer example

The following values define the ROOTNODEBASE structure:

- PERIPHBASE
- 12-bit Root Node Pointer
- Register offset. In this example, the register offset is `14'b0`

The following tables describe the Root Node Pointer for various XID and YID widths.

Table 2-4 Node ID bit assignments for XID_WIDTH and YID_WIDTH values of 2

[11:10]	[9]	[8]	[7]	[6]	[5:2]	[1]	[0]
`0b00`	HND_X[1]	HND_X[0]	HND_Y[1]	HND_Y[0]	`0b0000`	HND_PID[1]	HND_PID[0]

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Table 2-5 Node ID bit assignments for XID_WIDTH and YID_WIDTH values of 3

[11]	[10]	[9]	[8]	[7]	[6]	[5:2]	[1]	[0]
HND_X[2]	HND_X[1]	HND_X[0]	HND_Y[2]	HND_Y[1]	HND_Y[0]	0b0000	HND_PID[1]	HND_PID[0]

2.5.2 Configuration register node structure

Read-only registers that are organized into several register blocks are referred to as nodes.

Nodes are aligned on 8B boundaries (16KB aligned). The required registers are:

Node Information register Identifies the product or node type, and the CHI node ID.

Child Information register Indicates the child count and offset for the first register containing child node pointers. These optional Child Pointer registers each use 8B.

Important

The Node Information and Child Information registers are at fixed offsets for all nodes.

The following figure shows the basic node structure.

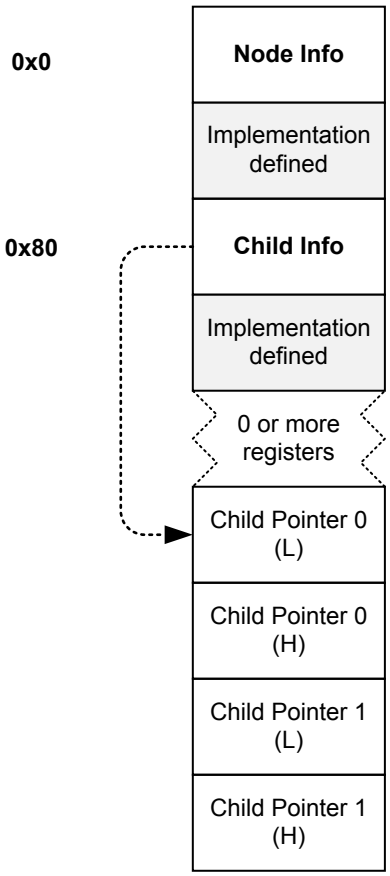

Figure 2-20 Basic node structure

The child_count field of the Child Information register indicates the number of children. This value also represents the number of functional units that are connected to the current unit on the next level of the discovery process.

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The child_ptr_offset field of the Child Information register indicates the Child Pointer 0 register offset, in bytes, from the Node Information register address.

Important

For a leaf node (node with no children), the child_count and child_ptr_offset fields must be set to zero.

The following figure provides the node structure detail.

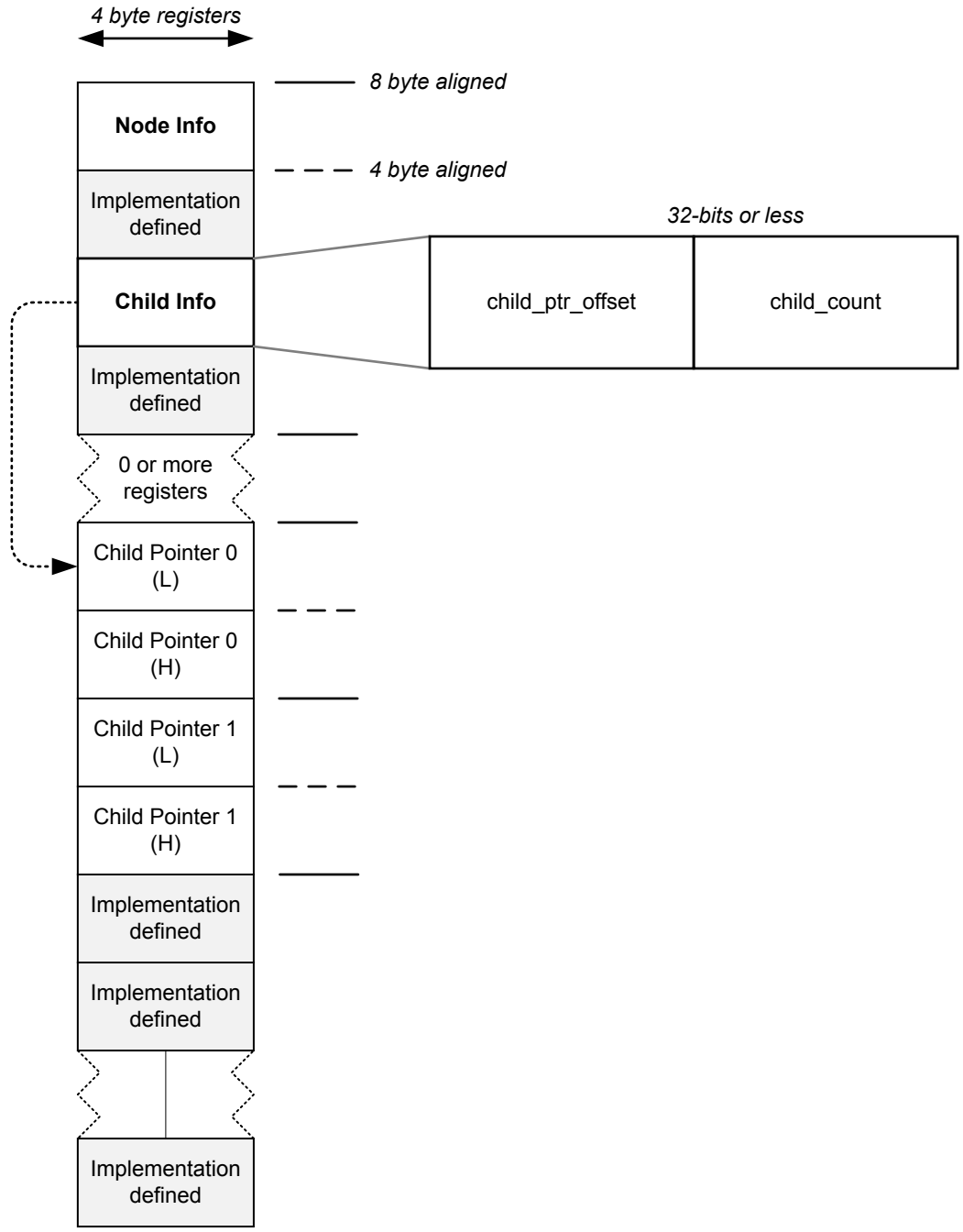

Figure 2-21 Node structure detail

The following table shows the supported node types and the corresponding node_type values in the Node Information register.

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Table 2-6 node_type values

Node type	Value
Invalid	16'h0000
DVM	16'h0001
CFG	16'h0002
DTC	16'h0003
HN-I	16'h0004
HN-F	16'h0005
XP	16'h0006
SBSX	16'h0007
RN-I	16'h000A
RN-D	16'h000D
RN SAM	16'h000F
CXRA	16'h0100
CXHA	16'h0101
CXLA	16'h0102

2.5.3 Child pointers

There is one child pointer register per child node.

The address of the register containing the first child pointer is computed as:

Base node address (of the current 16KB block) + the child_ptr_offset value (from the child_info register).

Each subsequent child pointer register is 8 bytes higher. For more information, see *Figure 2-21 Node structure detail* on page 2-59.

For example:

- Base node address = `0x4000`
- Child_ptr_offset in child info register = `0x100`
- Address of first child pointer register (child pointer 0) = Base node address + child_ptr_offset = `0x4100`
- Address to child pointer 1 = Address of child pointer 0 (`0x4100`) + `0x8` = `0x4108`

Child pointers are 32 bits or less and are contained in the low register. The high register is zero. Child pointer contents include the following:

- The child node address offset from PERIPHBASE, bits [27:0], which is an unsigned integer (positive offset)
- Three reserved bits, bits [30:28]
- An External Child Node indicator, bit 31

For example, address to 16KB block of the child node = PERIPHBASE + child pointer register [27:0].

The child node address offset relative to PERIPHBASE, including Node Pointer and Register Offset values, is held in the Child Pointer register. The following table shows the contents of the Child Pointer register and associated values.

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Table 2-7 Child Pointer register

External Child Node	Reserved	Child node address offset relative to PERIPHBASE	
31	30:28	27:14	13:0
1 = External, 0 = Internal	Not used	NODE POINTER [13:0]	REGISTER OFFSET[13:0]

The External Child Node, bit 31, behaves as follows:

- `1'b1`: Indicates that this CHILD POINTER is pointing to a Config Node external to CMN-600
- `1'b0`: Indicates that this CHILD POINTER is pointing to a Config Node internal to CMN-600

For CMN-600, external child nodes are only used for RN SAM and CXLA Config Node. The software performing the discovery can use two pieces of information:

1. The NODE POINTER information (X, Y, port ID (P0 or P1), device ID (D0, D1, D2, or D3)) to determine the CHI NodeID corresponding to the Config child node in question.
2. When the port (P0 or P1) has been determined using the NODE POINTER information, read the corresponding XP register to determine the device type that is connected to that specific port.
   a. por_mxp_device_port_connect_info_p0
   b. por_mxp_device_port_connect_info_p1

The device type corresponding to that child node helps the discovery software determine if the child node is RN-F, RN SAM, or CXLA. If the device type is CXRH, CXHA, or CXRA, then the external child node is CXLA, as every CXRH, CXHA, or CXRA node has a corresponding external CXLA node. It is the responsibility of the discovery software to ensure that the external child node is powered ON before sending any config accesses to it.

The NODE POINTER, bits [27:14], is processed as follows:

- If External Child Node is set to 1, then software can use the information in the NODE POINTER to extract the X dimension, Y dimension, port ID, and device ID corresponding to that Child Node.

The REGISTER OFFSET, bits [13:0], is always 0.

Depending on the size of the mesh (X and Y dimensions), CMN-600 supports two different widths for encoding the X and Y dimension. The number of bits that is required is selected based on the larger of the X and Y values.

Table 2-8 Mesh size and encoding bits

Mesh width in X dimension	Mesh width in Y dimension	Number of bits used to encode X, Y
$X \leq 4$	$Y \leq 4$	2 bits for X, 2 bits for Y
$4 < X \leq 8$	$Y \leq 8$	3 bits for X, 3 bits for Y
$X \leq 8$	$4 < Y \leq 8$	3 bits for X, 3 bits for Y

For mesh widths using two bits each for X,Y encoding, the details of the NODE POINTER structure are provided in the following table.

Table 2-9 Mesh widths using 2 encoding bits

NODE POINTER: XID_WIDTH and YID_WIDTH = 2					
[13:10]	[9]	[8]	[7]	[6]	[5:0]
`4'b0`	XID[1]	XID[0]	YID[1]	YID[0]	DeviceID

Mapping between NODE POINTER and CMN-600 NodeID for that processor or cluster:

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- NODE POINTER[0] = NodeID[2]
- NODE POINTER[1] = `1'b0`
- NODE POINTER[3:2] = NodeID[1:0]
- NODE POINTER[5:4] = `2'b00`
- NODE POINTER[7:6] = NodeID[4:3]
- NODE POINTER[9:8] = NodeID[6:5]

Note

If an AXI4-Stream interface is present on an RN-F device, NODE POINTER[5:4] takes the value `2'b11`. This only applies to non-ESAM RN-Fs.

For mesh widths using three bits each for X,Y encoding, the details of the NODE POINTER structure are provided in the following table.

Table 2-10 Mesh widths using three encoding bits

NODE POINTER: XID_WIDTH and YID_WIDTH = 3							
[13:12]	[11]	[10]	[9]	[8]	[7]	[6]	[5:0]
`2'b0`	XID[2]	XID[1]	XID[0]	YID[2]	YID[1]	YID[0]	DeviceID

Mapping between NODE POINTER and CMN-600 NodeID for that processor or cluster:
- NODE POINTER[0] = NodeID[2]
- NODE POINTER[1] = `1'b0`
- NODE POINTER[3:2] = NodeID[1:0]
- NODE POINTER[5:4] = `2'b00`
- NODE POINTER[8:6] = NodeID[5:3]
- NODE POINTER[11:9] = NodeID[8:6]

Note

If an AXI4-Stream interface is present on an RN-F device, NODE POINTER[5:4] takes the value `2'b11`. This only applies to non-ESAM RN-Fs.

The following figure shows a sample design for child pointers.

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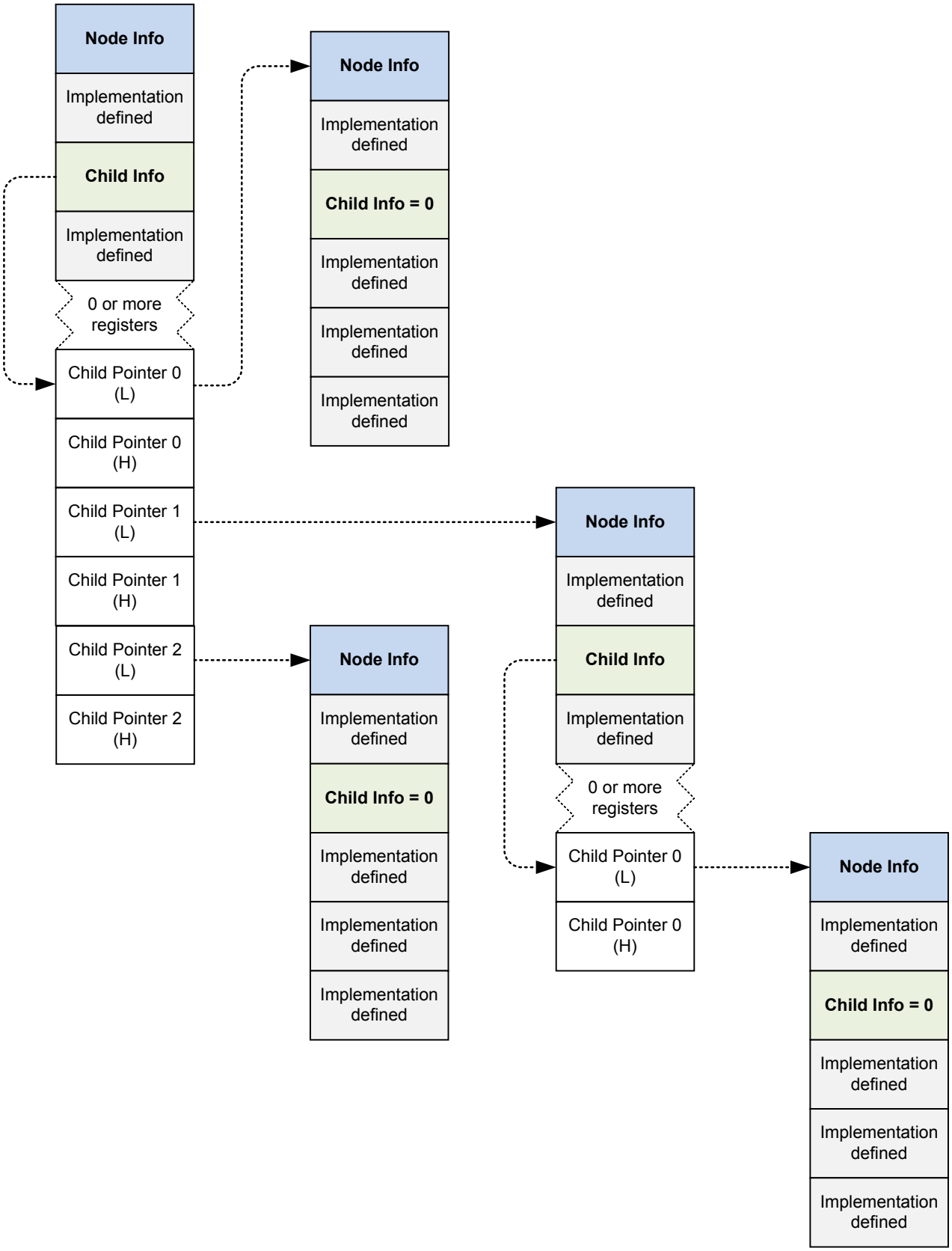

Figure 2-22 Child pointers

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2.5.4 Discovery tree structure

The one-time discovery process creates a lookup table that contains the addresses for all CMN-600 configured devices.

The discovery tree structure consists of three levels:

Level 1 Root Node, or the HN-D containing the Global Configuration Slave.

Level 2 XP layer.

Level 3 Leaf layer with one or two devices.

The following figure shows a 2 × 2 mesh configuration example with highlighted discovery tree levels.

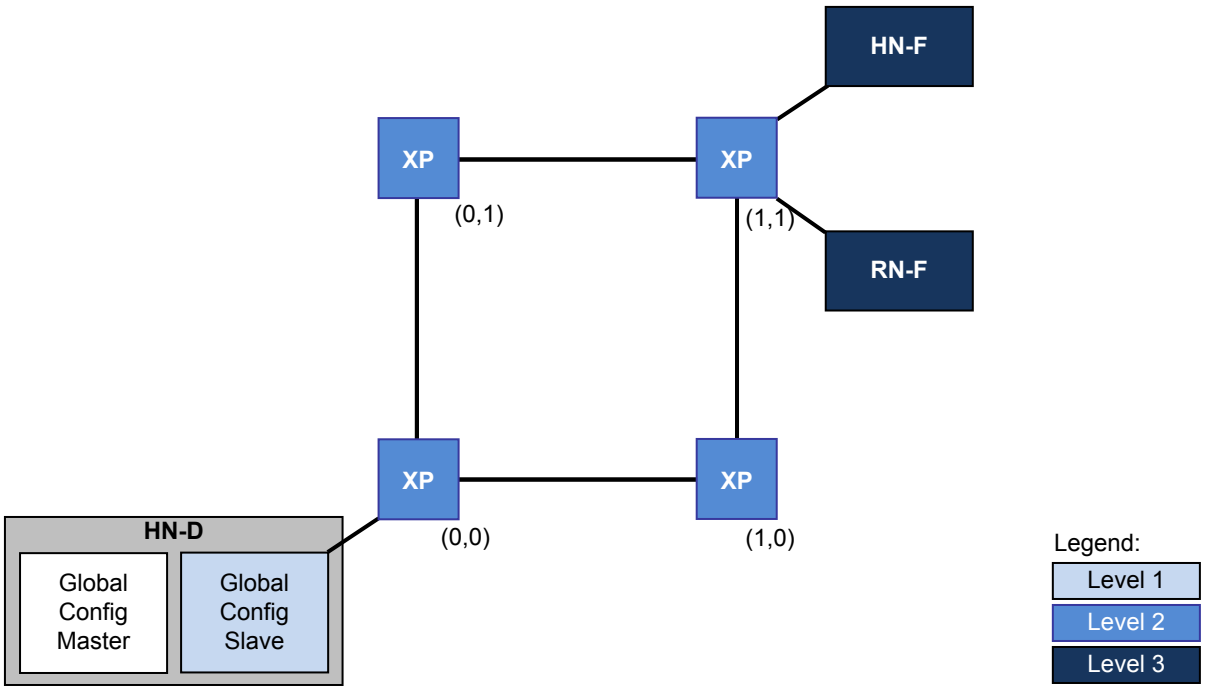

Figure 2-23 2 × 2 discovery tree example

The following figure shows the discovery tree structure for this 2 × 2 mesh configuration.

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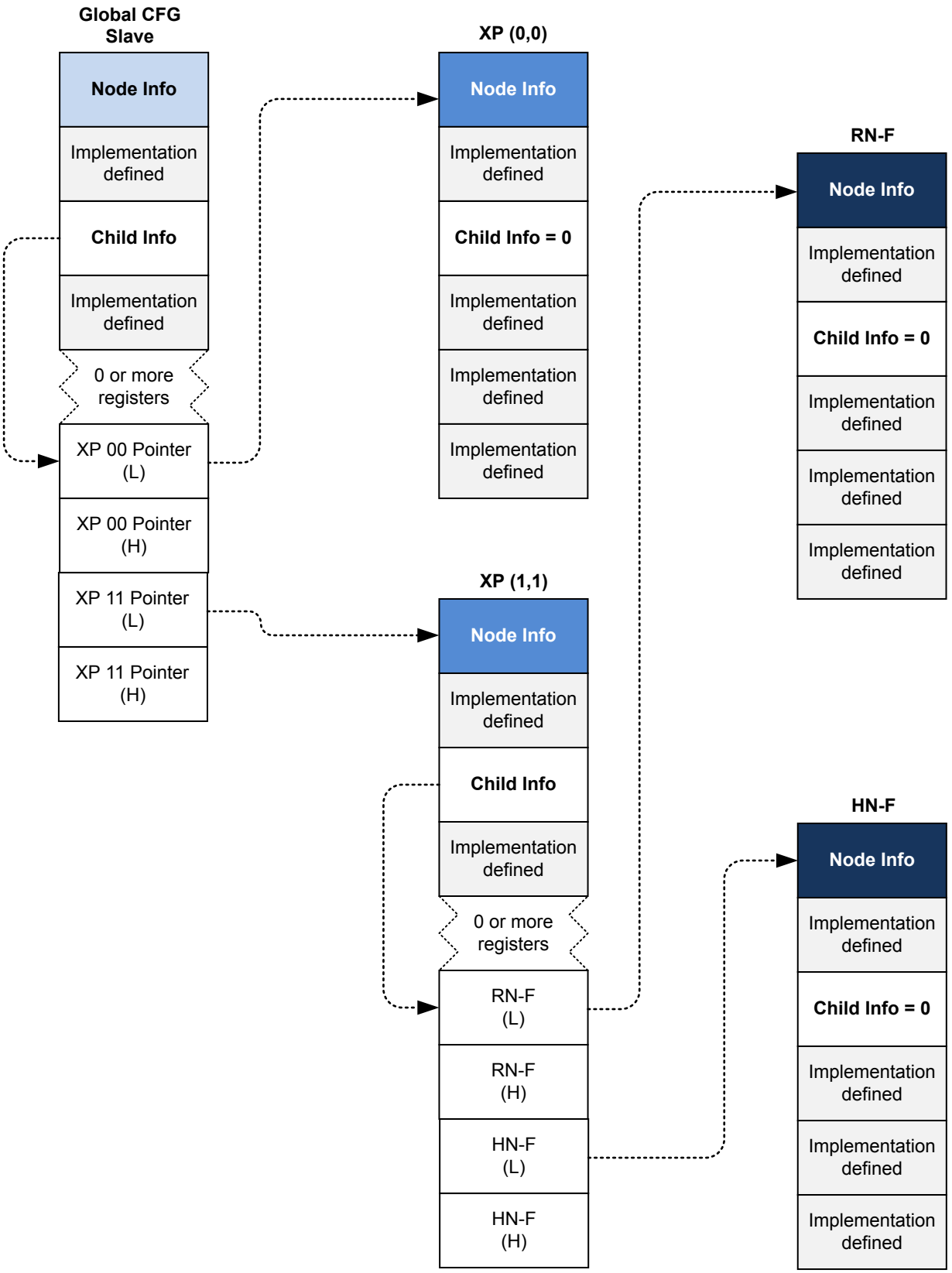

Figure 2-24 2 × 2 discovery tree structure

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2.6 Addressing capabilities

CMN-600 supports a 34-bit, 44-bit, or 48-bit physical address width. This width defines the physical address space for which read and write transactions are supported in the interconnect. Socrates System Builder configures these settings and creates the `PA_WIDTH` global parameter in the CMN-600 RTL.

CHI interfaces in CMN-600 support 44-bit and 48-bit address field widths for flits on the REQ channel. Socrates System Builder also configures these settings and creates the `REQ_ADDR_WIDTH` global parameter in the CMN-600 RTL.

The address field width for flits on the SNP channel is derived automatically based on the `REQ_ADDR_WIDTH` global parameter.

The following table shows the legal combinations of physical address widths and flit address widths.

Table 2-11 Legal combinations of physical address and flit address widths

Physical address width	REQ flit address width	SNP flit address width (derived)
34-bits	44-bits	41-bits
	48-bits	45-bits
44-bits	44-bits	41-bits
	48-bits	45-bits
48-bits	48-bits	45-bits

The minimum PA width that CCIX supports is 48 bits. If CMN-600 has a `PA_WIDTH` of less than 48-bits, then in a CML system with non-CMN-600 CCIX components, there is a mismatch between address widths. This mismatch means that the upper address bits of a CCIX request or snoop from a remote CCIX component might be truncated in CMN-600. For example, in this kind of system, bits [47:34] or [47:44] might be truncated in CMN-600. To prevent this truncation, software must ensure that non-CMN-600 CCIX components do not present requests and snoops with addresses higher than the CMN-600 `PA_WIDTH` to CMN-600.

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2.7 Atomics

CMN-600 supports atomic accesses to both cacheable and non-cacheable memory locations.

This section contains the following subsections:

2.7.1 Atomic requests in HN-F

The HN-F completes all CHI atomic requests that it receives, both for Cacheable and Non-cacheable transactions.

For Cacheable transactions, the HN-F completes any appropriate coherent actions and, if necessary, obtains the targeted cache line from memory. The HN-F then completes the required atomic operation and issues the appropriate response, with or without data.

For Non-cacheable transactions, the HN-F does not send an atomic request to the SN. As the final PoS/PoC for all memory traffic, the HN-F is able to process the transaction in the following way:

1. Issue a read to the SN
2. Atomically update the copy of the data in the HN-F
3. Write back the result to the SN

This approach means that the SN never receives CHI atomic requests, as the HN-F completely handles the requests.

2.7.2 Atomic requests in SN

The SN node (CHI memory controller or SBSX bridge) does not process atomic requests.

2.7.3 Atomic requests in HN-I

The HN-I does not complete atomic transactions.

On receiving an atomic request, the HN-I generates an appropriate error response to the originating master.

2.7.4 Atomic requests in RN-I and RN-D

RN-I and RN-D support atomic transactions in CMN-600. These nodes can receive atomics from ACE5-Lite and AXI5 masters, and translate them on CHI before sending them to HN-F, HN-I, or CXRH nodes.

RN-I and RN-D atomic support is only present in CMN-600 r3 version.

Atomics and write transactions share a write tracker for processing in RN-I and RN-D.

Note

For atomic transactions arriving at RN-I and RN-D from ACE5-Lite and AXI5 masters, all write strobes within **AWSIZE** must be set. RN-I and RN-D do not allow sparse write strobes for atomic transactions.

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2.8 Exclusive accesses

CMN-600 supports exclusive accesses to both Shareable and Non-shareable locations.

For more information, see the *Arm® AMBA® 5 CHI Architecture Specification*.

This section contains the following subsections:

2.8.1 Exclusive accesses in HN-F

The HN-F supports exclusive access on ReadNoSnp, WriteNoSnp, ReadShared, ReadClean, ReadNotSharedDirty, and CleanUnique transactions to any address that maps to the HN-F.

RNs generate ReadNoSnp and WriteNoSnp Exclusives for memory locations that are marked Non-cacheable or Device. ReadShared, ReadClean, ReadNotSharedDirty, and CleanUnique exclusives are used for shareable and coherent memory locations. Each HN-F partition includes 64 exclusive monitors for tracking of these transaction types. Each monitor can act as both a PoC monitor and System monitor, as the *Arm® AMBA® 5 CHI Architecture Specification* defines.

Only 64 unique logical threads, which are designated by a unique combination of SrcID and LPID, can concurrently access the HN-F exclusive monitors.

2.8.2 Exclusive accesses in HN-I

HN-Is support exclusive access on ReadNoSnp and WriteNoSnp transactions to any address that maps to an HN-I.

Each HN-I partition includes 32 exclusive monitors as defined in the *Arm® AMBA® 5 CHI Architecture Specification* for tracking of these transaction types. Only 32 unique logical threads can concurrently access the HN-I system exclusive monitors. These threads can be either processor or device threads, and are designated by a unique combination of SrcID and LPID.

All exclusives targeting the HN-I are terminated at the HN-I and are not propagated downstream. Exclusives are terminated regardless of the value of the HN-I PoS control register and auxiliary control register.

2.8.3 CML support for exclusive accesses

In the SMP mode, CMN-600 CML supports remote exclusive accesses from RN-Fs.

Constraints include:

- Remote exclusive accesses from an RN-I or RN-D are not supported
- Remote exclusive accesses targeting with an HN-I or HN-D is not supported

Support for remote exclusive accesses in *CCIX Gateway* (CXG) blocks include these constraints:

- CXRA in local CXG block passes Excl and LPID fields of incoming CHI request on CCIX request message USER (Ext) field
- CXHA in the remote CCIX gateway (CXG) block extracts these bits from CCIX request message USER (Ext) field. CXHA then sends these bits on respective CHI Excl and LPID fields. CXHA sets the source type as RN-F based on its RAID to LDID register.
- Exclusive OK (EXOK) response is sent as `0b01` on CCIX RespErr field

Note

`0b01` is a reserved encoding in RespErr field and this field is sent as a CCIX extension (Ext6).

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HN-Fs monitor exclusives from remote RN-Fs using existing exclusive monitors. To track remote exclusives, the monitors track the LDID and LPID fields of the incoming request.

2.8.4 Exclusive accesses in RN-I and RN-D

RN-I supports up to two active exclusive threads at any given AXI port. To differentiate the exclusive threads, RN-Is provides a per port 11-bit mask to extract the bit from **AxID**.

The 11-bit mask por_{rni,rnd}_s<X>_port_control can be found in the respective RN-I and RN-D AXI port control registers.

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2.9 Processor events

CMN-600 supports communicating processor events to all processors in the system.

Refer to the processor event interface signals described in *A.15 Processor event interface signals* on page Appx-A-1196.

When a processor generates an output event that an SEV instruction triggers, it is broadcast to all processors in the system. Similarly, anytime an exclusive monitor within HN-F or HN-I is cleared, an output event is broadcast to all processors in the system. The event interface signals are also present at RN-I and RN-D nodes, for use by components such as a *System Memory Management Unit* (SMMU).

The logical operator OR is used to combine the EVENT signals, then the result is broadcast to the processors.

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2.10 Quality of Service

CMN-600 includes end-to-end QoS capabilities which support latency and bandwidth requirements for different types of devices.

The QoS device classes are:

Devices with bounded latency requirements

These devices are primarily real-time or isochronous that require some or all of their transactions complete within a specific time period to meet overall system requirements. These devices are typically highly latency-tolerant within the bounds of their maximum latency requirement. Examples of this class of device include networking I/O devices and display devices.

Latency-sensitive devices

The response latency that the transactions of devices incur has a high impact on the performance of these devices. Processors are traditionally highly latency-sensitive devices, although a processor can also be a bandwidth-sensitive device depending on its workload.

Bandwidth-sensitive devices

These devices have a minimum bandwidth requirement to meet system requirements. An example of this class of device is a video codec engine, which requires a minimum bandwidth to sustain real-time video encode and decode throughput.

Bandwidth-hungry devices

These devices have significant bandwidth requirements and can use as much system bandwidth as is made available, to the limits of the system. These devices determine the overall scalability limits of a system, with the devices and system scaling until all available bandwidth is consumed.

Note

A device can be classified into one or more of these classes, depending on its workload requirements.

Support for these different types of devices and their resulting traffic is included in the AMBA 5 CHI protocol and in the entirety of CMN-600 microarchitecture. Each component in CMN-600 contributes to the overall QoS microarchitecture.

This section contains the following subsections:

- *2.10.1 Architectural QoS support* on page 2-71.
- *2.10.2 Microarchitectural QoS support* on page 2-71.
- *2.10.3 QoS configuration example* on page 2-76.

2.10.1 Architectural QoS support

The AMBA 5 CHI protocol includes a 4-bit *QoS Priority Value* (QPV) with all message flits.

The QPV of the originating message must propagate for all messages in a transaction. The QPV is defined as higher values being higher priority and lower values being lower priority. All CMN-600 components use the QPV to provide prioritized arbitration and to prevent Head-of-line blocking based on the QPV.

2.10.2 Microarchitectural QoS support

The QPV of RN requests must be modulated depending on how well or poorly their respective QoS requirements are met.

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QoS regulators

QoS-modulation capability can be integrated into the RN. However CMN-600 enables system designers to include non-QoS-aware devices in the CMN-600 system, but still have these devices meet the QoS-modulation requirements of the CMN-600 QoS microarchitecture.

CMN-600 includes inline QoS regulators that perform QoS modulation without requiring any QoS-awareness by the requesting device. A QoS regulator introduces an interstitial layer between an RN and the interconnect. This interstitial layer monitors whether the bandwidth and latency requirements of the RN are being met. It also performs in-line replacement of the RN-provided QPV field as required, adjusting upwards to increase priority or downwards to reduce priority in the system.

The QoS regulators are present at all entry points into CMN-600:

- For CHI ports, the regulator is present in the XP.
- For ACE-Lite and AXI4 slave interfaces, the regulator is present at the ACE-Lite and AXI4 side of the protocol bridge.

CMN-600 QoS regulators have three operating modes:

- Pass-through.
- Programmed QoS value.
- Regulation.

These operating modes are controlled through memory-mapped configuration registers.

QoS regulator operation

The values of the base QPV, **AxQOS** for AXI and ACE-Lite interfaces or **RXREQFLIT.QOS** for CHI ports, are inputs to the QoS subblock.

When latency regulation or period regulation is enabled, the values generated by the regulators replace the base QPV values. For an RN-F, a single QoS regulator monitors CHI transactions that return data to the RN-F such as reads, atomics, and snoop stash responses. The regulated QPV is applied to all CHI requests from that RN-F. For an RN-I or RN-D, separate QoS regulators exist for AR and AW channels.

The QoS regulators can operate in either latency regulation mode or period regulation mode. The registers to configure the QoS regulators exist in each RN-I, RN-D, and XP.

Latency regulation bandwidth mode

Configure CMN-600 to operate in latency regulation bandwidth mode, instead of period regulation bandwidth mode.

When configured for latency regulation, the QoS regulator increases the QPV whenever actual transaction latency is higher than the target. The QoS regulator decreases the QPV when it is lower:

- For every cycle that the latency of a transaction is more than the target latency, the QPV increases by a fractional amount. The scale factor K_i determines this amount.
- For every cycle that the latency of a transaction is less than the target latency, the QPV decreases by the same fractional amount. The scale factor K_i determines this amount.

The QoS Latency Target register specifies the target transaction latency in cycles.

The QoS Latency Scale register specifies the scale factor K_i. It is coded in powers of two, so that a programmed value of `0x0` = 2^{-3} and a programmed value of `0x7` = 2^{-10}.

Operate the QoS regulator in latency regulation bandwidth mode

You can program the QoS Control register bits to place the QoS regulator in latency regulation bandwidth mode.

The QoS Control register bits to program are lat_en bit, reg_mode bit, and pqv_mode bit.

Program the following bits to operate the QoS regulator in latency regulation mode:

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Procedure

1. Set the lat_en bit to 1.
2. Set the reg_mode bit to `0b0`.
3. Set the pqv_mode bit to `0b0`.

The QoS regulator is now in latency regulation mode.

Related tasks

Operate the QoS regulator in period regulation bandwidth mode on page 2-73

Period regulation mode for bandwidth regulation

Configure CMN-600 to operate in period regulation bandwidth mode, instead of latency regulation bandwidth mode.

There are two modes of period regulation:

Normal mode
The QPV does not increase or decrease when there are zero outstanding transactions.

Quiesce high mode
The QPV increases by a fractional amount, which the scale factor K_i determines, in every cycle where there are zero outstanding transactions.

The mode of period regulation can be selected by programming the pqv_mode bit in the QoS Control register.

When configured for period regulation, the QoS regulator increases the QPV whenever the period between transactions is larger than the target. The QoS regulator decreases the QPV when it is lower:

- For every cycle that the period between transactions (as measured at dispatch time) is more than the target period, the QPV increases the scale factor K_i by a fractional amount.
- For every cycle that the period between transactions is less than the target period, the QPV decreases the scale factor K_i by the same fractional amount.

The QoS Latency Target register specifies the target period in cycles.

The QoS Latency Scale register specifies the scale factor K_i. It is coded in powers of two, so that a programmed value of `0x0` = 2^{-3} and a programmed value of `0x7` = 2^{-10}.

Operate the QoS regulator in period regulation bandwidth mode

Program the QoS regulator to operate in period regulation bandwidth mode.

Program the QoS Control register bits to place the QoS regulator in latency regulation bandwidth mode.

Configure the relevant bits with the correct values to operate in period regulation mode.

Procedure

1. Set the qos_override_en bit to 1.
2. Set the lat_en bit to 1.
3. Set the reg_mode bit to 1.

The CMN-600 is configured for period regulation.

Related tasks

Operate the QoS regulator in latency regulation bandwidth mode on page 2-72

RN-I and RN-D bridge QoS support

In addition to the QoS regulators, the RN-I and RN-D bridge provides QoS-aware arbitration mechanisms.

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To simplify arbitration logic, all transactions are split into two QoS Priority Classes (QPCs), high and low. QoS-15 transactions make up the high class. All other transactions are considered to be in the low class.

Port multiplexer arbitration

An RN-I and RN-D bridge includes three ACE-Lite and ACE-Lite-with-DVM ports. The RN-I and RN-D bridge selects between these ports for allocation into its transaction tracker. This selection process makes the allocated transaction a candidate for issuing to a Home Node. The port multiplexer is arbitrated using the following strategy:

- High QPC first, then the low QPC.
- Round-robin arbitration among the AMBA ports within a QPC.

Tracker allocation

When transactions are allocated into the tracker, they are scheduled for issuance to a Home Node based on QPC. This strategy is the same strategy as port mux arbitration.

- High QPC first, then the low QPC.
- Round-robin arbitration in a QPC among the transactions for issue.

HN-F QoS support

The HN-F is a key shared system resource that is used for system caching and for communication with the memory controller for external memory access.

The HN-F includes the following QoS support mechanisms:

QoS decoding in HN-F

The HN-F interprets the 4-bit QPV at a coarser granularity, as the following table shows.

Table 2-12 QoS classes in HN-F

QoS value range	QoS Class	Class mnemonic	Priority
15	HighHigh	HH	Highest
14-12	High	H	High
11-8	Med	M	Medium
7-0	Low	L	Low

QoS class and POCQ resource availability

The HN-F includes a 32-entry or 64-entry structure, the *Point-of-Coherency Queue* (POCQ), from which all transaction ordering and scheduling is performed. The POCQ buffers are shared resources for all QoS classes, with one entry being reserved for internal use. The higher the QoS class, the higher the occupancy availability. As the following figure shows, the POCQ is partitioned so that higher priority requests are able to use a larger percentage of the POCQ buffering, ensuring bandwidth and latency requirements of higher priority transactions are met.

The number of entries available for use by each QoS class is defined in the HN-F QoS Reservation register, and is software-programmable.

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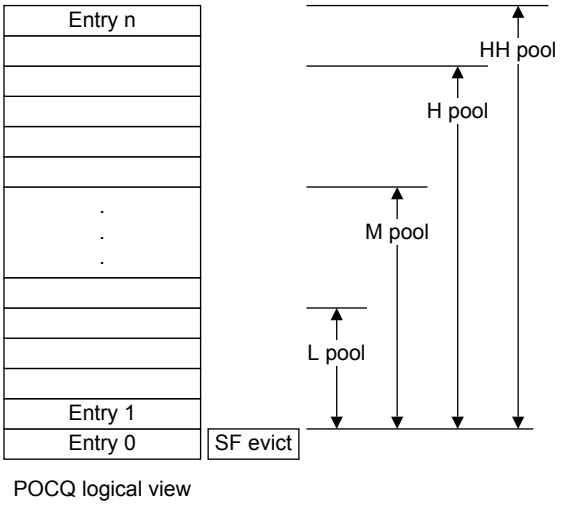

Figure 2-25 POCQ availability and QoS classes

The QoS pools are:

hh_pool Available for HH class.

h_pool Available for H class and HH class.

m_pool Available for M class, H class, and HH class.

l_pool Available for all classes.

seq SF evictions only.

POCQ allocation and scheduler policies

This section describes the two paths for POCQ allocation policies and the POCQ scheduling policy for issuance.

POCQ allocation policies

Allocation into POCQ entries can follow either of two paths:

- Immediate allocation on receipt of the initial request by the HN-F
- Allocation of a retried request after a protocol-layer retry of the initial request

The first case is the expected common case and is always the case in a reasonably uncongested system. If the POCQ has an available buffer corresponding to the QoS class of an arriving request, that request allocates in the POCQ.

However, in a congested system in which a POCQ entry corresponding to the QoS class of an arriving request is not available at the time of arrival, the AMBA 5 CHI protocol requires that the arriving request receive a protocol-layer retry. The transaction flow in this case is as follows:

1. A request arrives at a congested HN-F.
2. The HN-F does not have an available POCQ buffer corresponding to the QoS class of the new transaction.
3. The HN-F increments a credit counter for the specific QoS class of the specific RN and sends a RetryAck response to the RN.
4. On receiving a RetryAck response, the RN then waits for a follow-on PCreditGrant response.
5. When a POCQ entry becomes available, the HN-F reserves that buffer for the highest-priority RN with a nonzero credit-counter and sends a PCreditGrant response to the selected RN.
6. On receiving a PCreditGrant, the RN re-issues the transaction, which is guaranteed to be allocated into the HN-F.

This mechanism serves as prioritized arbitration based on QoS values for requests that are sent to the HN-F.

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POCQ scheduler policies

When transactions are allocated into the POCQ, they are scheduled for issuance based on the QPV as follows, in descending order of priority:

- Starved transactions. These are lower-priority transactions that have made no forward progress for the number of cycles that is specified in the respective fields in the RN Starvation Register.
- Highest QoS class.
- Round-robin arbitration within a QoS class among the issuable transactions.

HN-I and SBSX QoS support

The HN-I bridge provides QoS-aware arbitration mechanisms for static grants and AMBA requests.

To simplify arbitration logic, all transactions are split into two QPCs: high and low. QoS-15 transactions make up the high class. All other transactions are considered to be in the low class.

——— **Note** ———

SBSX QoS support is identical to that of the HN-I.

———————————

Dynamic credit tracker allocation

When the dynamic credit tracker is full, the HN-I begins a credit count process in an internal retry bank. Once tracker entries are cleared, the HN-I rechecks the retry bank and processes any retried transactions.

Requests allocate into the tracker until it is full. When the tracker is full, requests are then retried and the HN-I increments a credit counter for the affected RNs in an internal retry bank.

When a tracker entry is cleared, the HN-I checks the retry bank for any retried transactions. If any are present, the newly available tracker entry is reserved and a static credit grant is sent to an RN chosen using the following algorithm:

- Choose an RN marked as high QPC first, then the low QPC.
- Use round-robin arbitration within a QPC.

Schedule transactions to the AMBA interface

Transactions scheduled for issue on the AMBA interface use a schedule based on QPC. Write data buffers are also allocated based on QPC class.

When transactions are allocated into the tracker, they are scheduled for issue on the AMBA interface. This schedule is based on QPC, following a similar strategy to static credit allocation:

- Choose high QPC first, then the low QPC.
- Use round-robin arbitration within a QPC.

Write data buffers are also allocated based on QPC class. For write requests that are ready to issue:

- Choose high QPC first, then the low QPC.
- Use round-robin arbitration within a QPC.

2.10.3 QoS configuration example

This example configuration demonstrates the QoS mechanisms and their contribution to the overall QoS solution.

It is the responsibility of the SoC designer and system programmer to configure CMN-600 to meet the specific requirements of the system and expected workloads.

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System operating conditions

The example QoS configuration assumes the following:

- Four processor clusters:
  - Bimodal operation. A processor cluster is latency-sensitive when bandwidth per cluster is ≤ 2GB/s, and bandwidth-hungry, and therefore latency-tolerant, when bandwidth per cluster is > 2GB/s.
  - 16 outstanding combined reads and writes.
  - 10GB/s maximum bandwidth per cluster.
  - 25GB/s maximum aggregate bandwidth across all processor clusters.
- Four peripheral devices with bounded latency requirements:
  - Each device is the sole device that is connected to ACE-Lite interface 0 on four different RN-I bridges.
  - 1 microsecond maximum latency requirement.
  - 4GB/s maximum bandwidth per device.
  - 210GB/s maximum aggregate bandwidth across all devices.
- 14 peripheral bandwidth-hungry devices:
  - Connected to all remaining RN-I ACE-Lite interfaces.
  - 12GB/s read or write bandwidth per device, with a combined maximum of 24GB/s.
  - 60GB/s maximum aggregate bandwidth across all devices.
- All devices can be concurrently active.
- 80GB/s maximum aggregate bandwidth across all devices.

HN-F QoS classes

For the QoS ranges and class values in HN-F, refer to *Table 2-12 QoS classes in HN-F on page 2-74*.

QoS regulator settings

To meet the bandwidth and latency requirements of the described system configuration, CMN-600 QoS regulators can be configured with the settings as described in the following table.

Table 2-13 QoS regulation settings

Device	Regulation type	Regulation parameter	QoS range	QoS scale
Processor	Latency	60ns max latency	11-13	8-9
Real-time peripheral	Override (constant value)	Constant	15	n/a
High-bandwidth peripheral	Override (constant value)	Constant	8	n/a

The latency specification for real-time peripherals must be sufficiently far below the maximum real-time constraint to allow the control loop in the QoS regulator to adjust based on achieved latency. However, it must not violate the maximum latency requirement.

To meet the bandwidth and latency requirements of the described system configuration, HN-F QoS reservation values can be configured as summarized in the following table. The table is based on 32-entry POCQ with one entry for SF back invalidations.

Table 2-14 QoS class and reservation value settings

QoS class	QoS reservation value
HighHigh	31
High	30
Medium	15
Low	5

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These settings enable the following system functionality:

- Real-time devices are QPV-15, ensuring their transactions meet their bounded latency requirements.
- The processor QPV is higher than the bandwidth-hungry devices, second only to the real-time devices. Therefore the processor QPV generally achieves minimum latency, except when there is high-bandwidth real-time traffic.
- Real-time devices have all the HN-F POCQ buffering available to them, to prevent bandwidth limitations from impacting achieved latency.
- Real-time devices always have buffering available to them throughout the entirety of CMN-600 preventing Head-of-line blocking from lower-priority or higher-latency transactions.

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2.11 Barriers

Barriers were deprecated from CHI-B onwards. All masters (fully coherent and I/O coherent) must handle barriers at the source.

When memory barrier ordering or completion guarantees are required, masters must wait for the responses from all required previous transactions that are issued into the interconnect. No barrier requests can be issued into the interconnect.

All requesting devices that are attached to an interconnect must have a configuration option or strap that prevents issuing of any barriers. If a barrier is issued into the interconnect, the results are unpredictable.

Note

The DVM_SYNC command, the DVM synchronization that might be initiated by an Arm DSB instruction, is sent to the DVM block, and executes appropriately.

For more information about barriers, see the *Arm® AMBA® 5 CHI Architecture Specification* and the *Arm® AMBA® AXI and ACE Protocol Specification AXI3, AXI4, AXI5, ACE and ACE5*.

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2.12 DVM messages

If an RN-F supports *Distributed Virtual Memory* (DVM) messages, it can send DVM requests and receive DVM snoops.

A DVM message from an RN-F is sent to the HN-D. On receiving the DVM message, the HN-D:

- Forwards the DVM message as a snoop to the participating RNs. To do this action, the HN-D uses a static list to replace the DVM Domain Control register used with legacy products.
- Collects the individual snoop responses
- Sends a single response back to the RN-F that originated the DVM message transaction

The **SYSCOREQ/SYSCOACK** mechanism provides proxy snoop responses in scenarios when the RN is powered down. For more **SYSCOREQ/SYSCOACK** information, refer to *2.28 RN entry to and exit from Snoop and DVM domains* on page 2-163.

Note

- An RN that issues DVM messages must also be able to receive DVM messages. If this requirement is violated, the system must not rely on the DVM message causing any DVM snoops.
- An RN-F can issue only one outstanding DVMOp (Sync).

For more information about DVM messages, see the *Arm® AMBA® 5 CHI Architecture Specification*.

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2.13 PCIe integration

CMN-600 supports integration of a PCIe *Root Complex* (RC) or *EndPoint* (EP).

This section contains the following subsections:

2.13.1 PCIe topology requirements

There are specific topology rules that you must follow when integrating PCIe components with CMN-600.

The following PCIe topology requirements apply:

- PCIe slaves must not be connected to HN-D
- PCIe slaves must not share HN-I with other non-PCIe slaves

2.13.2 PCIe master and slave restrictions and requirements

This section describes the PCIe master and slave restrictions and requirements.

——— **Note** ———

In this section, PCIe HN-I refers to an HN-I which has a PCIe slave connected to it. HN-I refers to all other HN-I.

———————————

The general restrictions and requirements are:

- Peer-to-peer PCIe traffic, that is, one PCIe endpoint talking to another PCIe endpoint, must not pass through the CMN-600. Requests from the PCIe master can only target memory through the HN-F, CMN-600 configuration space, or an I/O slave device downstream of the HN-I. These requests must not target any PCIe slave downstream of the HN-I.
- The PCIe master must not create same-**AWID** dependency between *Non-Posted Write* (NPR-Wr) and *Posted Write* (P-Wr) transactions sent on the RN-I AXI/ACE-Lite slave port.

The flow control requirements are:

CMN-600 to PCIe slave

The PCIe slave must be able to sink at least one NPR-Wr from the CMN-600 sent on the HN-I AXI/ACE-Lite master port. This requirement guarantees that the HN-I AW channel remains unblocked. Therefore, P-Wrs from PCIe master targeting the downstream slave device can progress, as required by the PCIe ordering rules.

PCIe master to CMN-600

If a *System Memory Management Unit* (SMMU) or GIC-ITS is in the path between the PCIe master interface and the RN-I slave interface, there are two possible options:

- *Non-Posted Reads* (NPR-Rd) from the PCIe master must not target any PCIe HN-I.
- Use a separate master interface port in the SMMU and GIC-ITS for translation table walks (TCU in MMU-500/GIC-600 and beyond) and connect this port to a different RN-I which does not send any requests to any PCIe HN-I. None of the masters that are connected to this RN-I can talk to any PCIe HN-I.

2.13.3 System requirements for PCIe devices

There are certain system-level requirements that you must meet when integrating PCIe devices with CMN-600. These requirements determine which CMN-600 devices can handle certain request types and how PCIe and non-PCIe transactions must be handled.

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Note

In this section, PCIe HN-I refers to an HN-I which has a PCIe slave connected to it. HN-I refers to all other HN-Is.

CMN-600 has the following system requirements for PCIe devices:

- All non-PCIe I/O slave devices must complete all writes without creating any dependency on a transaction in the PCIe subsystem
- Your configuration might have an SMMU in the path between the PCIe master interface and the RN-I slave interface. If using this kind of configuration, table-walk requests from the SMMU can only be sent to memory through the HN-F or non-PCIe HN-I.
- Interrupt translation table walk requests from GIC-ITS can only be sent to memory through the HN-F or non-PCIe HN-I

2.13.4 RN-I and HN-I PCIe programming sequence

To ensure proper PCIe functionality, software must complete the following programming before any non-configuration access to the RN-I or HN-I.

When setting up PCIe RN-Is and HN-Is, the entire PCIe configuration space of an RC must be mapped to a single HN-I address region. HN-I has a SAM that can be configured for up to three address regions. All address regions that are not configured into these three regions are considered to be the default address region. For more information about configuring the HN-I SAM, including example configurations, see *2.21 HN-I SAM* on page 2-127.

If you map an HN-I SAM address region to a PCIe slave, you must map all address regions of that HN-I SAM to PCIe slaves.

Throughout the following procedure, address region X or address region Y can refer to any of the four address regions (0, 1, 2, or 3).

Procedure

1. If there is a PCIe-RC attached to the RN-I, then set the pcie_mstr_present field of the por_rni_cfg_ctl register. This programming indicates that one or more PCIe masters are present upstream.
2. Program the por_hni_sam_addrregion{0,1,2,3}_cfg registers so that the PCIe configuration space falls under one of the four HN-I address regions. This programmed address region is referred to as address region X.
3. Set only one of the following bits in por_hni_sam_addrregionX_cfg for address region X:

   ser_devne_wr
   Set this bit if the PCIe configuration space is marked as the Arm Device-nGnRnE memory type. If this bit is set, HN-I serializes all Device-nGnRnE writes to address region X. The HN-I does not send any other write requests with the same AWID as an outstanding Device-nGnRnE write.

   ser_all_wr
   Set this bit if the PCIe configuration space cannot be marked as Arm memory type of Device-nGnRnE. If this bit is set, HN-I serializes all writes targeting Address Region X.
4. Clear the pos_early_wr_comp_en bit of the por_hni_sam_addrregionY_cfg register for address region Y.

   Address region Y is the region in which PCIe EP memory space (posted traffic) is programmed. If the pos_early_wr_comp_en bit is cleared, HN-I does not provide early write completions for any write requests targeting address region Y.

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2.14 Reliability, Availability, and Serviceability

The CMN-600 *Reliability, Availability, and Serviceability* (RAS) features are implemented as set of distributed logging and reporting registers and a central interrupt handling unit.

The distributed logging and reporting registers are associated with devices that can detect errors. These devices are XP, HN-I, HN-F, SBSX, and CXHA.

The central interrupt handling logic is located in the HN-D.

Each device that can detect errors logs the error in local registers and sends error information to the central interrupt handling logic in the HN-D. The HN-D contains four error groups, a Secure and Non-secure group for error and fault type errors. Each is represented in an *ERRor Group Status Register* (ERRGSR).

Error group, Secure	por_cfgm_errgsr{0-4}
Fault group, Secure	por_cfgm_errgsr{5-9}
Error group, Non-secure	por_cfgm_errgsr{0-4}_NS
Fault group, Non-secure	por_cfgm_errgsr{5-9}_NS

The following figure shows the four error groups, and the four respective interrupt request signals, with XP connections highlighted. The HN-I, HN-F, SBSX, and CXHA use the same input/output structure.

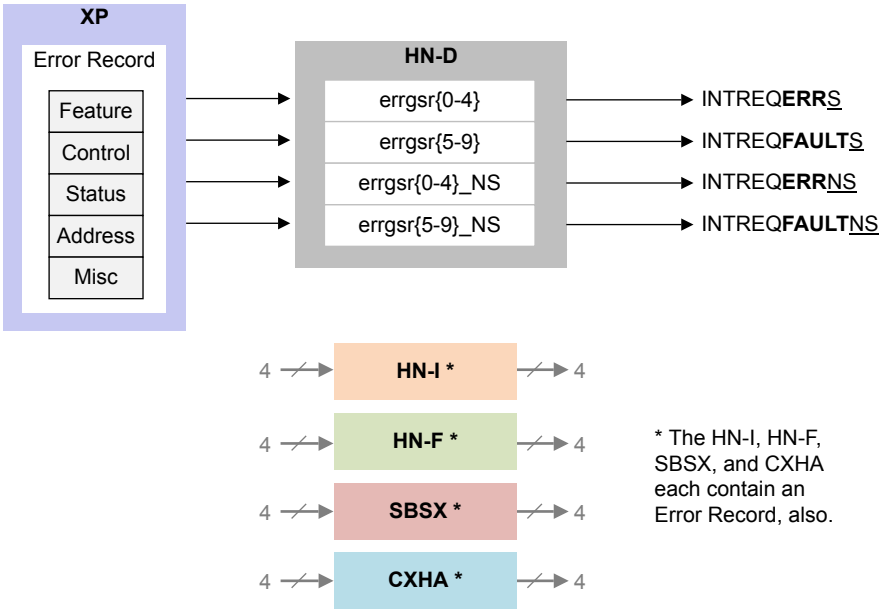

Figure 2-26 Error top-level diagram

Each ERRGSR is partitioned according to device type, with a 64-bit vector representing the logical ID of each device instance. The following figure shows the partitioning.

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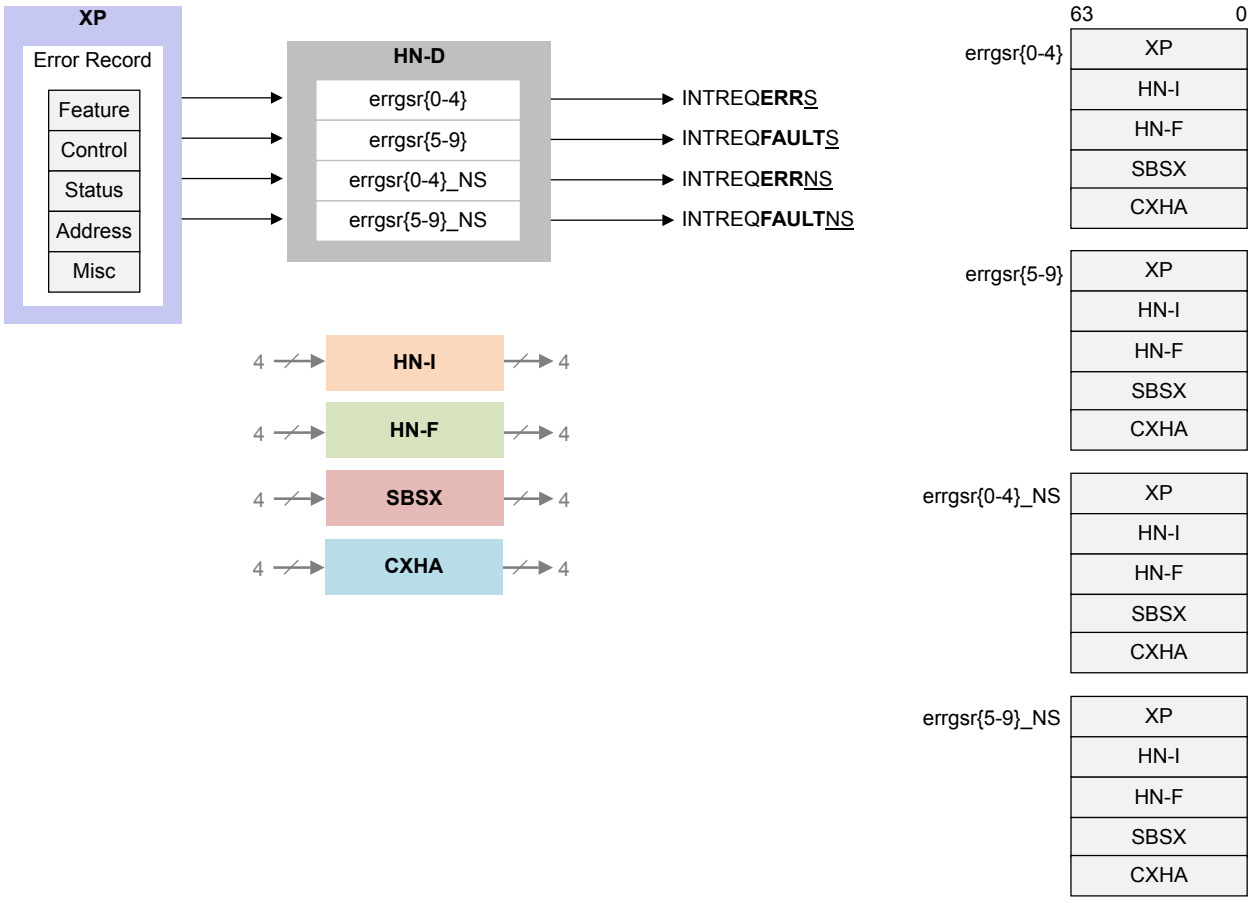

Figure 2-27 256-bit error handling structure

Each device that can detect errors has five Error Record registers that contain the error type, along with other information such as the address and opcode. Error types include *Corrected Error* (CE), *Deferred Error* (DE), and *Uncorrected Error* (UE).

For more information on error types, see *2.14.2 Error types* on page 2-85.

For register details, see *3.3 Register descriptions* on page 3-196.

This section contains the following subsections:

- *2.14.1 Error interrupt handler flow example* on page 2-84.
- *2.14.2 Error types* on page 2-85.
- *2.14.3 Error Detection and Deferred Error values* on page 2-87.
- *2.14.4 Error detection, signaling, and reporting* on page 2-88.
- *2.14.5 Error handling requirements* on page 2-92.
- *2.14.6 HN-F error handling* on page 2-92.
- *2.14.7 HN-I error handling* on page 2-93.
- *2.14.8 SBSX error handling* on page 2-96.
- *2.14.9 RN-I error handling* on page 2-96.
- *2.14.10 XP error handling* on page 2-96.
- *2.14.11 CXHA error handling* on page 2-98.
- *2.14.12 CCIX Protocol Error messaging support* on page 2-98.

2.14.1 Error interrupt handler flow example

How the process flow works to determine the error source and type of HN-I generating an interrupt request.

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The following sequence of events and figure describe the process for determining the error source and type of an HN-I generating an interrupt request:

1. The HN-D generates an interrupt for one of the five error group types.
2. The error group indicates the error source device type, which can be:
   - XP
   - HN-I, which is used in this case
   - HN-F
   - SBSX
   - CXHA
3. The bit location within the error group indicates the logical ID of that device type. In this case, it reveals an HN-I error, the HN-I Error Record Status block for this example.
4. The Status block of the Error Record for the specific XP, HN-I, HN-F, SBSX, or CXHA reveals the type of error.
5. The Address and Misc blocks of the Error Record provide further details regarding error root cause, in this case a Corrected Error.
6. The Valid bit is also asserted.
7. To clear the asserted interrupt on the pin, the valid bit of the error status has to be cleared.

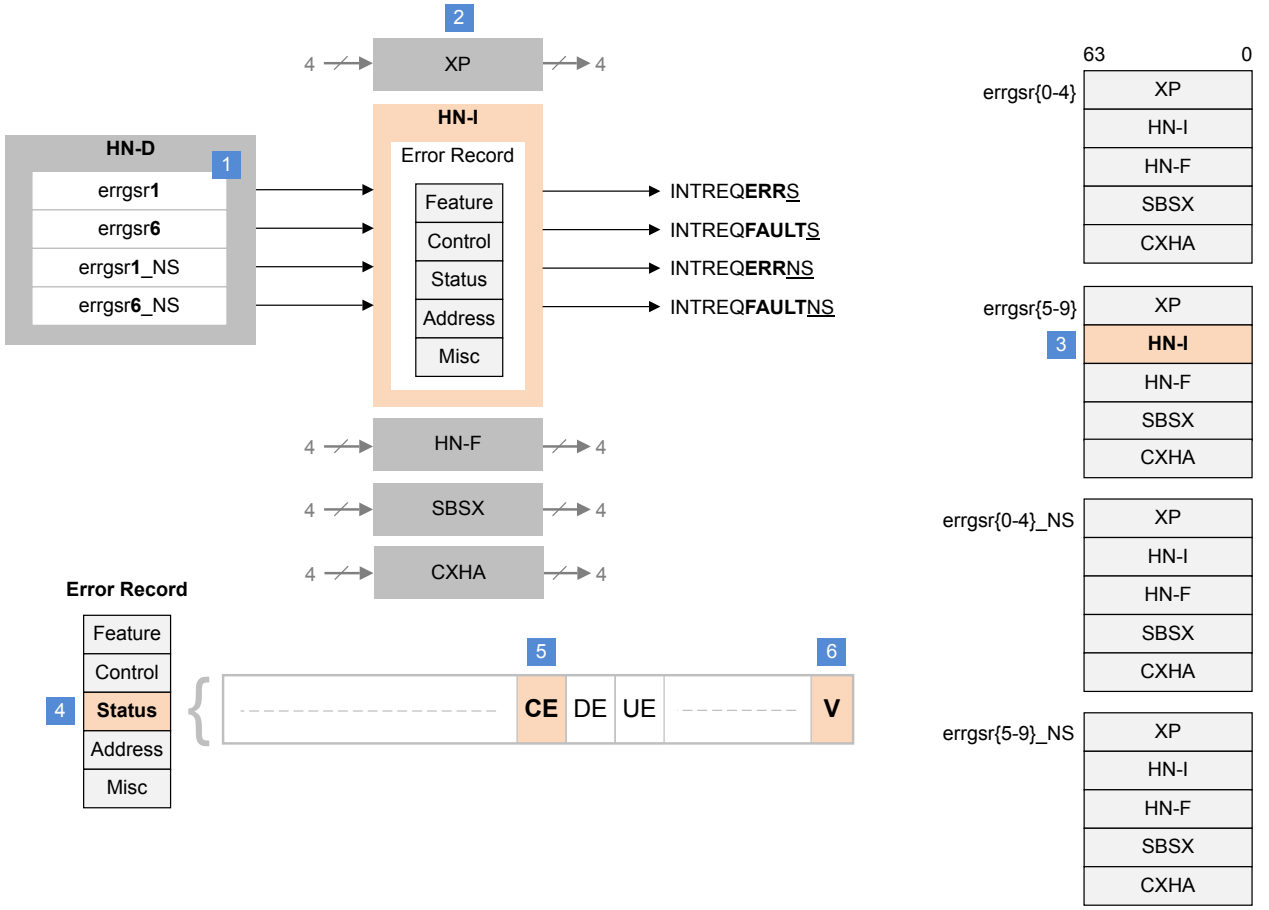

Figure 2-28 Error interrupt handler flow example

2.14.2 Error types

CMN-600 supports several error types.

The supported errors are:

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- *Corrected Error* (CE)
- *Deferred Error* (DE)
- *Uncorrected Error* (UE)

Note

CEs, DEs, and UEs can occur simultaneously.

There might be cases when an error occurs and sets the status register, however, the interrupt reporting is not enabled. For other cases where the interrupt asserts, the interrupt request is generated immediately when enabled. Otherwise, if interrupt reporting is disabled and the error remains logged with UE, DE, and CE, any interrupt is cleared.

Note

If both ERRCTLR.UI (uncorrected interrupt) and ERRCTLR.FI (fault interrupt) are set and a UE occurs, both fault and error interrupts are delivered from CMN-600.

Corrected errors

How CMN-600 handles corrected error types, and how to use *Error Correcting Code* (ECC), or other methods, to correct these error types.

These errors can be corrected using *Error Correcting Code* (ECC) or other methods. They include:

- A single-bit ECC error.
- An error that is recovered by replaying the transaction in the pipeline.

The system handles these errors as follows:

1. Detects the error and increments the ERRMISC.CEC counter. Sets ERRSTATUS.AV and ERRSTATUS.MV. Logs the attributes in the ERRADDR and ERRMISC registers.
2. If CEC counter overflowed, the system updates ERRSTATUS.V and ERRSTATUS.CE, and sets ERRMISC.CECOF.
3. Masks signaling of the error to the *RAS Control Block* (RCB) using ERRCTLR.CFI.
4. If there are multiple CEC overflows, then the system sets ERRSTATUS.OF.

Deferred errors

These errors are UEs that are detected in one node of CMN-600, but the data is not used within the same node, and poison bits are set for the data.

The errors can be either fatal or non-fatal errors as described in this section. These errors are not correctable, but the system can operate for a time without being corrupted. These errors can be contained and the system might be able to recover using software means. They include:

- A data double bit ECC error in the SLC Data RAM.
- Data check error detected in SLC.

The system handles these errors as follows:

1. Logs the error information in the applicable ERRSTATUS, ERRADDR, and ERRMISC registers.
2. Sets ERRSTATUS.V and ERRSTATUS.DE.
3. Masks signaling of the error to the RAS control block using ERRCTLR.FI and ERRCTLR.UI.
4. If there are multiple DEs, then the system sets ERRSTATUS.OF.

Uncorrectable fatal errors

Uncorrectable fatal errors are in the control logic at a node.

Continuing operation with these error types, might corrupt the system beyond recovery. These errors include:

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- A double-bit ECC error in SLC tag.
- Flit parity error.
- *Non-data Error* (NDE) in a response packet.

The system handles these errors as follows:

1. Logs the error information in the applicable ERRSTATUS, ERRADDR, and ERRMISC registers.
2. Sets ERRSTATUS.V and ERRSTATUS.UE.
3. Masks signaling of the error to the RAS control block using ERRCTLR.UI.
4. If there are multiple UEs, then the system sets ERRSTATUS.OF.

A component might not respond to further messages after an error is signaled. In this case, for the error handling routine to be successful, the component must still respond to configuration access requests from the configuration bus.

CMN-600 follows the *Arm® Reliability, Availability, and Serviceability (RAS) Specification Armv8, for the Armv8-A architecture profile* for mapping of the different error types to the interrupt. The following table summarizes the mapping of various error types.

Table 2-15 Mapping of error types

Interrupt type	Error type		
	Uncorrected Error	Detected Error	Corrected Error
Fault Handling Interrupt	Yes (if ERRCTLR.FI==1)	Yes (if ERRCTLR.FI==1)	Yes (if ERRCTLR.CFI==1)
Error Recovery Interrupt	Yes (if ERRCTLR.UI==1)	No	No

Map error types to interrupt type

CMN-600 can map different error types to the interrupt type. The error types include uncorrected, detected, and corrected error types. The interrupt types include fault handling interrupt and error recovery interrupt.

CMN-600 follows the *Arm® Reliability, Availability, and Serviceability (RAS) Specification Armv8, for the Armv8-A architecture profile* for mapping of the different error types to the interrupt. The following table summarizes the mapping of various error types.

Table 2-16 Mapping of error types

Interrupt type	Error type		
	Uncorrected Error	Detected Error	Corrected Error
Fault Handling Interrupt	Yes (if ERRCTLR.FI==1)	Yes (if ERRCTLR.FI==1)	Yes (if ERRCTLR.CFI==1)
Error Recovery Interrupt	Yes (if ERRCTLR.UI==1)	No	No

2.14.3 Error Detection and Deferred Error values

For XP, the default values of *Error Detection* (ED) and DE depend on build time parameters.

Only the HN-F has CE counters that are implemented in the ERRMISC register. The default values of UI, FI, and CFI are `2'b10`, which enables control for the interrupt generation. The following table contains default values of ED and DE for XP.

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Table 2-17 Default values of ED and DE for XP

POR_FLIT_PAR_EN	POR_DATACHECK_EN	MXP_DEV_DATACHECK_EN		ED	DE
		P0	P1		
0	0	0	0	2'b00	2'b00
0	1	0	0	2'b01	2'b01
		0	1	2'b01	2'b01
		1	0	2'b01	2'b01
		1	1	2'b00	2'b00
1	0	0	0	2'b01	2'b00
1	1	0	0	2'b01	2'b01
		0	1	2'b01	2'b01
		1	0	2'b01	2'b01
		1	1	2'b01	2'b00

For SBSX, if the AXDATAPOISON_EN parameter is not set, the default values of ED and DE are 2'b01. If the parameter is set, the default values are 2'b00.

For HN-I and HN-F, the default values of ED and DE are always 2'b01.

All fields are required, even though only HN-F has CE counters that are implemented in ERRMISC.

The default values of UI, FI, and CFI must be 2'b10, indicating that the interrupt generation is controllable.

2.14.4 Error detection, signaling, and reporting

Each CMN-600 component that is connected to a configuration bus can be included in the local error reporting mechanism.

The error handling protocol is as follows: or

The error handling protocol is:
- Error overflow
- ERRSTATUS.OF value after errors
- ERRMISC fields and register bits

Error overflow

The CMN-600 has an error overflow, which you can set and assert for multiple errors of equal priority.

The overflow is set when different types of errors are detected. It is also asserted when multiple errors of equal priority are detected.

0b1 More than one error has been detected.

0b0 Only one error of the most significant type that ERRSTATUS.{UE, CE, DE} describes has been detected.

This bit is read/write-one-to-clear.

Note

ERRSTATUS.OF is only for the highest priority error. For example, if another DE follows the first DE, ERRSTATUS.OF is set. When the next UE happens, ERRSTATUS.OF is cleared. ERRSTATUS.OF is cleared because UE is the highest priority error in the system, and is the first occurrence of UE.

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The ERRSTATUS.OF value after an error

There are different values for the status of ERRSTATUS.OF after an error occurs at t0, t1, and t2.

The following table shows the value of ERRSTATUS.OF after errors occur at t0, t1, and t2.

Table 2-18 ERRSTATUS.OF value after errors

Error at			Status of OF after error		
t0	t1	t2	t0	t1	t2
CE	CE	CE	0	1	1
CE	CE	DE	0	1	0
CE	CE	UE	0	1	0
CE	DE	CE	0	0	0
CE	DE	DE	0	0	1
CE	DE	UE	0	0	0
CE	UE	CE	0	0	0
CE	UE	DE	0	0	0
CE	UE	UE	0	0	1
DE	CE	CE	0	0	0
DE	CE	DE	0	0	1
DE	CE	UE	0	0	0
DE	DE	CE	0	1	1
DE	DE	DE	0	1	1
DE	DE	UE	0	1	0
DE	UE	CE	0	0	0
DE	UE	DE	0	0	0
DE	UE	UE	0	0	1
UE	CE	CE	0	0	0
UE	CE	DE	0	0	0
UE	CE	UE	0	0	1
UE	DE	CE	0	0	0
UE	DE	DE	0	0	0
UE	DE	UE	0	0	1
UE	UE	CE	0	1	1
UE	UE	DE	0	1	1
UE	UE	UE	0	1	1

ERRMISC fields

ERRMISC is the Secondary Error Syndrome Register in CMN-600.

The fields of this register differ for ECC, parity, and other errors. The following table summarizes the valid fields for each unit.

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Table 2-19 ERRMISC register bits

Bit	Component				
	XP	HN-I	HN-F	SBSX	CXHA
63	-	-	CECOF	-	-
62			SETMATCH		
61			-		
60			ERRSET[12:0]		
59					
58	TGTID[10:0]				
57					
56		LPID[4:0]			
55					ERRSET[7:0]
54					
53					
52					
51		-			
50					
49		ORDER[1:0]			
48					
47	-	-	CEC[15:0]		-
46					
45					
44					
43					
42					
41					
40					
39					
38					
37					
36					
35					
34					
33					
32					

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Table 2-19 ERRMISC register bits (continued)

Bit	Component				
	XP	**HN-I**	**HN-F**	**SBSX**	**CXHA**
31	-	-	-	-	-
30		SIZE[2:0]		SIZE[2:0]	
29					
28					
27		MEMATTR[3:0]		MEMATTR[3:0]	
26					
25					
24					
23		-		-	
22					
21	OPCODE[5:0]	OPCODE[5:0]			
20					
19					
18					
17			OPTYPE[1:0]		
16				OPTYPE	
15	-	-	-	-	
14	SRCID[10:0]	SRCID[10:0]	SRCID[10:0]	SRCID[10:0]	
13					
12					
11					
10					
9					SRCRAID[5:0]
8					
7					
6					
5					
4					
3	-	ERRSRC[3:0]	ERRSRC[3:0]	-	-
2	ERRSRC[2:0]				
1					ERRSRC[1:0]
0					

Error log clearing

How to clear the Error Syndrome register with the applicable mask bits.

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In addition to the Error Syndrome Registers, each component has a write-only Error Syndrome Clear Register. Write the applicable mask bits to clear the first_err_vld and mult_err bits of the Error Syndrome 0 Register.

2.14.5 Error handling requirements

This section describes the specific error handling behaviors of CMN-600.

Error reporting rules

CMN-600 uses specific error reporting rules, concerning which errors must be reported and propagated.

The rules regarding error reporting in CMN-600 are:
- Any error originating in CMN-600 is reported
- Any error originating outside CMN-600 but corrupting CMN-600 is reported
- If a response packet from outside CMN-600 does not propagate the response any further, the HN-I can report an error in the response packet
- All non-posted write errors are propagated where possible

2.14.6 HN-F error handling

Errors are reported at the HN-F for various reasons.

Errors at HN-F

The HN-F detects the following errors:
- ECC errors in SF Tag, SLC Tag, and Data RAMs
- Data check and poison errors on DAT flits
- *Non-Data Errors* (NDEs) on responses

ECC errors in SF Tag, SLC Tag, and Data RAMs

HN-F can detect, correct, and log single-bit and double-bit ECC errors, for SF Tag, SLC Tag, and Data RAMs.

HN-F detects single-bit and double-bit ECC errors in the SF Tag, SLC Tag, and Data RAMs. It can correct single-bit ECC errors. Such errors are logged and reported as CEs.

The source of the double-bit ECC errors determines how they are handled.

Double bit errors in the SLC Data RAM

SLC Data RAM double bit errors are:
- Logged and reported as DEs
- Propagated to the data consumer in the form of data poison

Double bit errors in the SF Tag RAM

SF Tag RAM double bit errors:
- Are logged and reported as DEs
- Are not propagated to the requestor
- Disable the SF in the HN-F after the first occurrence of a double-bit ECC error

Double bit errors in the SLC Tag RAM

SLC Tag RAM double bit errors are:
- Fatal errors
- Logged and reported as UEs
- Propagated to the requestor as NDEs in the responses

Data check and poison errors on DAT flits

If the HN-F allocates data, the HN-F detects data check errors and poison errors on the data flits. Data check errors are logged as DEs and poison errors are logged as UEs.

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Data check errors on DAT flits

If the HN-F allocates data, the HN-F detects data check errors and poison errors on the data flits. In such cases, HN-F logs and reports the data check error as a DE. If HN-F allocated the data in SLC Data RAM, it converts the data check error into data poison for all subsequent requests to this cache line.

If por_hnf_aux_ctl.hnf_poison_intr_en == 1, then the poison errors originating from HN-F are logged and reported as UEs.

Poison errors on DAT flits

If the HN-F allocates data, the HN-F detects poison errors on the data flits. If por_hnf_aux_ctl.hnf_poison_intr_en == 1, then the poison errors originating from HN-F are logged and reported as UEs.

NDEs on responses

A cache line not allocated in HN-F SLC Data RAM, propagates errors to the requestor as an NDE.

HN-F can receive NDEs from other data and response sources such as RN-F, RN-I, and SN-F. If the cache line was allocated in HN-F SLC Data RAM, it is logged and reported as a UE. If the cache line is not allocated in HN-F SLC Data RAM, it propagates the errors to the requestor as an NDE.

2.14.7 HN-I error handling

Errors are reported at the HN-I for various reasons.

Request errors at HN-I

The HN-I detects errors on receiving various request types and sends an NDE response to the requesting RN.

The HN-I logs request information in the error logging registers, por_hni_erraddr(_NS) and por_hni_errmisc(_NS). They are marked as DEs in the error status register, por_hni_errstatus(_NS). The HN-I detects errors on receiving the following request types:

- Coherent Read
- CleanUnique/MakeUnique
- Coherent/CopyBack Write
- Atomic
- Illegal Configuration Read or Write, HN-D only

The reqerr_cohreq_en configuration bit in the por_hni_cfg_ctl register enables or disables the sending of NDE responses and logging of error information for following request types. By default, this bit is enabled. It can only be programmed during boot time to any one of the following:

- Coherent Read
- CleanUnique/MakeUnique
- Coherent/CopyBack Write

The following table lists all the requests that an HN-I detects as errors and the support of reqerr_cohreq_en.

Table 2-20 HN-I request errors and support for configuration bit

Request type	Reqerr_cohreq_en controls sending of NDE and log error
Coherent Read	Yes
CleanUnique/MakeUnique	Yes
Coherent/CopyBack Write	Yes

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Table 2-20 HN-I request errors and support for configuration bit (continued)

Request type	Reqerr_cohreq_en controls sending of NDE and log error
Atomics	No
Illegal Configuration Read or Write	No

- Coherent reads are downgraded to ReadNoSnp and sent downstream, AXI or ACE-Lite slave
- Coherent and Copyback writes are downgraded to WriteNoSnp and sent downstream, AXI or ACE-Lite slave
- Illegal Configuration Read is sent as ReadNoSnp to downstream, AXI or ACE-Lite slave
- CleanUnique, MakeUnique, atomics, and Illegal Configuration Writes are handled within HN-I
- StashOnceShared, StashOnceUnique, and PrefetchTgt are completed within HN-I without any errors

Data Errors at HN-I

The HN-I only detects errors on write data if it does not detect an error on that request.

The following provides an overview of AXI and ACE-Lite write requests and configuration write requests, with no request error:

- For AXI and ACE-Lite write requests with no request error, when they receive Poison error on data, the HN-I detects the error. If downstream does not support poison, the HN-I logs the request information in por_hni_erraddr(_NS) and por_hni_errmisc(_NS). The write requests are marked as UEs in the error status register, por_hni_errstatus(_NS).
- For configuration write requests with no request error, on receiving write data with Partial ByteEnable error, Data check error, or Poison, HN-I detects and sends an NDE response to the requesting RN. It logs the SrcID and TxnID of the request and drops the write. They are marked as DEs in the error status register, por_hni_errstatus(_NS).

  ———— **Note** ————

  StashOnceShared, StashOnceUnique, and PrefetchTgt are completed within HN-I without any errors.

  ————————————

Response Errors at HN-I

The HN-I only detects errors on write response if it does not detect an error on that request.

To summarize:

- For AXI or ACE-Lite write requests with early completions from HN-I and no request error, HN-I detects the error when it receives the following error response types on the downstream write response (BRESP):
  - *Slave Error* (SLVERR)
  - *Decode Error* (DECERR)

  HN-I logs request information in por_hni_erraddr(_NS) and por_hni_errmisc(_NS). They are marked as UEs in the error status register, por_hni_errstatus(_NS).
- For AXI or ACE-Lite write requests with downstream completions and no request error, SLVERR, or DECERR on downstream write response (BRESP) are passed on to the requesting RN as CHI DEs or NDEs
- For AXI or ACE-Lite read requests, SLVERR and Poison (if supported by downstream) are both converted to Poison within the CMN-600 system. This conversion occurs independent of error on request. DECERRs on downstream read responses are passed on to the requesting RN.

HN-I summary on sending NDE and DE

The HN-I sends NDE scenarios for certain situations.

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The HN-I sends NDE in the following cases:

- Request Error:
  - Coherent Read, if reqerr_cohreq_en is set to 1
  - CleanUnique/MakeUnique, if reqerr_cohreq_en is set to 1
  - Coherent/CopyBack Write, if reqerr_cohreq_en is set to 1
  - Atomic
  - Illegal Configuration Read or Write, HN-D only

  ———— **Note** ————

  For the legal format of configuration read/write request, refer to *3.1.5 Requirements of configuration register reads and writes* on page 3-172.

  ————————————

- Write Data Error for Configuration Write request, HN-D only:
  - Partial ByteEnable Error
  - Data Check Error
  - Poison
- AXI or ACE-Lite Response Error:
  - DECERR on *downstream write response*, **BRESP**, for writes with downstream completions
  - DECERR on *downstream read response*, **RRESP**

The HN-I sends DE in the following cases:

- AXI or ACE-Lite Response Error:
  - SLVERR on **BRESP** for writes with downstream completions

HN-I summary on logging errors

The HN-I logs an error as deferred or uncorrected in certain conditions.

Deferred Errors

The HN-I logs an error as deferred in the following cases:

- Request error:
  - Coherent Read, if reqerr_cohreq_en is set to 1
  - CleanUnique/MakeUnique, if reqerr_cohreq_en is set to 1
  - Coherent/CopyBack Write, if reqerr_cohreq_en is set to 1
  - Atomic
  - Illegal Configuration Read or Write

  ———— **Note** ————

  For the legal format of a Configuration Read or Write request, see *3.1.5 Requirements of configuration register reads and writes* on page 3-172.

  ————————————

- Write Data Error for Configuration Write request:

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— Partial ByteEnable Error
— Data Check Error
— Poison Error

Uncorrected Errors

The HN-I logs an error as uncorrected in the following cases:

- Write Data Error for AXI or ACE-Lite write requests:
  — Poison Error on data if downstream does not support poison
- AXI or ACE-Lite Write Response Error:
  — SLVERR or DECERR on BRESP for writes that were sent early completions

CML configuration with HN-I

In CML configuration, HN-I must be configured to report NDE response on coherent requests.

This requirement is met by setting por_hni_cfg_ctl.reqerr_cohreq_en. This action is required in CML mode so that NDE error responses are not missed on CCIX because of early completion responses from the CXG block.

2.14.8 SBSX error handling

This section describes how errors are handled at the SBSX.

If the following circumstances are both true, then the SBSX detects and logs errors:

- The AXI memory controller downstream of SBSX does not support POISON, indicated by por_sbsx_unit_info.axdata_poison_en = 0
- CHI Write Data has Poison set

Note

SBSX does not have opcode-based Request and Response Error class as does HN-I.

The following table shows the SBSX summary on sending an NDE or DE.

Table 2-21 SBSX summary on sending NDE or DE

Case number	Source of error	SBSX error response
1	Decode Error on RDATA from AXI side	NDE on COMP_DATA on CHIE side
2	Slave Error on RDATA from AXI side	Poison on COMP_DATA on CHIE side
3	Decode Error on BRESP from AXI side	NDE on COMP for CMOs or Writes with EWA = 0
4	Slave Error on BRESP from AXI side	DE on COMP for CMOs or Writes with EWA = 0

2.14.9 RN-I error handling

With regards to error reporting, RN-I does not report any errors. When a parity error is detected in the *Read Data Buffer* (RDB) RAMs, if present, RN-I or RN-D propagates the error on AXI R channel as RPOISON or RRESP. However coherent transactions from AXI and ACE-Lite masters are downgraded to non-coherent transactions.

Coherent transactions that are received at RN-I from AXI and ACE-Lite masters which are targeted for HN-I are downgraded to non-coherent transactions. For example:

- ReadOnce is downgraded to ReadNoSnp
- WriteUnique is downgraded to WriteNoSnp

2.14.10 XP error handling

Errors are reported at the XP for various reasons.

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The following errors are detected in the XP:

- Flit parity error
- Data check error, DAT channel only

Flit parity error

Flit parity is generated on a flit upload from a device port to a mesh port, for both internal and external devices. Flit parity check is done on a flit download from a mesh port to a device port.

Flit parity is not generated or checked when a flit is bypassed or looped back across the device ports on the same XP.

Data check error

Data check is enabled in the XP using the `DATACHECK_EN` parameter.

Data check, Data Byte Parity, bits are generated corresponding to each byte of data on a DAT flit upload from a device port when the corresponding device does not support Data check. Data check support is indicated by `DEV_DATACHECK_EN` = 0.

Data check is accomplished on a flit download to a device which does not support Data check.

Data check bits are generated and checked when a DAT flit is bypassed or looped back across the device ports on the same XP when the corresponding devices involved do not support Data check.

Error reporting and logging

Flit parity and Data check errors are reported to the RCB. The following table contains flit fields that are logged in the XP configuration register.

Table 2-22 XP configuration register flit fields

Error source	Errstatus					Errmisc			
-	DE	CE	MV	UE	V	ERRSRC	SRCID	OPCODE	TGTID
Data Parity P0 REQ channel	1	0	1	0	1	`3'b000`	v	v	v
Data Parity P1 REQ channel	1	0	1	0	1	`3'b001`	v	v	v
Data Parity P0 RSP channel	1	0	1	0	1	`3'b010`	v	v	v
Data Parity P1 REQ channel	1	0	1	0	1	`3'b011`	v	v	v
Data Parity P0 SNP channel	1	0	1	0	1	`3'b100`	v	v	0
Data Parity P1 SNP channel	1	0	1	0	1	`3'b101`	v	v	0
Data Parity P0 DAT channel	1	0	1	0	1	`3'b110`	v	v	v
Data Parity P1 DAT channel	1	0	1	0	1	`3'b111`	v	v	v
FLIT Parity P0 REQ channel	0	0	1	1	1	`3'b000`	v	v	v
FLIT Parity P1 REQ channel	0	0	1	1	1	`3'b001`	v	v	v
FLIT Parity P0 RSP channel	0	0	1	1	1	`3'b010`	v	v	v
FLIT Parity P1 REQ channel	0	0	1	1	1	`3'b011`	v	v	v
FLIT Parity P0 SNP channel	0	0	1	1	1	`3'b100`	v	v	0
FLIT Parity P1 SNP channel	0	0	1	1	1	`3'b101`	v	v	0
FLIT Parity P0 DAT channel	0	0	1	1	1	`3'b110`	v	v	v
FLIT Parity P1 DAT channel	0	0	1	1	1	`3'b111`	v	v	v

If the device supports Poison, indicated by `DEV_POISON_EN` = 1, the Datacheck error is factored in the POISON field of the DAT flit. Else, it is factored in as DataError in the RESPERR field.

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2.14.11 CXHA error handling

Errors are reported at the CXHA for various reasons.

CXHA uses RAMs as buffers for storing the Read and Write data. The contents of the RAM are protected using byte parity. CXHA reports errors if there is an error that is detected when the contents of the Data RAMs are read. These detected errors are of two types:

- Parity error on *Byte-Enable* (BE) fields of the Write Data RAM
- Parity error on Data and Poison fields of the Read and Write Data RAM

Parity error on BE fields of the Write Data RAM

The Write Data buffer RAM stores BE. Parity errors that are detected on BE are treated as UEs. On detecting an error, CXHA does the following:

- Logs the error as UE

Parity error on Data and Poison fields of the Read and Write Data RAM

The Read and Write data buffer RAMs contain the Data and Poison fields. Errors that are detected on these fields are treated as DEs. If an error is detected on Data fields, then the CXHA does the following:

- Logs the error as DE
- Poisons the data by setting the corresponding poison bit of the data. For more information about data poisoning, see the *Arm® AMBA® 5 CHI Architecture Specification*.

If an error is detected on Poison fields, then the CXHA does the following:

- Logs the error as DE
- All Poison bits are set to 1

2.14.12 CCIX Protocol Error messaging support

CMN-600 CML supports sending of CCIX *Protocol Error* (PER) message to the CCIX Error Agent present on the Host chip.

CMN-600 includes configuration registers, present in CXLA, and a mechanism to trigger a CCIX PER message. It is expected that an external Error Aggregator/Handler present outside CMN-600 collects and consolidates all the errors and uses these registers to trigger a CCIX PER message to the CCIX Error Agent.

CXLA Configuration Registers:

- CCIX PER Message Payload:
  - por_cxla_permsg_pyld_0_63
  - por_cxla_permsg_pyld_64_127
  - por_cxla_permsg_pyld_128_191
  - por_cxla_permsg_pyld_192_255
- CCIX PER Message Control:
  - por_cxla_permsg_ctl
- CCIX Error Agent ID:
  - por_cxla_err_agent_id

Mechanism:

- Error Aggregator external to CMN-600:
  - Writes the PER payload in CCIX PER Message Payload registers, por_cxla_permsg_pyld_*
  - Sets per_msg_vld_set bit in CCIX PER Message Control register, por_cxla_permsg_ctl. When set, a PER message is sent on the given CCIX link that is determined by the Target ID.

  It is the responsibility of CCIX discovery software to program CCIX Error Agent ID in CCIX Error Agent ID por_cxla_err_agent_id register. This programming should happen during initial system bring up and the programmed ID is used as the target ID on CCIX PER message.

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PER message is supported only in non-SMP mode and therefore smp_mode_en bit in por_cxla_aux_ctl register must be cleared during initial system startup. For more details on SMP mode, see *2.30 CML Symmetric Multiprocessor support* on page 2-168.

By default, *Error SourceID* (ESID) field from PER message payload, bits [53:48], are used as source ID on PER message. per_msg_srcid_ovrd and per_msg_srcid fields in CCIX PER message control register, por_cxla_permsg_ctl, can be used to override source ID sent on PER message.

Note

CMN-600 CML does not implement a CCIX Error Agent. It can accept the incoming PER messages, but these messages are dropped at CXLA.

Related concepts

2.14.2 Error types on page 2-85

Related references

3.3 Register descriptions on page 3-196

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2.15 CCIX Port Aggregation Groups

The CMN-600 CML configuration supports up to four CXGs. These CXGs can be grouped in up to two *CCIX Port Aggregation Groups* (CPAGs).

This feature can be used when connecting two or more chips together with multiple ports between the chips. For example, the following figure shows three chips that are connected by four CXGs that are grouped into two CPAGs.

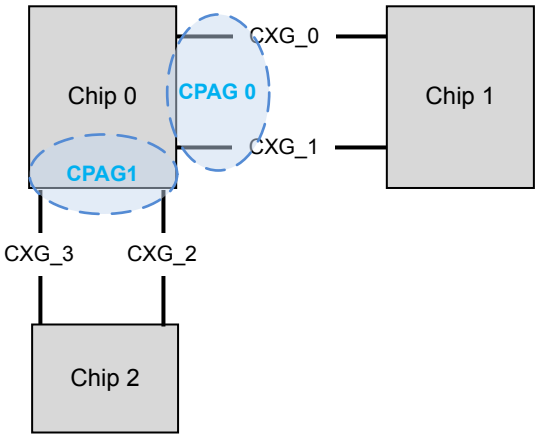

Figure 2-29 CCIX Port Aggregation Groups

In the preceding example, the following CPAGs are present:

CPAG_0 CPAG with two CCIX ports, CXG_0 and CXG_1, to connect Chip 1 to Chip 0.

CPAG_1 CPAG with two CCIX ports, CXG_2 and CXG_3, to connect Chip 2 to Chip 0.

To enable CPAG, both RN SAM and HN-F registers must be programmed accordingly in each chip.

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2.16 System Address Map

Every master that is connected to CMN-600 has the same view of memory.

The entire addressable space can be partitioned into subregions, and each partition must be designated as one of the following:

I/O space HN-I, HN-D, and HN-T service requests to I/O space

DDR space HN-F, SN-F, and SBSX service requests to DDR space

Note

Unmapped addresses are routed to the HN-D.

Each HN-F covers a mutually exclusive portion of the system address space. The options and constraints for HN-Fs are:

- Each HN-F can contain an SLC
- HN-Fs can be combined into *System Cache Groups* (SCGs)
- Each HN-F in an SCG must have the same SLC partition size
- An address hash function determines the target HN-F within an SCG

This section contains the following subsection:

- *2.16.1 CHI transactions and target IDs* on page 2-101.

2.16.1 CHI transactions and target IDs

This overview describes the relationship between CHI transactions and target IDs to route packets from a source to a destination.

All CHI transactions require a target ID to route packets from source to destination. For addressable requests, a *System Address Map* (SAM) determines the target ID. Each node that can generate a CHI addressable request contains a SAM:

RN SAM
Present in all RNs. Generates a target ID for requests to HN-F, HN-I, HN-D, HN-T, SBSX, and SN-F.

CXRA SAM
Present in all CXRA nodes. Generates a target ID for requests to CXHA nodes

HN-F SAM
Present in all HN-Fs. Generates a target ID for requests to SN-F and SBSX

HN-I SAM
Present in all HN-Is. Maps the address of the incoming CHI request to an I/O subregion for ordering purposes.

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2.17 RN SAM

Transactions from an RN must pass through an RN SAM to generate a CHI target ID.

CMN-600 RN-Is and CXHAs use an RN SAM that is internal to the interconnect.

CHI RN-Fs can use an RN SAM that is either internal or external to the interconnect. For CHI.A RN-Fs, there is a configuration option to instantiate a SAM that is internal to the interconnect. If this option is not selected, an external SAM must be created and integrated. It must be configurable without relying on the use of the CMN-600 programmable register space. Arm does not provide such an external RN SAM for CHI.A masters.

This section contains the following subsections:

2.17.1 Target IDs

This section describes how the Default target ID, *Generic Interrupt Controller* (GIC) target ID, and DVM target ID are determined in CMN-600.

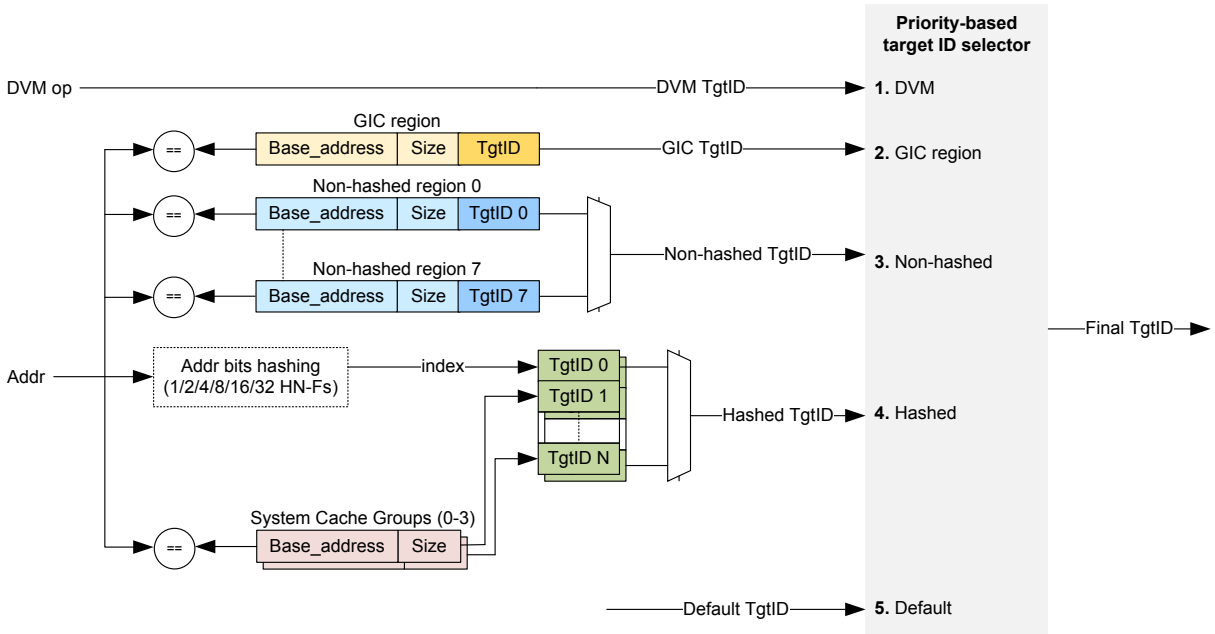

Figure 2-30 RN SAM target ID selection policy

Default target ID

Until the RN SAM has been fully programmed, all addressable transactions use the default target ID. RN SAMs that are internal to CMN-600 define the HN-D node ID as their default target ID. RN SAMs that are external to CMN-600 must be configured with a default target ID, which is programmable. When the RN SAM has been programmed, the default target ID is selected only for addressable requests that do not fall within one of the programmed address regions.

Hashed and non-hashed regions

A given memory partition can be either:

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- Distributed (hashed) across many target devices
- Assigned to an individual device (non-hashed)

A hashed region can overlap with a non-hashed region. Whether a given region is configured as hashed or non-hashed affects the target ID selection policy for that address range. The SCG region registers support up to four hashed regions. The non-hashed region registers support up to eight non-hashed regions.

The I/O space (HN-I, HN-D, and HN-T) is intended to be the target of non-hashed regions. The DRAM space (HN-F), however, can be the target of either non-hashed or hashed regions. It is also possible to classify a region that only targets one HN-F as hashed. Extra configuration scenarios include:

- Using an SCG region register for an HN-I, HN-D, and HN-T target. This scenario might be useful if all the non-hashed region registers have already been used. The region can optionally be classified as a non-hashed region, except for SCG region 0.
- Using a non-hashed region register for an HN-F target. This scenario might be useful if all the SCG region registers have already been used. For target ID selection purposes, this HN-F is classified as a non-hashed region.

GIC target ID

RN SAMs also support a *Generic Interrupt Controller* (GIC) memory region which can be used to select GIC-related addresses to a specific target ID. The GIC region can overlap with hashed and non-hashed regions.

RN SAM target ID selection policy

RN SAMs support priority-based target ID selection. The order of priority is when selecting a target ID is:

1. GIC memory region, highest priority
2. Non-hashed memory region
3. Hashed memory region
4. Default memory region, lowest priority

DVM target ID

DVM transactions are assigned the DVM target ID. RN SAMs that are internal to CMN-600 define the nodeID of the HN-D as the DVM target ID. RN SAMs that are external to CMN-600 must be configured with a DVM target ID, which is programmable.

2.17.2 Memory region requirements

This section describes the RN SAM memory region requirements.

Each of the programmed region sizes must be a power of two and the partition must be size-aligned. The region size can range from 64KB–256TB. For example, a 1GB partition must start at a 1GB-aligned boundary.

It is possible to support complex memory maps where DRAM region sizes are not a power of two or are not size-aligned. For example, the following figure shows a memory map where the entire address is assigned to a hashed region. Then, non-hashed regions can be individually programmed, because of their higher target ID selection priority. Software must prevent accesses to addresses in a hashed region that are not actually backed by physical memory. For more information, see the *Principles of Arm® Memory Maps White Paper*.

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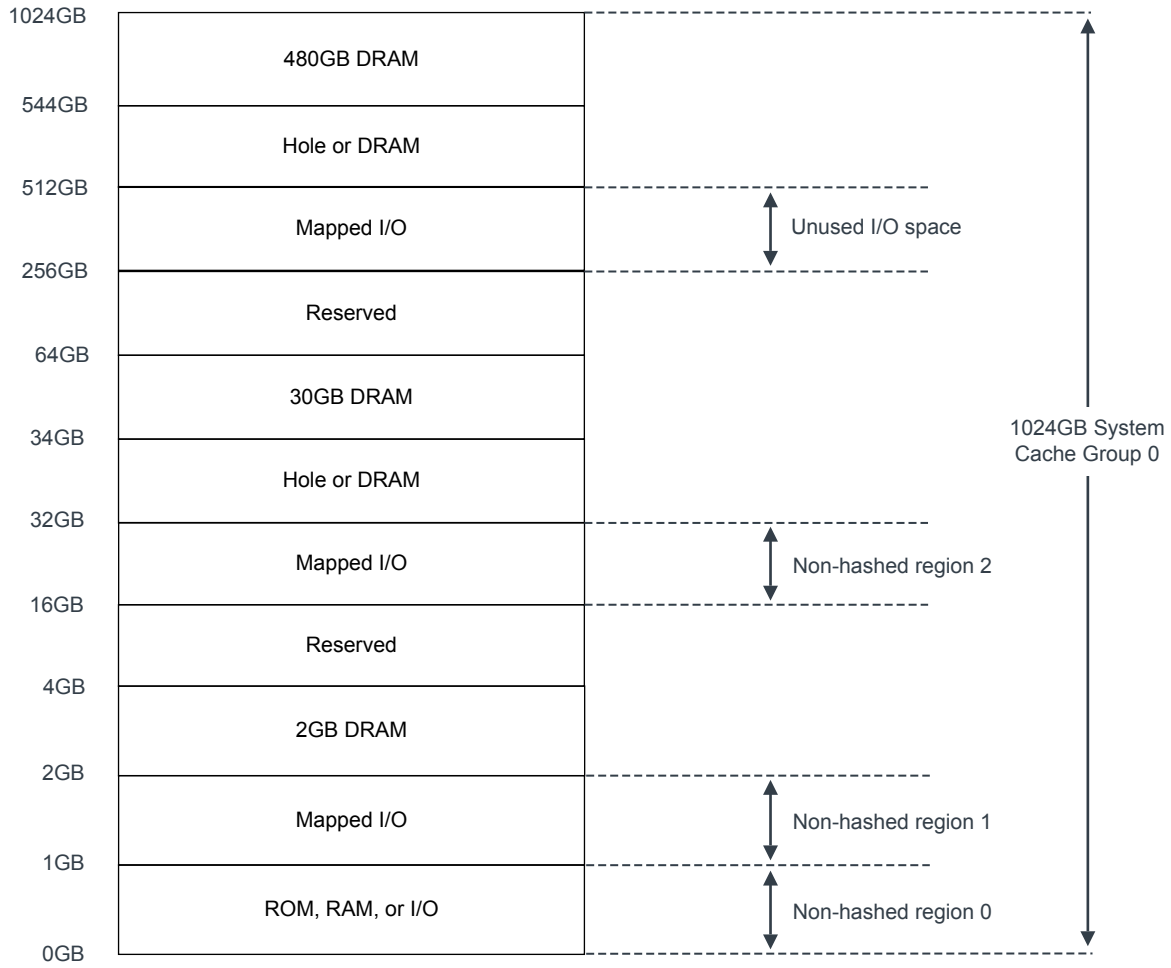

Figure 2-31 Example memory map

For more information about RN SAM configuration register memory partition sizes, see *2.20.2 SAM memory region size configuration* on page 2-120.

2.17.3 System Cache Groups

This section provides SCG configuration information.

An SCG is a group of HN-Fs that share a contiguous address region. However, the addresses that are covered by each HN-F in an SCG are mutually exclusive. An HN-F belonging to an SCG is selected as the target based on a hash function.

An SCG supports hashing over 1, 2, 4, 8, 16, 32, or 64 HN-Fs, using bits [MSB:6] of the PA of the request. If CMN-600 is configured to implement fewer than 52 PA bits, the unused upper bits are assumed to be zero. The hash algorithm calculates a pointer in the HN-F ID table in the RN SAM. The hash function is explicitly given in the following list. All numbers on the right-hand side of the equations in the list are bit positions within the PA. For example, 17 corresponds to PA bit [17]. In the equations, ^ represents XOR:

- Two HN-Fs:
  - Number of bits in select: 1
  - select [0] = (6^7^8^…^51)
- Four HN-Fs:

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  - Number of bits in select: 2
  - select [0] = (6^8^10^…^50)
  - select [1] = (7^9^11^…^51)
- Eight HN-Fs:
  - Number of bits in select: 3
  - select [0] = (6^9^12^…^51)
  - select [1] = (7^10^13^…^49)
  - select [2] = (8^11^14^…^50)
- 16 HN-Fs:
  - Number of bits in select: 4
  - select [0] = (6^10^14^…^50)
  - select [1] = (7^11^15^…^51)
  - select [2] = (8^12^16^…^48)
  - select [3] = (9^13^17^…^49)
- 32 HN-Fs:
  - Number of bits in select: 5
  - select [0] = (6^11^16^…^51)
  - select [1] = (7^12^17^…^47)
  - select [2] = (8^13^18^…^48)
  - select [3] = (9^14^19^…^49)
  - select [4] = (10^15^20^…^50)
- 64 HN-Fs:
  - Number of bits in select: 6
  - select [0] = (6^12^18^…^48)
  - select [1] = (7^13^19^…^49)
  - select [2] = (8^14^20^…^50)
  - select [3] = (9^15^21^…^51)
  - select [4] = (10^16^22^…^46)
  - select [5] = (11^17^23^…^47)

SCG configuration

CMN-600 supports up to four SCGs, depending on the number of HN-Fs in each SCG. The following table shows the restrictions on SCG selection when there are 16, 32, or 64 HN-Fs in a given SCG.

Table 2-23 Permitted allocation of HN-Fs into SCGs

SysCacheGroup HN-F/SN-F counts.	1 HN-F	2 HN-F	4 HN-F	8 HN-F	16 HN-F	32 HN-F	64 HN-F
SysCacheGroup 0	Y	Y	Y	Y	Y	Y	Y
SysCacheGroup 2	Y	Y	Y	Y	Y	N	N
SysCacheGroup 1	Y	Y	Y	Y	N	N	N
SysCacheGroup 3	Y	Y	Y	Y	N	N	N

The RN SAM supports up to 64 hashed HN-F and SN-F target IDs without using CAL mode. This feature allows up to 64 unique hashed target IDs in the RN SAM SCG target nodeID registers. RN SAM also supports up to 32 hashed target IDs when using CAL mode.

The nodeIDs in sys_cache_grp_[hn, sn]_nodeid_reg<X> registers are shared between all the SCGs. Therefore, the number of nodeIDs that are available for each SCG depends on the number of HN-Fs or CALs. The following algorithm determines the distribution of nodeIDs.

SCG0 NodeID0 to nodeID[n - 1]

SCG1 NodeID[n / 4] to nodeID[(n / 2) - 1]

SCG2 NodeID[n / 2] to nodeID[n - 1]

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SCG3 NodeID[n x 3 / 4] to nodeID[n - 1]

In the preceding algorithm, n represents the total number of hashed target IDs in the SAM.

If SCG0 uses all the available nodeIDs, then SCG1, SCG2, and SCG3 must not be used. If SCG0 only uses nodeID0 through nodeID[(n / 2) - 1], then SCG1 cannot be used. However, in this case, you can use SCG2 and SCG3 with (n / 4) nodeIDs in each of the SCGs.

For example, the following table shows the register and nodeID allocation for each SCG in a system with 64 hashed target IDs.

Table 2-24 RN SAM SCG target ID programming for 64 hashed targets

SCG target ID registers (64 hashed targets)	Number of HN-Fs per SCG target ID table				
	64	**32**	**16**	**8**	**4,2,1**
SCG CAL mode supported	No	Yes	Yes	Yes	Yes
sys_cache_grp_hn_nodeid_reg0	SCG0_NIDs	SCG0_NIDs	SCG0_NIDs	SCG0_NIDs	SCG0_NIDs
sys_cache_grp_hn_nodeid_reg1					-
sys_cache_grp_hn_nodeid_reg2				-	-
sys_cache_grp_hn_nodeid_reg3				-	-
sys_cache_grp_hn_nodeid_reg4			SCG1_NIDs	SCG1_NIDs	SCG1_NIDs
sys_cache_grp_hn_nodeid_reg5					-
sys_cache_grp_hn_nodeid_reg6				-	-
sys_cache_grp_hn_nodeid_reg7				-	-
sys_cache_grp_hn_nodeid_reg8		SCG2_NIDs	SCG2_NIDs	SCG2_NIDs	SCG2_NIDs
sys_cache_grp_hn_nodeid_reg9					-
sys_cache_grp_hn_nodeid_reg10				-	-
sys_cache_grp_hn_nodeid_reg11				-	-
sys_cache_grp_hn_nodeid_reg12			SCG3_NIDs	SCG3_NIDs	SCG3_NIDs
sys_cache_grp_hn_nodeid_reg13					-
sys_cache_grp_hn_nodeid_reg14				-	-
sys_cache_grp_hn_nodeid_reg15				-	-

The following table shows the register and nodeID allocation for each SCG in a system with 16 hashed target IDs.

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Table 2-25 RN SAM SCG target ID programming for 16 hashed targets

SCG target ID registers (16 hashed targets)	Number of HN-Fs per SCG target ID table			
	16	8	4	2, 1
sys_cache_grp_hn_nodeid_reg0	SCG0_NIDs	SCG0_NIDs	SCG0_NIDs	SCG0_NIDs
				-
sys_cache_grp_hn_nodeid_reg1			SCG1_NIDs	SCG1_NIDs
				-
sys_cache_grp_hn_nodeid_reg2		SCG2_NIDs	SCG2_NIDs	SCG2_NIDs
				-
sys_cache_grp_hn_nodeid_reg3			SCG3_NIDs	SCG3_NIDs

The following table shows the register and nodeID allocation for each SCG in a system with eight hashed target IDs.

Table 2-26 RN SAM SCG target ID programming for eight hashed targets

SCG target ID registers (eight hashed targets)	Number of HN-Fs per SCG target ID table			
	8	4	2	1
sys_cache_grp_hn_nodeid_reg0	SCG0_NIDs	SCG0_NIDs	SCG0_NIDs	SCG0_NIDs
				-
			SCG1_NIDs	SCG1_NIDs
				-
sys_cache_grp_hn_nodeid_reg1		SCG2_NIDs	SCG2_NIDs	SCG2_NIDs
			SCG3_NIDs	SCG3_NIDs
				-

The following table shows the register and nodeID allocation for each SCG in a system with four hashed target IDs.

Table 2-27 RN SAM SCG target ID programming for four hashed targets

SCG target ID registers (four hashed targets)	Number of HN-Fs per SCG target ID table		
	4	2	1
sys_cache_grp_hn_nodeid_reg0	SCG0_NIDs	SCG0_NIDs	SCG0_NIDs
			SCG1_NIDs
		SCG2_NIDs	SCG2_NIDs
			SCG3_NIDs

The hashed target ID allocation in the preceding tables is also applicable to SN target IDs.

The following table contains an example mapping of HN-Fs to SCGs.

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Table 2-28 25 HN-Fs to three SCGs programming example

SCG number	Number of HN-Fs	Node ID
SCG0	16	NID0-15
SCG2	8	NID16-23
SCG3	1	NID24

The following table contains example programming for 25 HN-Fs.

Table 2-29 Example programming for 25 HN-Fs

SCG target ID registers.	Number of HN-Fs per SCG			
	32	16	8	1
sys_cache_grp_hn_nodeid_reg0	-	SCG0 NID0-15	-	-
sys_cache_grp_hn_nodeid_reg1				
sys_cache_grp_hn_nodeid_reg2				
sys_cache_grp_hn_nodeid_reg3				
sys_cache_grp_hn_nodeid_reg4		-	SCG2 NID16-23	
sys_cache_grp_hn_nodeid_reg5				
sys_cache_grp_hn_nodeid_reg6			-	SCG3 NID24
sys_cache_grp_hn_nodeid_reg7				-

SCGs 1-3 can be configured to non-hashed mode. In non-hashed mode, the SCG can contain a single HN-I, HN-T, HN-D, or HN-F.

2.17.4 PrefetchTgt RN SAM

The RN SAM supports CHI PrefetchTgt operations.

These operations are sent from RN-F directly to SN-F, bypassing the HN-F. To support such requests, the RN SAM integrates the functionality of HN-F SAM to determine the appropriate SN-F target ID for a given address. RN-Fs that integrate the PrefetchTgt RN SAM only use the SN-F target ID for PrefetchTgt requests. The PrefetchTgt RN SAM programming must match the HN-F SAM for SN-F target IDs.

The registers that are used for programming the PrefetchTgt RN SAM are:

- por_rnsam_sys_cache_grp_sn_attr
- por_rnsam_sys_cache_grp_sn_nodeid_reg{0-7}
- por_rnsam_sys_cache_grp_sn_sam_cfg{0-1}

The PrefetchTgt RN SAM registers are only present in RN SAM blocks associated with CHI-B or CHI-C RN-F nodes.

Note

For RN SAM blocks associated with other node types such as RN-I, RN-D, and CXHA:

- Reads of these register offsets always return a value of zero
- Writes to these register offsets have no effect
- These registers do not appear in the IP-XACT files

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2.18 CXRA SAM

All *CCIX Requesting Agents* (CXRA) in CMN-600 require a CCIX *Requesting Agent System Address Map* (RA SAM) to determine the target CCIX *Home Agent ID* (HAID). This HAID is used as the target ID to route the CCIX request.

The RA SAM uses configuration registers to specify address regions and corresponding HAIDs. Each address region is configured by programming the base address and corresponding size of the address region, or programming the address limit. Each valid address region is marked using a valid bit. The incoming address is compared against programmed valid address regions to generate a specific HAID.

The following figure shows a CCIX RA SAM block diagram.

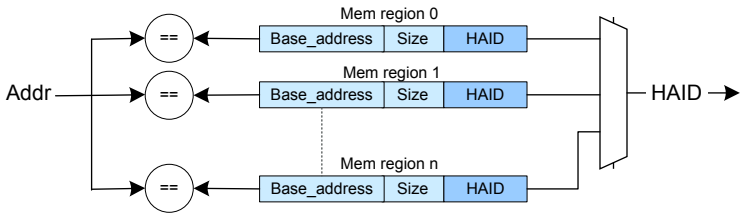

Figure 2-32 RA SAM block diagram

Address region requirements

Each of the programmed address region sizes must be a power of two and must be naturally-aligned to its size. For example, a 1GB partition must start at 1GB boundary. That is, 0GB-1GB or 1GB-2GB, and so forth, but it cannot start from 1.5GB or 2.5GB.

For information about how CCIX messages are routed based on the CXRA SAM programming, see *2.22 Cross chip routing and ID mapping* on page 2-135.

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2.19 HN-F SAM

Transactions from an HN-F to an SN must pass through an HN-F SAM to generate a CHI target ID.

The following figure shows how the target ID is determined from the HN-F SAM.

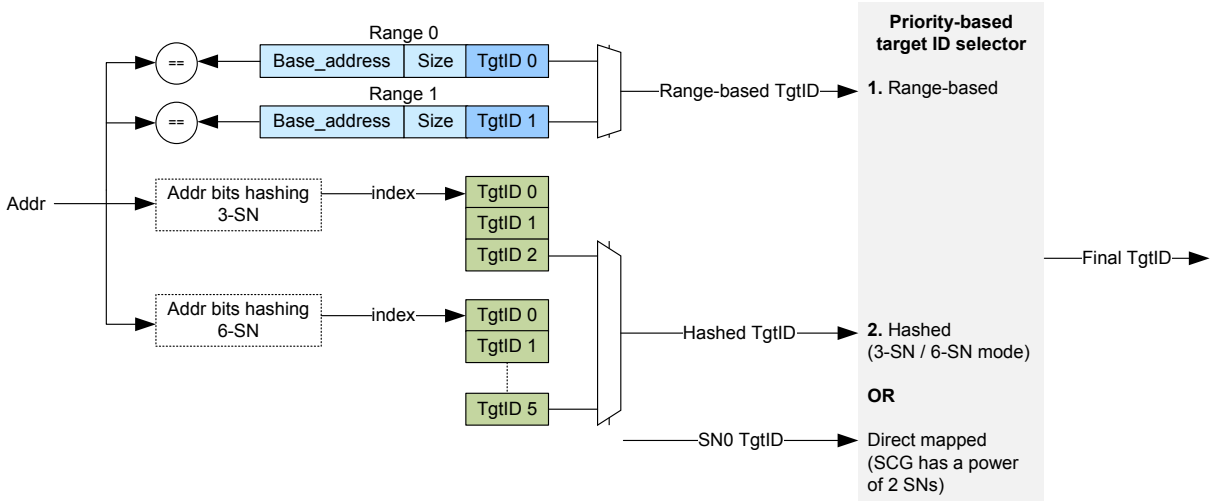

Figure 2-33 HN-F SAM target ID selection policy

As the preceding figure shows, the HN-F SAM has three mapping policies to generate target IDs for transactions:

- Range-based
- Hashed
- Direct mapping

An HN-F cannot use both hashed mapping mode and direct mapping mode. To map transactions that fall in the range-based part of the HN-F SAM, HN-F SAMs support priority-based target ID selection. The order of priority when selecting a target ID is:

1. Range-based mapping, highest priority
2. Striped target ID, 3-SN or 6-SN mode, or direct mapped target ID, SCG has a power of 2 SNs

Range-based mapping

Range-based mapping is an address-based target ID generation policy. Up to two address regions can be created, each targeting a single HN. This mode is useful where a partition of memory from the global DRAM is mapped explicitly to an individual SN, for example, an on-chip SRAM.

Hashed mapping

The HN-F SAM supports two address striping modes for SN target ID selection, which can only be used when the SCG targets three or six SNs:

3-SN mode Addresses from a given HN-F are striped across three SNs

6-SN mode Addresses from a given HN-F are striped across six SNs

Addresses within the address range of the SCG are striped at a 256B granularity between the selected SNs. The stripe function uses address bits [16:8], and an extra two, 3-SN, or three, 6-SN, user-defined address bits.

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Direct mapping

Direct SN mapping is used if the SCG targets 1, 2, 4, or 8 SNs. In this case, the transaction uses the SN0 target ID. Distributing accesses across the SNs targeted by the SCG is achieved by programming the SN0 field of each HN-F to the SN node ID it targets. For example, if an SCG with eight HN-Fs targets eight SNs, the SN0 field of each HN-F would be programmed with a different SN node ID. If that same SCG with eight HN-Fs targets four SNs instead, every two HN-F nodes would have the same SN0 field value.

This section contains the following subsections:

- *2.19.1 HN-F SAM 3-SN and 6-SN memory striping modes* on page 2-111.
- *2.19.2 SN contiguous address spaces* on page 2-115.

2.19.1 HN-F SAM 3-SN and 6-SN memory striping modes

The CMN-600 HN-F SAM supports two memory striping modes, 3-SN mode and 6-SN mode. In these modes, the HN-F SAM stripes addresses across three SN-Fs or six SN-Fs respectively.

3-SN mode

In 3-SN mode, a stripe function ensures that traffic is distributed evenly among the three SNs. The stripe function is based on PA[16:8] and two higher bits in the PA. The two higher PA bits are referred to as top_address_bit1 and top_address_bit0. The top address bits are selected so that:
- Three of the four combinations of the top address bits appear evenly in the selected address space.
- The fourth combination never appears.

Note

In some situations, a top bit can be the inverse of the selected PA bit.

For each physical address, one of the three SNs is selected using the following formula:

SN = { ADDR[10:8] + ADDR[13:11] + ADDR[16:14] + ((top_addr_bit1<<1) | top_addr_bit0) } % 3

General SN distribution behavior example

For a simple case with a 3GB flat address space starting at address `0x0`, top_address_bit1 is PA[31], and top_address_bit0 is PA[30]. With increasing physical address, the function steps between SNs at a 256-byte granularity. As the physical address iterates from 0-128KB, with top_address_bit1 = top_address_bit0 = 0, the first three terms distribute the traffic relatively evenly among the SNs. Of the 512 blocks (256B each) in the first 128KB, the distribution is:

SN[0] 170 blocks 33.2%
SN[1] 171 blocks 33.4%
SN[2] 171 blocks 33.4%

This pattern repeats over each 128KB until 1GB, where top_address_bit0 toggles. With top_address_bit1 = 0 and top_address_bit0 = 1, the pattern is shifted. For each 128KB:

SN[0] 171 blocks 33.4%
SN[1] 170 blocks 33.2%
SN[2] 171 blocks 33.4%

At 2GB, when top_address_bit1 = 1 and top_address_bit0 = 0, the pattern shifts again:

SN[0] 171 blocks 33.4%
SN[1] 171 blocks 33.4%
SN[2] 170 blocks 33.2%

Over the full 3GB, the same number of lines are distributed to each SN.

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The HN-F uses the hn_cfg_three_sn_en bit in its por_hnf_sam_control register to enable routing to three SNs. In the por_hnf_sam_control register, the hn_cfg_sam_top_address_bit0 and hn_cfg_sam_top_address_bit1 fields must be configured at boot time. These two address bits are decoded, and used with a hashing function to determine the target SN-F.

6-SN mode

Similar to 3-SN hashing, 6-SN extends the function to equally distribute the addresses between six SNs. For each physical address, one of the six SNs is selected using the following formula:

SN = { ADDR[10:8] + ADDR[13:11] + ADDR[16:14] + ((top_addr_bit2<<2) | (top_addr_bit1<<1) | top_addr_bit0) } % 6

HN-F SAM uses the hn_cfg_six_sn_en bit in its por_hnf_sam_control register to enable striping across all six SN-Fs. In 6 SN-F hashed mode, HN-F SAM also uses hn_cfg_sam_top_address_bit2 field in the por_hnf_sam_control register along with hn_cfg_sam_top_address_bit1 and hn_cfg_sam_top_address_bit0 to hash the incoming address.

3-SN and 6-SN configurations

The valid top address bits for Arm PDD Memory Map are shown in the following table. For more information, refer to the *Principles of Arm® Memory Maps White Paper*. This configuration ensures equal distribution of requests across all SN-Fs and prevents memory aliasing. The SAM also provides an inv_top_address_bit configuration bit, which can be used with top address bits as shown in the following table:

Table 2-30 3-SN mode top address bits [bit 1, bit 0]

Combination 1 (inv_top_address_bit set to 0b0)	Combination 2 (inv_top_address_bit set to 0b0)	Combination 3 (inv_top_address_bit set to 0b1)	Combination 4 (inv_top_address_bit set to 0b1)
[0, 0]	[1, 1]	[0, 0]	[0, 0]
[0, 1]	[0, 1]	[1, 0]	[0, 1]
[1, 0]	[1, 0]	[1, 1]	[1, 1]

Note

When inv_top_address_bit=1, it forces the SAM to invert the top most significant top address bit. For 3-SN mode, top_address_bit1 is inverted. For 6-SN mode, top_address_bit2 is inverted.

The following table shows the valid combinations for the address bits for 6-SN mode with PDD memory map.

Table 2-31 6-SN top address bits [bit 2, bit 1, bit 0]

Combination 1 (inv_top_address_bit set to 0b0)	Combination 2 (inv_top_address_bit set to 0b0)	Combination 3 (inv_top_address_bit set to 0b1)
[0, 0, 0]	[0, 1, 0]	[0, 0, 0]
[0, 0, 1]	[0, 1, 1]	[0, 0, 1]
[0, 1, 0]	[1, 0, 0]	[0, 1, 0]
[0, 1, 1]	[1, 0, 1]	[0, 1, 1]

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Table 2-31 6-SN top address bits [bit 2, bit 1, bit 0] (continued)

Combination 1 (inv_top_address_bit set to 0b0)	Combination 2 (inv_top_address_bit set to 0b0)	Combination 3 (inv_top_address_bit set to 0b1)
[1, 0, 0]	[1, 1, 0]	[1, 1, 0]
[1, 0, 1]	[1, 1, 1]	[1, 1, 1]

Example 2-2 Example for PDD memory map

Assume that a system supports three SN-Fs with 32GB of DRAM at each SN-F port and all three SN-Fs are used for SCG 0. Since the DRAM space is non-contiguous in this memory map (2GB + 30GB + 480GB), the base addresses for each DRAM partition are:

1. a. `000_8000_0000` to `000_FFFF_FFFF` (2GB)
   b. `008_8000_0000` to `00F_FFFF_FFFF` (30GB)
2. `088_0000_0000` to `08F_FFFF_FFFF` (32GB)
3. `090_0000_0000` to `097_FFFF_FFFF` (32GB)

The first two regions together comprise a 32GB region, while the remaining two regions are 32GB each. The following table breaks down the address bits for the regions that are shown in the preceding list.

Table 2-32 Address region example bit settings: 3-SN example

Region	39	38	37	36	35	34	33	32	31
1	0	0	0	0	0	0	0	0	1
1	0	0	0	0	1	x	x	x	1
2	1	0	0	0	1	x	x	x	x
3	1	0	0	1	0	x	x	x	x

From the address bit breakdown, the selected top address bits must make sure both regions that are marked as Region 1 have the same values. This requirement ensures no aliasing in memory. For this memory map and DRAM size, there are no address bits that directly give Combination 1 or Combination 2 as shown in *Table 2-30 3-SN mode top address bits [bit 1, bit 0]* on page 2-112. However, if bits [39, 36] are used along with inv_top_address_bit = 1, then Combination 3 is possible. This approach ensures that the memory requests are equally distributed across the three SN-Fs without memory aliasing.

The following figure shows the Arm proposed memory map.

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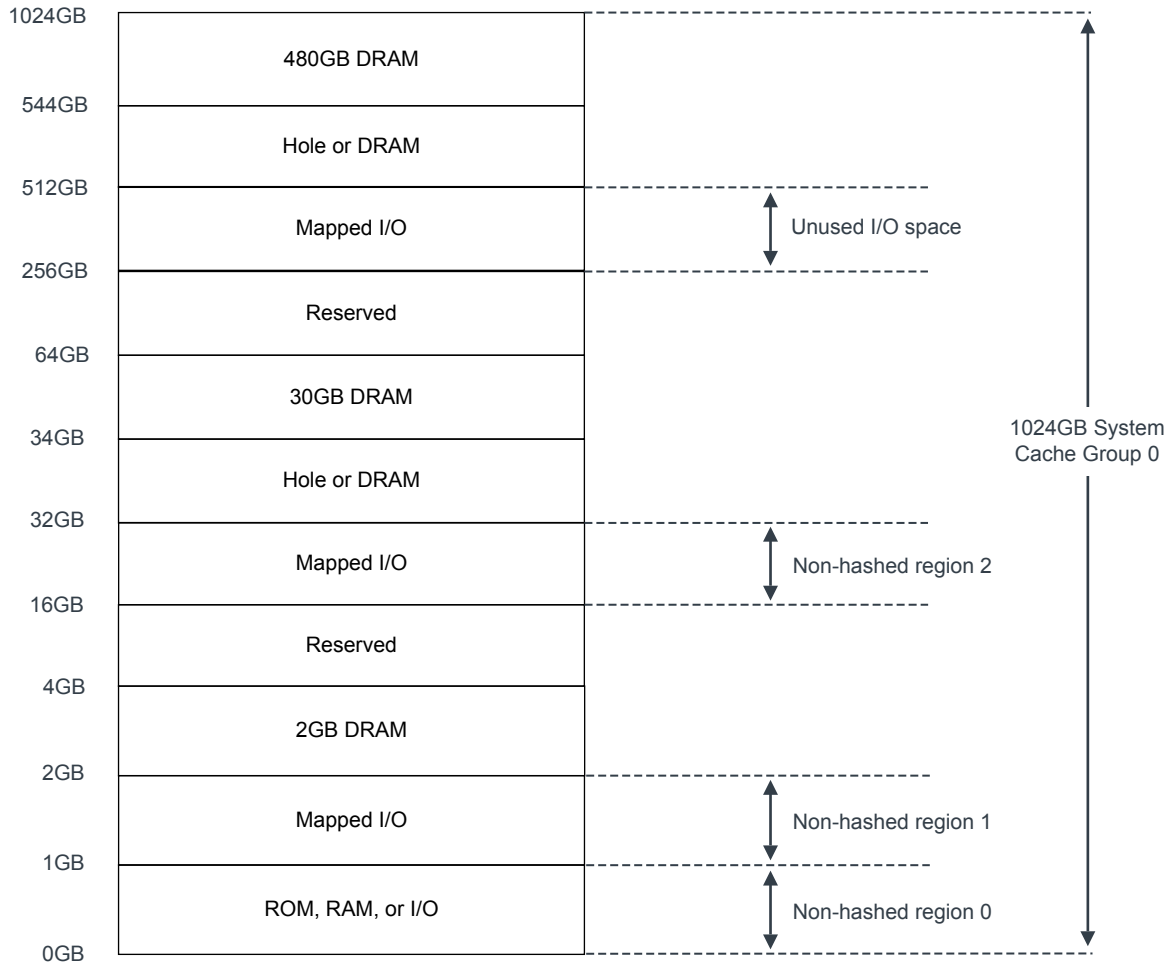

Figure 2-34 Example memory map programming

The following tables provide example address bits that are known to provide equal distribution of memory across all SN-Fs in 3-SN and 6-SN modes.

Table 2-33 3-SN DRAM size settings

3-SN DRAM size at each SN-F port	Top address bits [bit 1, bit 0]	Inv_top_address_bit value
1GB (Total 3GB)	[35, 30]	0b0
2GB (Total 6GB)	[35, 31]	0b0
4GB (Total 12GB)	[33, 32]	0b0
8GB (Total 24GB)	[34, 33]	0b0
16GB (Total 48GB)	[39, 34]	0b0
32GB (Total 96GB)	[39, 36]	0b1
64GB (Total 192GB)	[37, 36]	0b0
128GB (Total 384GB)	[38, 37]	0b0

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Table 2-34 6-SN DRAM size settings

6-SN DRAM size at each SN-F port	Top address bits [bit 2, bit 1, bit 0]	Inv_top_address_bit value
1GB (Total 6GB)	[35, 31, 28]	0b0
2GB (Total 12GB)	[33, 32, 28]	0b0
4GB (Total 24GB)	[34, 33, 28]	0b0
8GB (Total 48GB)	[39, 34, 33]	0b0
16GB (Total 96GB)	[39, 36, 28]	0b1
32GB (Total 192GB)	[37, 36, 28]	0b0
64GB (Total 384GB)	[38, 37, 28]	0b0

2.19.2 SN contiguous address spaces

This section describes which physical address bits must be connected to an SN-F for various configurations.

If all HN-Fs send their cache misses to a single SN-F, that SN-F sees the full address space. However, it is common for a system to have two or more SN-Fs, with each HN-F sending its cache misses to a single SN-F. In this scenario, each SN-F receives only part of the address space. SN-F typically removes one or more address bits to retain a contiguous address map. The full physical address is presented to each SN-F for every request so that any SN-F based memory protection logic can function. However, the actual mapping to RAM locations can be done with the modified address. The address modification depends on multiple factors:

- Number of HN-Fs in the cache group
- Number of SN-Fs in the cache group
- Which HN-Fs share SN-Fs

2^n-SN address striping

The following table provides HN-F and SN-F combinations that are supported within a cache group, along with the address bits that should be removed.

Table 2-35 HN-F and SN-F combinations supported within a cache group

Number of HN-Fs	Number of SN-Fs	Bits to strip from full PA
2	1	None
	2	[6]
4	1	None
	2	[7]
	4	[7, 6]
8	1	None
	2	[8]
	4	[8, 7]
	8	[8, 7, 6]

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Table 2-35 HN-F and SN-F combinations supported within a cache group (continued)

Number of HN-Fs	Number of SN-Fs	Bits to strip from full PA
16	1	None
	2	[9]
	4	[9, 8]
	8	[9, 8, 7]
	16	[9, 8, 7, 6]
32	1	None
	2	[10]
	4	[10, 9]
	8	[10, 9, 8]
	16	[10, 9, 8, 7]
	32	[10, 9, 8, 7, 6]
64	1	None
	2	[11]
	4	[11, 10]
	8	[11, 10, 9]
	16	[11, 10, 9, 8]
	32	[11, 10, 9, 8, 7]

The method that is used to calculate the bits stripped is as follows:

1. The highest bit removed is the least significant address bit used in the XOR function for the most significant bit of the HN-F select hash function.

   64 HN-Fs PA[11]
   32 HN-Fs PA[10]
   16 HN-Fs PA[9]
   Eight HN-Fs PA[8]
   Four HN-Fs PA[7]
   Two HN-Fs PA[6]

2. The number of bits stripped is $\log_2$(number of SN-Fs), sequentially below the highest bit.

This approach to bit stripping assumes that HN-Fs that share SN-Fs are sequential in the RN SAM cache group HN-F table. For example, if there are eight HN-Fs and two SN-Fs, the bottom four HN-Fs in the RN SAM table would share an SN-F. The top four HN-Fs would share an SN-F.

3-SN and 6-SN address striping

3-SN and 6-SN address hashing modes implement a modulo function according to the top address bits used. Therefore, the SN-F must remove these bits to achieve a contiguous memory map in the DRAM.

3-SN mode The SN-F must remove top_address_bit1 and top_address_bit0.

6-SN mode The SN-F must remove top_address_bit2, top_address_bit1, and top_address_bit0.

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2.20 RN and HN-F SAM

This section describes the features that RN SAM and HN-F SAM support.

These features are:

- Secondary memory regions for each SCG
- Address bit masking for hashing and range comparison
- 64 HN-Fs with CAL support in the RN SAM
- 64 hashed targets and 20 non-hashed regions in RN SAM

Secondary memory regions for SCGs

Each SCG supports two memory regions. If the incoming address matches either of the two programmed valid regions, the RN SAM selects the target ID of the corresponding SCG from the target ID table.

——— **Restriction** ———

- Secondary memory region sizes must be size-aligned and a power of two
- If the primary region for an SCG is set to non-hashed mode, the secondary region must also be set to non-hashed mode

———————————

Address bit masking

RN SAM supports masking of address bits that are used for range comparison and address hashing. To enable this support, program the rnsam_hash_addr_mask_reg and rnsam_region_cmp_addr_mask_reg registers.
When comparing the incoming address against the programmed ranges, RN SAM uses address bits:

- [47:26] for hashed and non-hashed memory regions
- [47:16] for GIC memory regions

To mask off the incoming address and the programmed address ranges before comparison, program the select bits in rnsam_region_cmp_addr_mask_reg to 0. This region mask is applied to hashed, non-hashed, and GIC memory regions.
RN SAM hashes all address bits [47:6] to equally distribute the requests across all target devices, HN-F and SN-F. To remove address bits from the hashing logic, program the select bits in rnsam_hash_addr_mask_reg to 0. This feature is only applicable to hashed memory regions.
HN-F SAM uses all address bits [47:26] when comparing the incoming address against the programmed ranges. To mask off the incoming address and the programmed address ranges before comparison, program the select bits in hnf_sam_region_cmp_addr_mask_reg to 0. This region mask is only applicable to region-based memory partitioning in the HN-F. Therefore the mask is not applied to the hashing scheme in 3-SN and 6-SN modes.
HN-F SAM supports masking of address bits used for 3-SN or 6-SN address hashing. To enable this feature, program the hn_sam_hash_addr_mask_reg register.

——— **Restriction** ———

- If 3-SN or 6-SN mode is enabled, address bits [16:7] and the top_addr_bits are essential in distributing the addresses between memory. Arm recommends that these bits are masked carefully to avoid memory aliasing.
- The range comparison mask cannot mask off bits that represent the size of the region. For example, if any region has a size of 64MB, address bit [26] cannot be masked. Similarly, if any region has a size of 512MB, address bit [29] cannot be masked.
- The address bits masked in HN-F and RN SAM must be consistent. This consistency ensures that PrefetchTgt requests from an RN-F to SN-F are addressed by the same SN-F as an SLC miss from the HN-F to SN-F.

———————————

HN-F with CAL support in the RN SAM

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CMN-600 supports pairing of two HN-Fs at an MXP port using CAL. CMN-600 Supports up to 32 CAL instances for HN-F nodes in a mesh, allowing up to 64 HN-F nodes. The HN-F node IDs paired at the CAL are only differentiated using the device ID (NodeID[1:0]) field as described in *2.4 Node ID mapping* on page 2-52.
There are two modes for assigning HN-F nodes to SCGs when CALs are used:

Note

If CAL mode is not used for SCGs when HN-F CAL instances are present, modifying the `RNSAM_NUM_ADD_HASHED_TGT` global RTL parameter might be required when configuring the mesh in Socrates. By default, the number of HN-F CAL instances, rather than the absolute number of HN-F nodes determines the number of sys_cache_grp_hn_nodeid registers rendered in the HN-F. For the number sys_cache_grp_hn_nodeid registers to at least match the absolute number of HN-F nodes, the `RNSAM_NUM_ADD_HASHED_TGT` global RTL parameter value should be increased by the number of HN-F CAL instances present in the mesh.

Normal mode

When using normal mode, each HN-F node ID is explicitly assigned to a SCG using the methods as described in *2.17.3 System Cache Groups* on page 2-104 and in the previous programming examples. For example, if four CAL instances are used to connect eight HN-F nodes, two HN-F nodes per CAL, and all eight HN-F nodes belonged to the same SCG, all eight HN-F node IDs would be entered in the target ID registers of the SCG, and the HN-F count field for that SCG would be set to eight.

CAL mode

When using CAL mode, only one of the two HN-Fs attached to the CAL has its node ID entered into the target ID registers of the SCG. For example, if four CAL instances were used to connect eight HN-F nodes, two HN-F nodes per CAL, and all eight HN-F nodes belonged to the same SCG, only four of HN-F node IDs would be entered in the SCG target ID registers, one per CAL, of the SCG, and the HN-F count field for that SCG would be set to four.
The RN SAM register, sys_cache_grp_cal_mode_reg, is used to enable CAL mode for each SCG. For example, to enable CAL mode for SCG 0, write a 1 to bit [0] of this register.
RN SAM relies on this scheme to support hashing of addresses over twice the number of HN-Fs using the existing hashed target ID programming table.
For example, if an SCG is programmed to have four HN-Fs and HN-F CAL mode for this region is enabled, the RN SAM generates eight unique target IDs as follows:

- Number of bits in select: 3
- select[0] = (6^9^12^15^18^21^24^27^30^33^36^39^42^45)
- select[1] = (7^10^13^16^19^22^25^28^31^34^37^40^43^46)
- select[2] = (8^11^14^17^20^23^26^29^32^35^38^41^44^47)

Bits select[1:0] are used to pick between the four programmed HN-F target IDs. Bit select[2] is used to override the device ID field as follows:
Target NodeID[10:0] = {hash_nodeID_pick[10:1], hash_nodeID_pick[0] ^ select[2]}

Restriction

- This feature can only be used when the target HN-F are paired using CAL
- RN SAM does not apply this method to SN-F target IDs. For optimal use of the CHI.B PrefetchTgt operations to SN-F, the paired HN-Fs must always be mapped to the same SN-F, or group of SN-Fs if 3-SN or 6-SN hashing is used.
- Only one HN-F ID from each CAL group can be programmed in the RN SAM hashed target ID registers
- If an SCG contains a mix of local HN-F and CXG node IDs, CAL mode cannot be used for that SCG

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20 non-hashed regions in RN SAM

The RN SAM supports 20 non-hashed regions.

Note

When 20 non-hashed regions are present in an RN-F ESAM node, there is an extra cycle of latency for RN SAM lookup in the XP on the request flit.

This section contains the following subsections:

2.20.1 Program the SAM

The SAM must be programmed using a specific sequence. An RN-F or master that is connected to an RN-I must perform this sequence during the configuration of CMN-600 at boot.

There are several configuration decisions that must be made when setting up the SAM. For more information, see the following sections:

- *2.17 RN SAM* on page 2-102
- *2.19 HN-F SAM* on page 2-110

Prerequisites

This sequence is part of the overall CMN-600 boot configuration process. There are steps that must occur at boot-time before SAM programming. For more information about the full process, see *3.4.1 Boot-time programming sequence* on page 3-1069.

Procedure

1. Define the following memory map regions:
   - Hashed memory regions, which target HN-Fs. The hashed memory regions can be partitioned into SCGs, if applicable.
   - Non-hashed memory regions, which likely target HN-I or HN-D.
   - Non-hashed regions with HN-I or HN-D mapping. If a single HN-F is the target, HN-F can also be used in non-hashed mode.
   - GIC memory region, if present.
   - HN-F SAM memory regions, if applicable.
   - Mapping of HN-Fs to SN-Fs. This mapping can be direct, 3-SN, or 6-SN mode.
2. Ensure that the memory map meets the following requirements:
   - Non-hashed memory regions must not overlap.
   - Hashed memory regions must not overlap.
   - The memory regions must be size-aligned.
3. Program the following attributes and registers for each HN-F SAM:
   a. Program the appropriate properties for each SN-F ID, according to the features that are supported in the por_hnf_sam_sn_properties register.

      These properties provide the interface width as either 128-bit or 256-bit, CMO support, and PCMO support.
   b. Program the HN-F to SN-F mapping, which depends on the mapping schemes that are used:
      - If the HN-F is directly mapped to an SN-F, program the SN0 target ID and corresponding attributes.
      - If the HN-F is in 3-SN or 6-SN mode, program the following:

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— All SN-F target IDs and the attributes for each SN-F.
— The mode of operation as 3-SN or 6-SN.
— The top address bits.
- If the HN-F uses range-based SN-F partitioning for a particular memory region, program the memory region registers, including the target ID that is associated with each region.

4. Complete the following programming for the RN-F RN SAM:
   a. Program the following attributes and registers for each SCG:
      - Memory region registers.
      - HN-F count registers.
      - HN-F target ID registers.
      - If PrefetchTgt operations are enabled:
        — SN-F target ID registers for SCG.
        — SN-F target ID selection mode for SCG.
        — If 3-SN or 6-SN mode is enabled, program the top address bits.
   b. Program the non-hashed memory region registers.
   c. Program the non-hashed target ID registers.
   d. Program the rnsam_status register to disable the default target ID mode.
5. Complete the following programming for each RN-I RN SAM and RN-D RN SAM:
   a. Program the following registers for each SCG:
      - Memory region registers.
      - HN-F count registers.
      - HN-F target ID registers.
   b. Program the non-hashed memory region registers.
   c. Program the non-hashed target ID registers.
   d. Program the rnsam_status register to disable the default target ID mode.

2.20.2 SAM memory region size configuration

Hashed, non-hashed, and GIC memory regions support various sizes. Each memory partition must be individually programmed in the SAM registers.

RN SAM and HN-F SAM support the following memory partition sizes:

Hashed and non-hashed 64MB to maximum addressable space (2^{48}).

GIC 64KB, 128KB, 256KB, and 512KB.

The following table lists the memory partition size encodings that are used to program the RN SAM and HN-F SAM registers.

Table 2-36 RN SAM and HN-F SAM configuration register memory partition sizes

Memory partition size		regionX_size value
GIC	**Hashed and non-hashed**	
64KB	64MB	`5'b00000`
128KB	128MB	`5'b00001`
256KB	256MB	`5'b00010`
512KB	512MB	`5'b00011`

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Table 2-36 RN SAM and HN-F SAM configuration register memory partition sizes (continued)

Memory partition size		regionX_size value
GIC	Hashed and non-hashed	
N/A	1GB	5'b00100
	2GB	5'b00101
	4GB	5'b00110
	8GB	5'b00111
	16GB	5'b01000
	32GB	5'b01001
	64GB	5'b01010
	128GB	5'b01011
	256GB	5'b01100
	512GB	5'b01101
	1TB	5'b01110
	2TB	5'b01111
	4TB	5'b10000
	8TB	5'b10001
	16TB	5'b10010
	32TB	5'b10011
	64TB	5'b10100
	128TB	5'b10101
	256TB	5'b10110

The RN SAM also outputs the target type of the device along with the target ID for the RN to use in various optimizations. The target type encodings are listed in the following table.

Table 2-37 Device target types

Device type	Target type
HN-F	2'b00
HN-I	2'b01
CXRA	2'b10
Reserved	2'b11

The following table contains RA SAM configuration register memory partition sizes and encodings.

Table 2-38 RA SAM configuration register memory partition sizes

Memory partition size	regionX_size value
64KB	6'b000000
128KB	6'b000001
256KB	6'b000010
512KB	6'b000011

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Table 2-38 RA SAM configuration register memory partition sizes (continued)

Memory partition size	regionX_size value
1MB	6'b000100
2MB	6'b000101
4MB	6'b000110
8MB	6'b000111
16MB	6'b001000
32MB	6'b001001
64MB	6'b001010
128MB	6'b001011
256MB	6'b001100
512MB	6'b001101
1GB	6'b001110
2GB	6'b001111
4GB	6'b010000
8GB	6'b010001
16GB	6'b010010
32GB	6'b010011
64GB	6'b010100
128GB	6'b010101
256GB	6'b010110
512GB	6'b010111
1TB	6'b011000
2TB	6'b011001
4TB	6'b011010
8TB	6'b011011
16TB	6'b011100
32TB	6'b011101
64TB	6'b011110
128TB	6'b011111
256TB	6'b100000

2.20.3 Example memory map programming

This section describes an example memory map and how to program it in the RN SAM and HN-F SAM.

The following figure shows an example memory map with 1024GB addressable size. It is based on the Arm 40-bit proposed address map. It has three separate DRAM regions (in the address ranges from 2-4GB, 34-64GB and 544-1024GB) and four I/O regions, which must be mapped to specific targets. It is assumed that the I/O region 256-512GB is unused and no requests are sent to this address.

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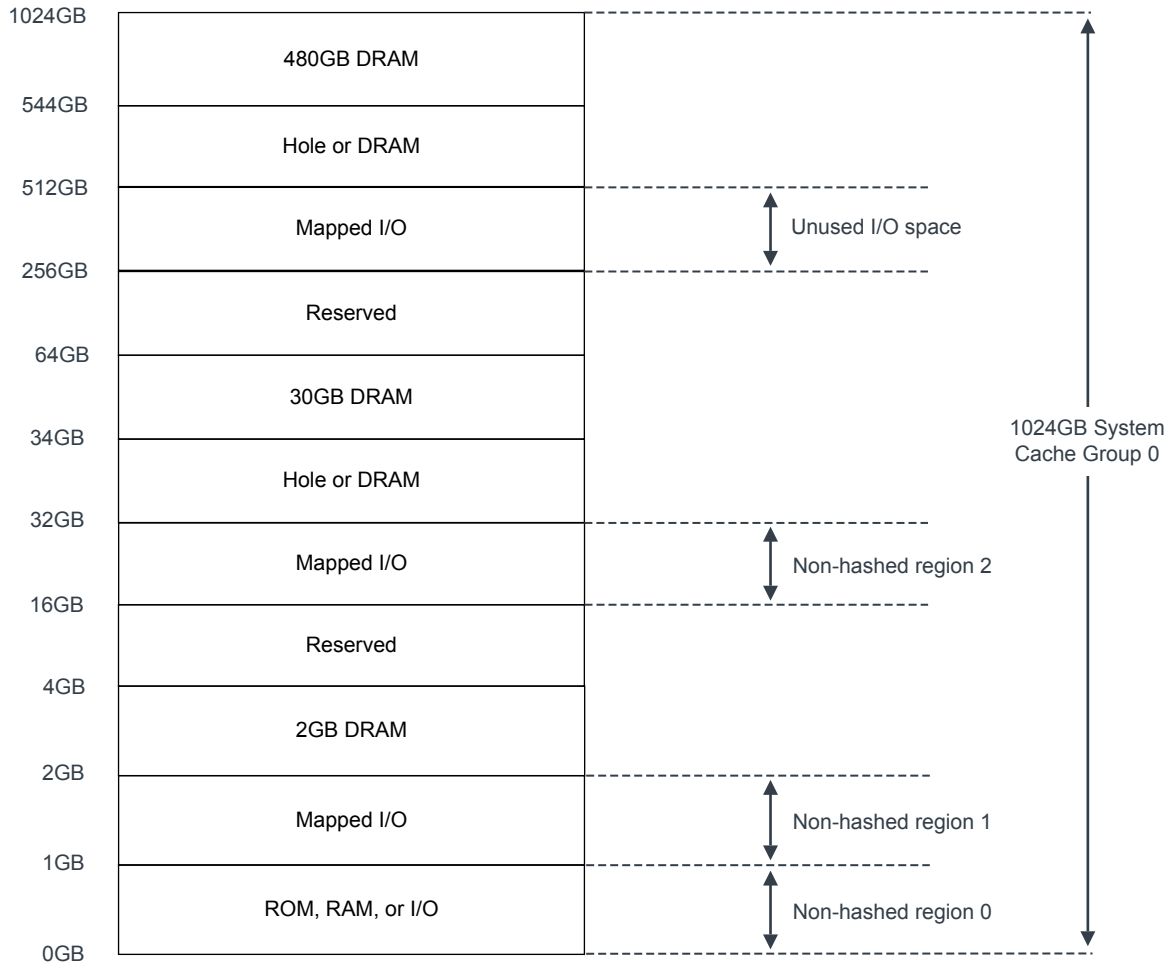

Figure 2-35 CMN-600 example memory map

It is assumed that there are eight HN-Fs in the system and all HN-Fs are being used for one SCG (group 0). To program the RN SAM, follow these steps:

1. Map the full 1024GB memory map to the system cache group. Arm recommends this mapping because DRAM regions are non-contiguous and the entire DRAM space is assigned to one SCG.
2. Carve out each of the non-hashed regions from the full 1024GB memory map as shown in the preceding figure. Assign each non-hashed region to individual non-hashed targets.
3. When the RN SAM programming is done, turn ON the region-based target ID selection by disabling the default mode of the RN SAM.

The following table shows the RN SAM registers and the corresponding programmed values.

Table 2-39 RN SAM registers and programmed values

Register	Field	Value	Description
sys_cache_grp_region_reg0	region0_base_address	`0x0_0000`	Base address [47:26]
	region0_size	`5'b01110`	1024GB size
	region0_target_type	`2'b00`	HN-F target type
	region0_valid	`1'b1`	Region 0 is valid

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Table 2-39 RN SAM registers and programmed values (continued)

Register	Field	Value	Description
sys_cache_grp0_nodeid_reg0	nodeid_0	<hnf0_node_id>	Physical node IDs of the HN-Fs in the system from HN-F 0 to HN-F 7
	nodeid_1	<hnf1_node_id>	
	nodeid_2	<hnf2_node_id>	
	nodeid_3	<hnf3_node_id>	
sys_cache_grp0_nodeid_reg1	nodeid_4	<hnf4_node_id>	
	nodeid_5	<hnf5_node_id>	
	nodeid_6	<hnf6_node_id>	
	nodeid_7	<hnf7_node_id>	
sys_cache_group_hnf_count	scg0_num_hnf	0x08	Total of eight HN-Fs in this system cache group
non_hash_mem_region_reg0	region0_base_address	0x0_0000	<1GB from [47:26] 0x0_0000_0000
	region0_size	5'b00100	1GB size
	region0_target_type	2'b01	HN-I target type
	region0_valid	1'b1	Region 0 is valid
	region1_base_address	0x0_0010	1GB region from 0x0_4000_0000
	region1_size	5'b00100	1GB size
	region1_target_type	2'b01	HN-I target type
	region1_valid	1'b1	Region 1 is valid
non_hash_mem_region_reg1	region2_base_address	0x0_0100	16GB region from 0x4_0000_0000
	region2_size	5'b01000	16GB size
	region2_target_type	2'b01	HN-I target type
	region2_valid	1'b1	Region 2 is valid
non_hash_tgt_nodeid0	nodeid_0	<hni0_node_id>	Node ID of HN-I 0 corresponding to non-hashed region 0
	nodeid_1	<hni1_node_id>	Node ID of HN-I 1 corresponding to non-hashed region 1
	nodeid_2	<hni2_node_id>	Node ID of HN-I 2 corresponding to non-hashed region 2
rnsam_status	nstall_req	1'b1	Unstall any operations that depend on SAM programming.
	default_target	1'b0	Disable default mode and use the programmed ranges for new incoming addresses.

Similarly to RN SAM, HN-F SAM must also be programmed so that it can select the correct SN-F target ID. All HN-F SAMs within SCG 0 must have the same programming, as the following table shows, including the attributes of each SN-F.

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Table 2-40 HN-F programming information

Register name	Field name	Value	Description
por_hnf_sam_control	hn_cfg_sn0_nodeid	<sn0_node_id>	Node ID of SN-F 0
	hn_cfg_sn1_nodeid	<sn1_node_id>	Node ID of SN-F 1
	hn_cfg_sn2_nodeid	<sn2_node_id>	Node ID of SN-F 2
	hn_cfg_three_sn_en	1'b1	Enable 3-SN mode.
	hn_cfg_sam_top_address_bit0	39	Bit 39 of address
	hn_cfg_sam_top_address_bit1	36	Bit 36 of address
	hn_cfg_sam_inv_top_address_bit	1'b1	Invert top address bit.

2.20.4 Support for CCIX Port Aggregation

RN SAM supports *CCIX Port Aggregation* (CPA).

Requests from an RN to a remote chip can be striped across multiple CCIX gateway blocks based on address bits. The following figure shows this functionality.

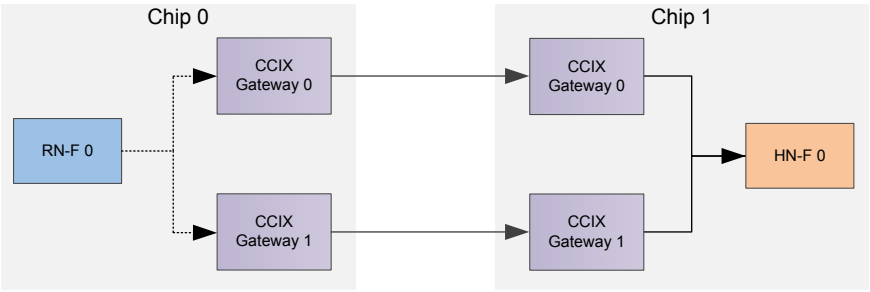

Figure 2-36 RN SAM CCIX Port Aggregation

This striping is achieved by hashing physical address bits[47:6]. The RN SAM CCIX can hash incoming addresses across two or four gateway blocks forming a *CCIX Port Aggregation Group* (CPAG). RN SAM can support up to two CPAGs. RN SAM also has an address mask for each CPA which can be used to remove certain bits from the hashing. For example, to stripe the incoming address at 512B granularity, the address mask bits[47:6] can be set to `0x3FFFFFFFFF8`. With this mask setup, the logical operator AND is applied to all incoming addresses before hashing the address bits. For details on programming, see the RN SAM registers.

HN-F support for CPA

HN-F also supports CPA for snoop requests going to a remote chip. HN-F uses the same hashing as RN SAM so that a given address always goes to the same CCIX gateway block. HN-F uses the ID of the RN-F to determine if CPA is enabled. To enable CPA for the ID of each RN-F, refer to the logical to physical ID conversion registers in HN-F.

To determine if CPA is enabled, RN SAM uses the address ranges and HN-F SAM uses the logical ID of the RN-F. As explained in *2.22 Cross chip routing and ID mapping* on page 2-135, HN-F contains the *Logical ID* (LDID) to physical node ID conversion table as shown in *2.22 Cross chip routing and ID mapping* on page 2-135 in the Example Programming table. This table, along with the CHI node ID and valid fields, also contains remote, cpa_en, and cpa_grpid bits. By using these bits, HN-F can determine if the RN-F is enabled to use CPA, and sends the snoops through appropriate ports by hashing the address bits.

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Guidelines for enabling CPA in RN SAM and HN-F

Certain rules apply when enabling the CPA in RN SAM and HN-F:

- The CPA is only applicable to SCG and non-hashed ranges.
- Each non-hashed memory range can be explicitly enabled to use CPA or use a single non-hashed target ID.
- The target ID of each SCG can be explicitly enabled to use CPA.
- The HN-F, when participating as a CPA target for traffic from a remote RN-F, must not receive non-CPA traffic from the same remote RN-F. In other words, an RN-F cannot send CPA and non-CPA traffic to the same remote HN-F.
- Each SCG in RN SAM can contain only one CPA group along with local HN-F target IDs.

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2.21 HN-I SAM

To simplify mapping and ordering of downstream endpoint address space, the HN-I SAM maps an incoming address to a target endpoint that is connected downstream behind HN-I.

The endpoint can be one of the following:

- Peripheral with memory-mapped I/O space, such as UART or GPIO
- Physical memory, such as SRAM or FLASH

Restriction

Arm recommends that the HN-I SAM is only programmed during the boot process.

To map and order the address space of these endpoints, the HN-I SAM supports:

- Up to three Address Regions

  Restriction

  Address Regions 1, 2, and 3 must not overlap.

- One Order Region of configurable size for each Address Region
- A default Address Region, Address Region 0

Each Address Region can be programmed as either peripheral or physical memory.

Note

By default, each Address Region is mapped to peripheral memory.

Physical

- Follows normal memory ordering guarantees
- Order Region programming function output does not matter

Peripheral

- Follows device memory ordering guarantees
- These Address Regions can be further divided into smaller address spaces that are known as Order Regions. Device memory ordering guarantees are maintained within each Order Region.
- To enforce strict ordering for a specific Address Region, program its Order Region size to `6'b111111`

Caution

An Address Region register must be disabled if the following are true:

- There is potential for new requests to fall into the Address Region register that is newly configured
- These new requests require ordering regarding the existing outstanding requests

The minimum address granularity for Address Regions and Order Regions is 4KB. This size is equivalent to the minimum slave address space granularity in AXI and ACE-Lite. Therefore, the base address in the Address Region {1, 2, 3} Configuration Registers only includes bits [`REQ_ADDR_WIDTH` −1:12].

Address Region 0

By default, the entire address space of a given HN-I is mapped to Address Region 0. All transactions to this region are kept in order.

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The default Order Region size in Address Region 0 is `6'b111111`, which covers the entire HN-I address space. The Order Region size can also be configured to:

- `6'b100100` when `REQ_ADDR_WIDTH`==48
- `6'b100000` when `REQ_ADDR_WIDTH`==44

Address Region 0 is always valid. Therefore, the Address Region 0 Configuration Register does not define a Valid bit.

For more information, see *por_hni_sam_addrregion0_cfg* on page 3-578.

This section contains the following subsection:

- *2.21.1 HN-I SAM example configuration* on page 2-128.

2.21.1 HN-I SAM example configuration

This example system configuration for HN-I SAM uses three Address Regions and an Order Region within each Address Region.

The following figure shows the high-level configuration of the address space and the base addresses of each Address Region.

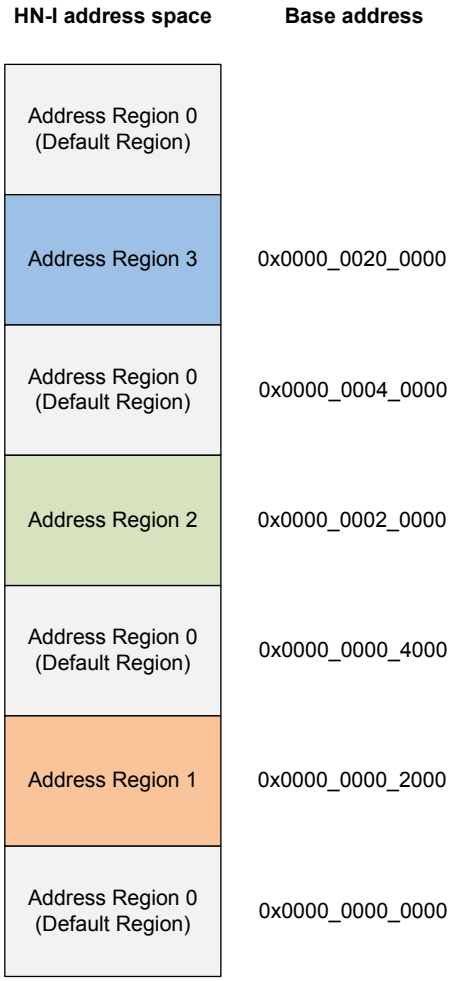

Figure 2-37 HN-I address space example

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Note

In each Address Region Configuration Register, the following bitfields use the default value:

- ser_all_wr
- ser_devne_wr
- pos_early_wr_comp_en
- pos_early_rdack_en

Address Region 0

The following figure shows the example configuration for Address Region 0.

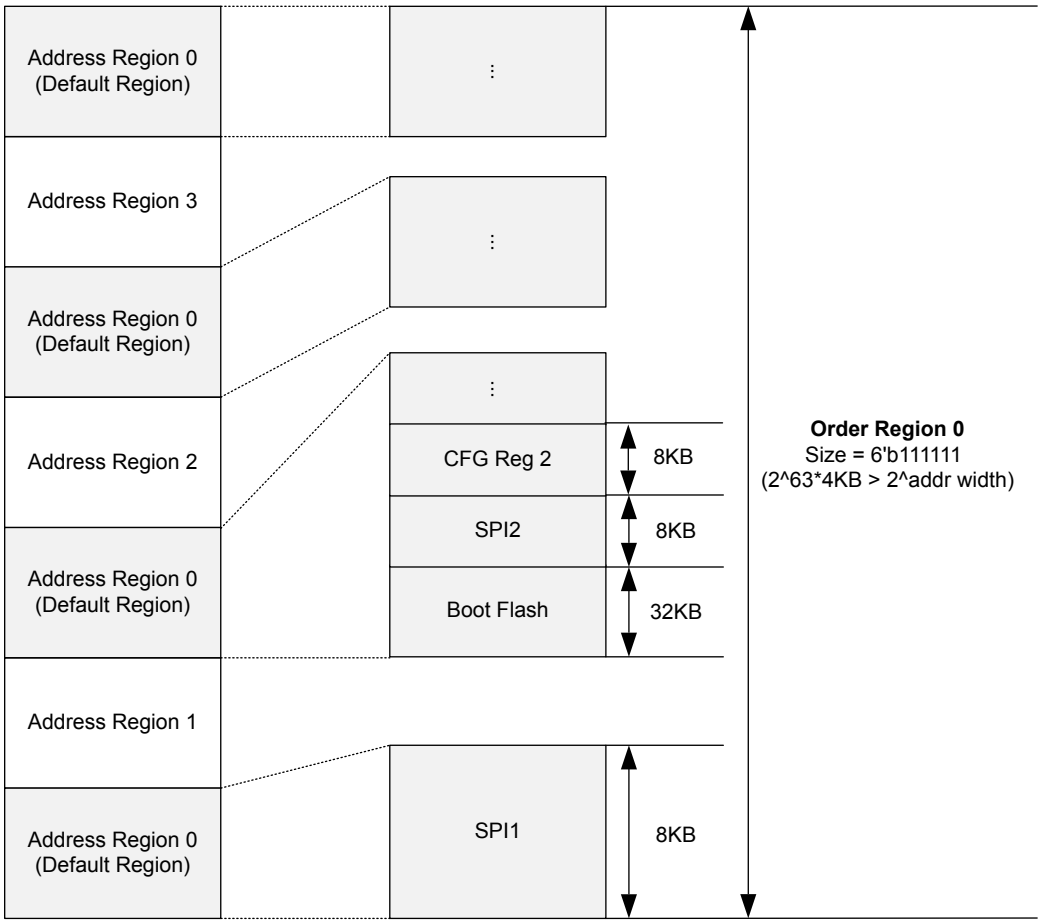

Figure 2-38 Address Region 0 configuration

The size of the maximum peripheral address space in Address Region 0 is 32KB (Boot Flash). Requests targeting this Boot Flash must be kept in order. By configuring the Order Region 0 size to 32KB, requests with addresses from `0x0000_0000_0000` to `0x0000_0000_8000` are ordered. However, since Boot Flash is not aligned to the 32KB boundary (`0x0000_0000_4000` to `0x0000_0000_C000`), requests might be out of order and cause issues. To ensure all requests to Boot Flash are ordered, the Order Region 0 size must be configured to at least 64KB. In this configuration, requests to SPI1, SPI2, and CFG Reg 2 are also ordered with respect to requests to Boot Flash. Instead, to optimize performance:

- Address Region 0 can have a SAM with Boot Flash aligned to the 32KB boundary.
- The Order Region 0 size can be configured to 32KB.

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The following table shows the configured values for the Address Region 0 Configuration Register, por_hni_sam_addrregion0_cfg.

Table 2-41 Address Region 0 Configuration Register

Bits	Field name	Configured value
[5:0]	order_reg_size	`6'h4`
[58]	physical_mem_en	`1'b0`
[59]	ser_all_wr	`1'b0`
[60]	ser_devne_wr	`1'b0`
[61]	pos_early_rdack_en	`1'b1`
[62]	pos_early_wr_comp_en	`1'b1`

Address Region 1

The following figure shows the example configuration for Address Region 1.

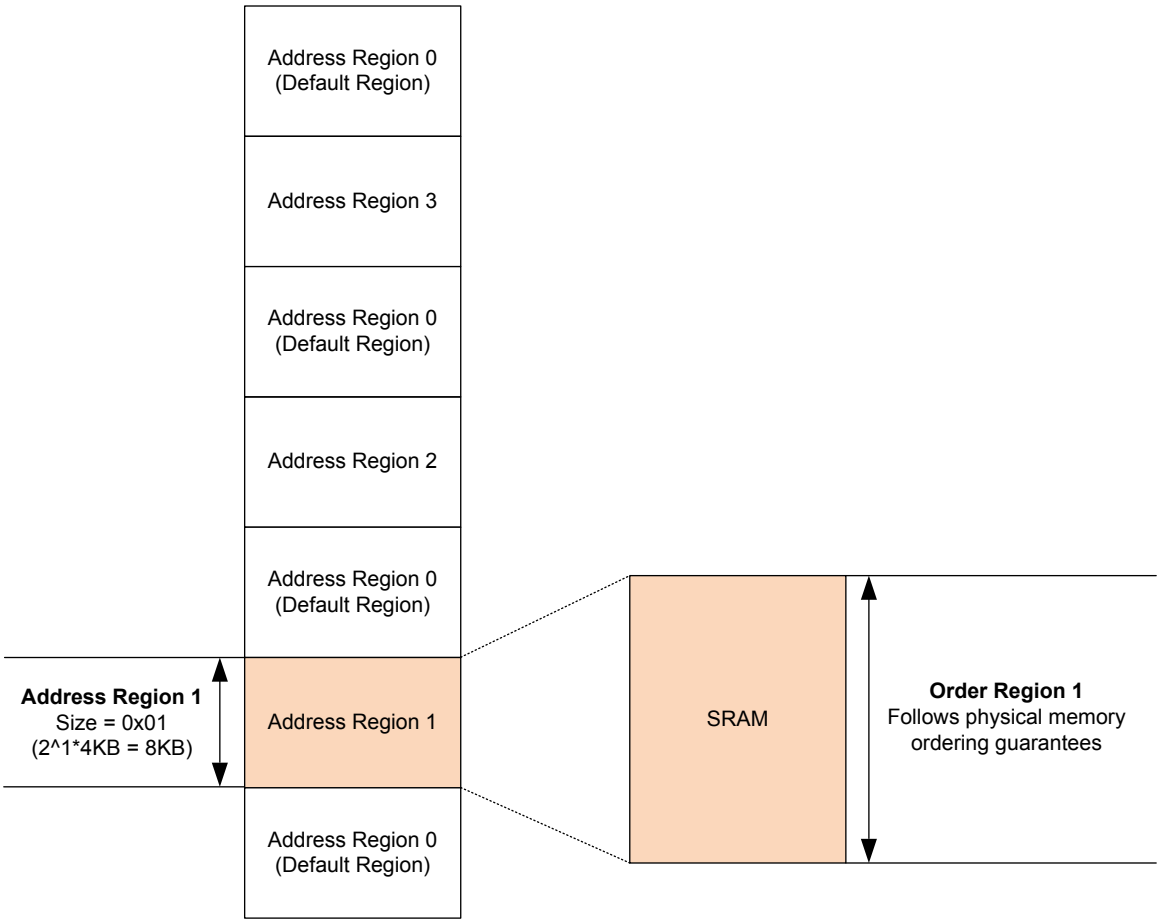

Figure 2-39 Address Region 1 configuration

Address Region 1 starts at base address `0x0000_0000_2000` and is 8KB in size. Because there is SRAM behind this region, it is mapped as physical memory. The entire Address Region 1 is considered as one

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Order Region. Therefore, ordering is maintained between all requests to the overlapping cache line region (64B).

The following table shows the configured values for the Address Region 1 Configuration Register, por_hni_sam_addrregion1_cfg.

Table 2-42 Address Region 1 configuration

Bits	Field name	Configured value
[5:0]	order_reg_size	6'h1
[15:10]	addr_region_size	6'h1
[55:20]	base_addr	36'h0000_0000_2
[58]	physical_mem_en	1'b1
[59]	ser_all_wr	1'b0
[60]	ser_devne_wr	1'b0
[61]	pos_early_rdack_en	1'b1
[62]	pos_early_wr_comp_en	1'b1
[63]	valid	1'b1

Address Region 2

The following figure shows the example configuration for Address Region 2.

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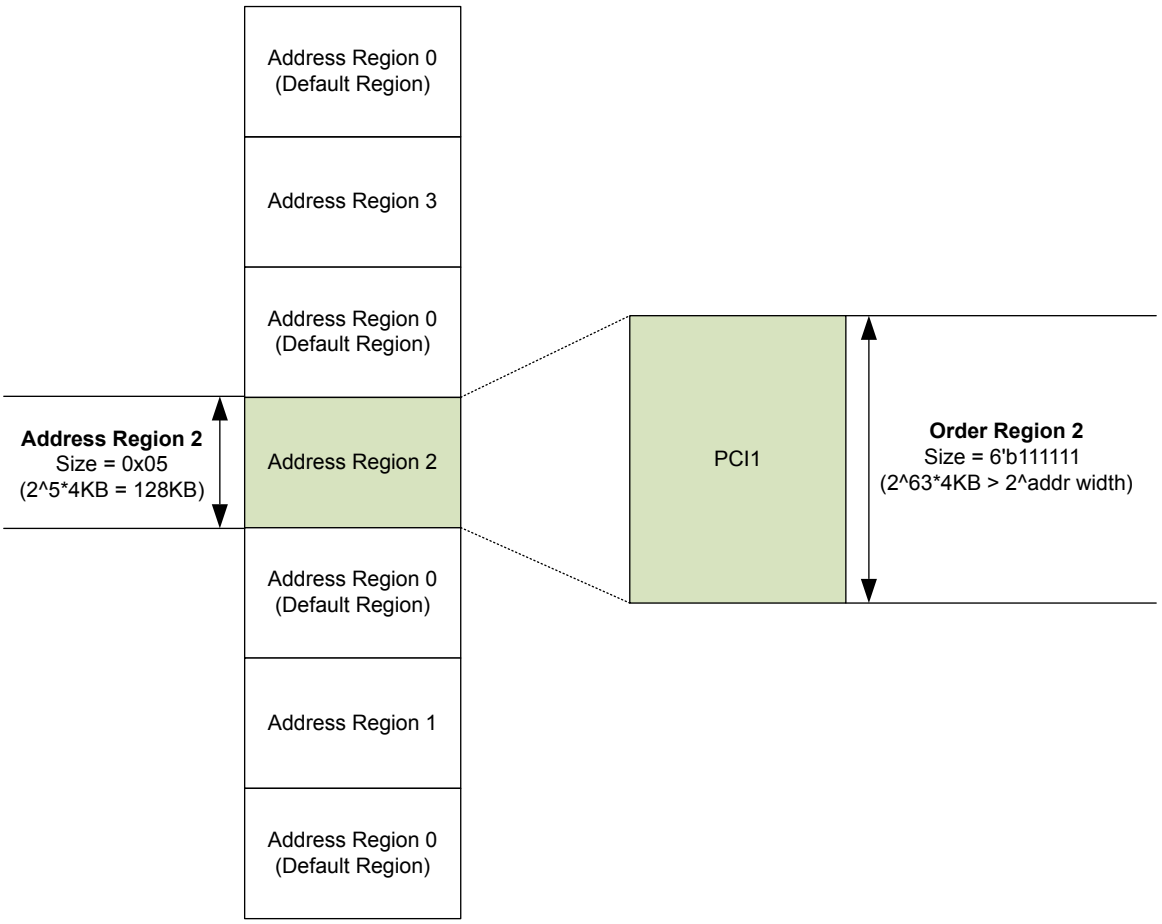

Figure 2-40 Address Region 2 configuration

Address Region 2 starts at base address `0x0000_0002_0000` and is 128KB in size. The Order Region 2 size ($2^{63} \times 4$KB) is configured to the maximum value (`6'b111111`), so Address Region 2 is considered as one Order Region. PCI1 occupies the entire Order Region, so all PCI1 requests are ordered.

The following table shows the configured values for the Address Region 2 Configuration Register, por_hni_sam_addrregion2_cfg.

Table 2-43 Address Region 2 configuration

Bits	Field name	Configured value
[5:0]	order_reg_size	`6'b111111`
[15:10]	addr_region_size	`6'h5`
[55:20]	base_addr	`36'h0000_0002_0`
[58]	physical_mem_en	`1'b0`
[59]	ser_all_wr	`1'b0`
[60]	ser_devne_wr	`1'b0`
[61]	pos_early_rdack_en	`1'b1`

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Table 2-43 Address Region 2 configuration (continued)

Bits	Field name	Configured value
[62]	pos_early_wr_comp_en	1'b1
[63]	valid	1'b1

Address Region 3

The following figure shows the example configuration for Address Region 3.

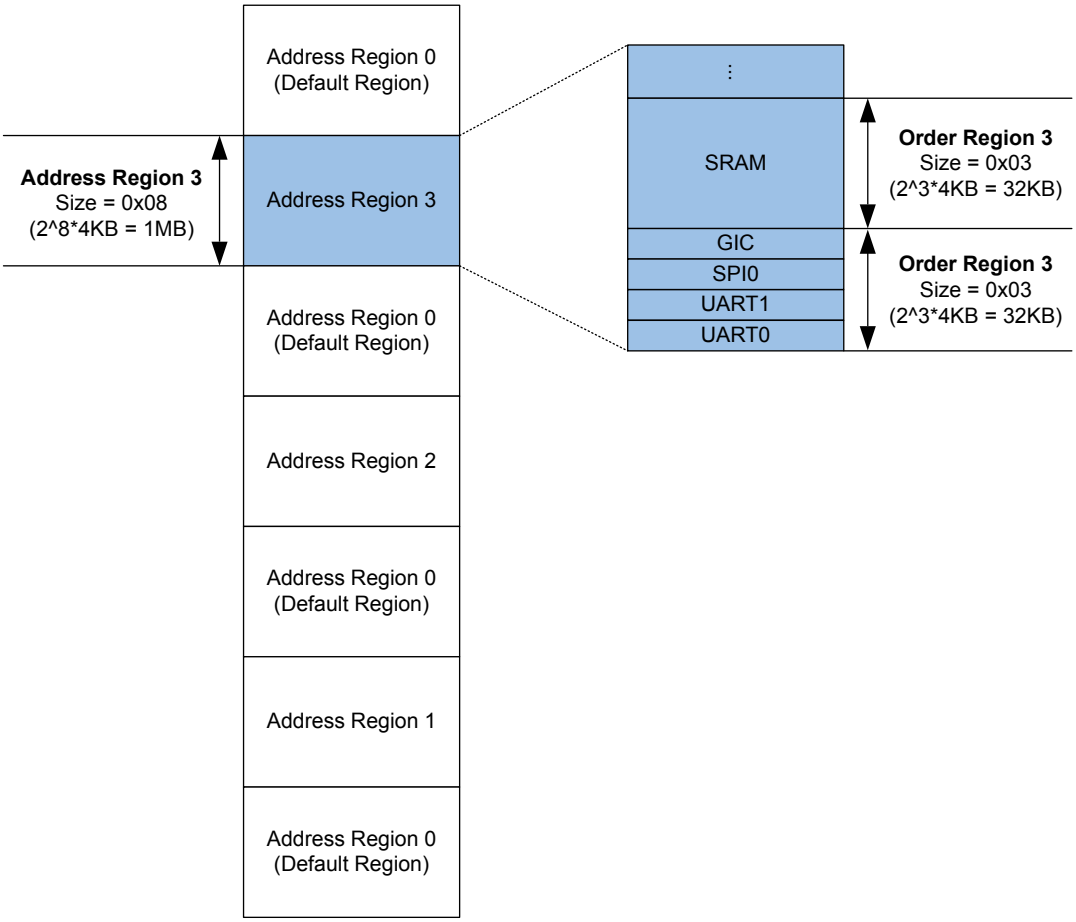

Figure 2-41 Address Region 3 configuration

Address Region 3 starts at base address `0x0000_0020_0000` and is 1MB in size. The Order Region 3 size of 32KB is less than the Address Region 3 size of 1MB, resulting in a total of 32 Order Regions. GIC, SPI0, UART1, and UART0 map to one Order Region, therefore all requests to these peripherals are ordered. SRAM also maps to one Order Region, therefore all requests to SRAM are ordered. Because SRAM maps to a separate Order Region from GIC, SPI0, UART1, and UART0, the following request types are not ordered:

- Requests to SRAM
- Requests to GIC, SPI0, UART1, and UART0

The following table shows the configured values for the Address Region 3 Configuration Register, por_hni_sam_addrregion3_cfg.

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Table 2-44 Address Region 3 configuration

Bits	Field name	Configured value
[5:0]	order_reg_size	6'h3
[15:10]	addr_region_size	6'h8
[55:20]	base_addr	36'h0000_0020_0
[58]	physical_mem_en	1'b0
[59]	ser_all_wr	1'b0
[60]	ser_devne_wr	1'b0
[61]	pos_early_rdack_en	1'b1
[62]	pos_early_wr_comp_en	1'b1
[63]	valid	1'b1

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2.22 Cross chip routing and ID mapping

IDs are generated and used to route protocol messages across multiple chips.

The following sections cover ID generation and the methods used to route CCIX protocol messages across multiple chips. RA SAM-related acronyms used include:

- *CCIX Request Agent ID* (RAID)
- *CCIX Home Agent ID* (HAID)
- *Logical Device ID* (LDID)

LDIDs are uniquely assigned within a device type. For example, RN-Fs in the system could be assigned LDIDs 0-n, while RN-Is could be assigned LDIDs 0-m, and RN-Ds could be assigned LDIDs 0-k.

The following rules apply:

- RAID usage:
  - Is confined to CCIX gateway devices only
  - All non-CCIX CMN-600 components use and operate on sequentially assigned LDIDs. CXG devices bidirectionally map each CCIX RAID to an LDID.
- RN-F LDID assignment:
  - Local RN-Fs are assigned LDIDs from 0-n, sequentially
  - Remote RN-Fs must be assigned LDIDs n+1 and above by the discovery software

The following figure shows a basic multi-chip block diagram.

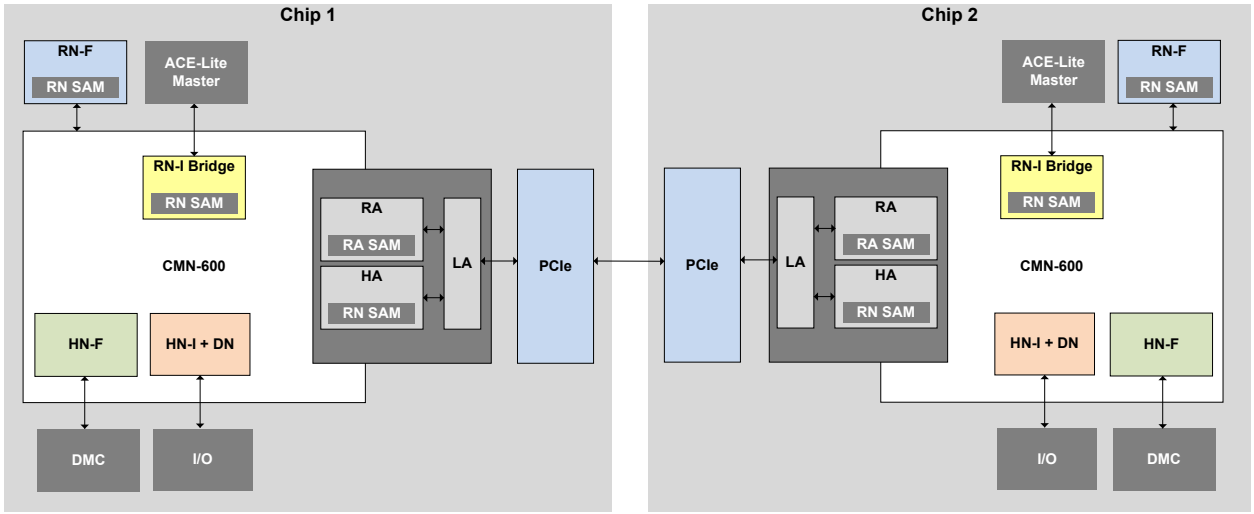

Figure 2-42 Multi-chip block diagram

This section contains the following subsections:

- *2.22.1 Request from an RN-F to a remote HN-F* on page 2-135.
- *2.22.2 Programmable registers during CCIX Discovery* on page 2-136.
- *2.22.3 Generated IDs to and from a remote HN-F to an RN-F* on page 2-138.
- *2.22.4 Snoop process flow* on page 2-138.

2.22.1 Request from an RN-F to a remote HN-F

This is an overview of the process flow used to route a request from a local RN-F on Chip 1 to a remote HN-F on Chip 2.

The following figure shows all IDs generated and used to route a request from a local RN-F on Chip 1 to a remote HN-F on Chip 2.

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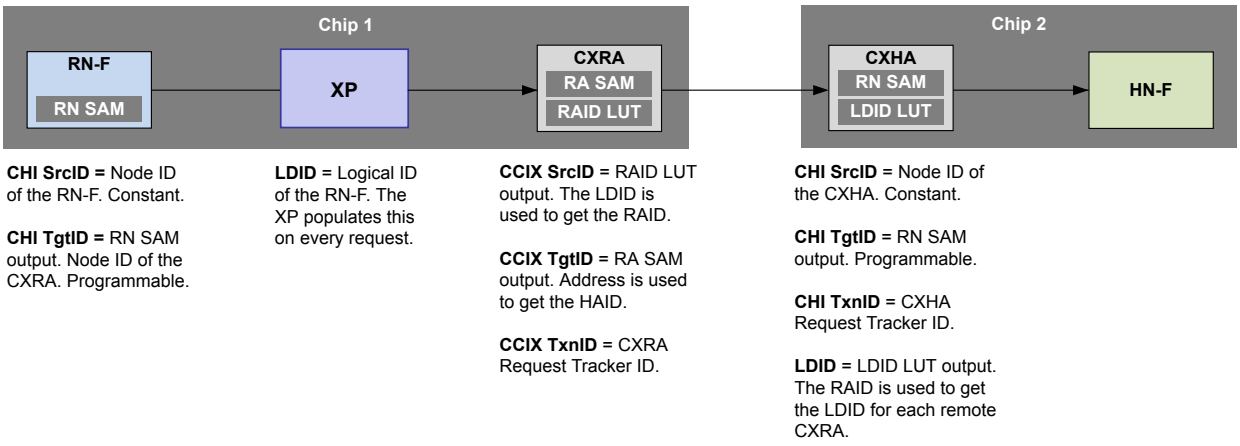

Figure 2-43 RN-F to remote HN-F IDs

The process flow to route the request is as follows:

- The RN-F looks up the programmable RN SAM to populate the CHI target ID on a request.
- The XP populates the RN-F LDID on this request.
- RN-Is and RN-Ds are internal to CMN-600 and get their logical ID assigned during CMN-600 generation. The RN-I or RN-D sends this LDID on every request.
- The CXRA contains programmable lookup tables, RAID LUTs, for each class of local RN (RN-F, RN-I, and RN-D). CCIX discovery software discovers all local RN-Fs, RN-Ds, and RN-Is, and programs their corresponding RAIDs in these LUTs. The LDID of the incoming request is used to look up these RAID LUTs and determine the CCIX RAID. CXRA also has CCIX RA SAM. This CCIX RA SAM is used to generate the HAID. This HAID is used as the target ID to route the CCIX request message.
- The LDIDs for local RN-Fs must not be changed. The build-time LDID assignments are discovered by reading any one of the HN-F por_hnf_rn_physid registers. A few cycles after reset, these registers are prepopulated with the LDIDs for local RN-Fs within that chip.

2.22.2 Programmable registers during CCIX Discovery

CMN-600 contains several registers that you can program for CCIX Discovery.

The following figure shows the programmable registers during CCIX Discovery.

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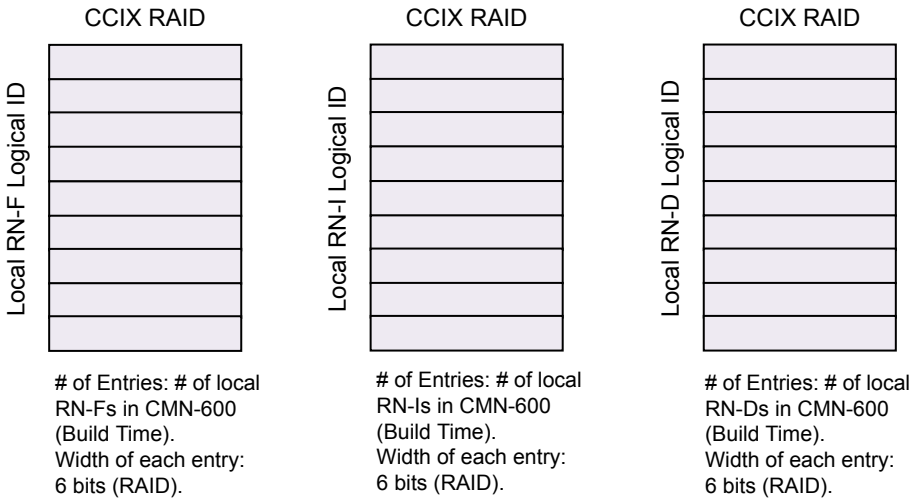

Figure 2-44 Programmable registers during CCIX discovery

The CXHA contains a programmable register to program the local LDID for each remote CCIX RAID that communicates with local CHI HNs on a given chip or socket. Each entry in the programmable register also contains an RN-F bit to identify whether the remote CXRA is a caching agent (RN-F) or not. HN-Fs on the local chip use this LDID to track a line in its SF. Therefore a unique LDID assignment is required for each remote requesting caching agent. These unique LDIDs must not overlap with LDIDs assigned to local RN-Fs. It is assumed that these IDs are assigned after CCIX Discovery is complete. For example, all the CXRAs are discovered and assigned an RAID.

RAID to LDID programmable register during CCIX Discovery

CMN-600 contains a programmable register for RAID to LDID during CCIX Discovery.

The following figure shows the programmable register for RAID to LDID during CCIX Discovery.

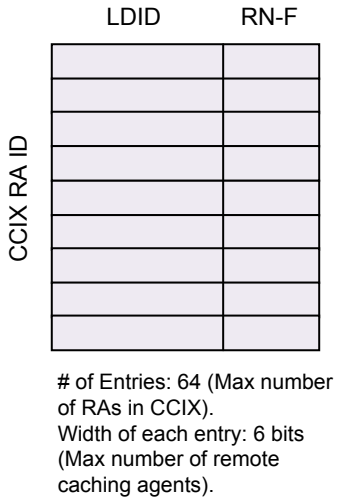

Figure 2-45 RAID to LDID during CCIX discovery

With the LDID passed to HN-F in all CHI REQ flits, HN-F uses this LDID as the true logical ID for SF tracking purposes. HN-F uses a logical ID vector in the SF, with its size based on the total number of RN-Fs in the entire system (local and remote RN-Fs). The size is assigned when CMN-600 is generated. This value controls the SF efficiency, therefore set the value according to the total number of caching agents found in the entire system. If the exact number is not known, the value must be set to support the

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maximum number of caching agents that the entire system can have. CCIX supports a maximum of 64 CXRAs in the entire system.

2.22.3 Generated IDs to and from a remote HN-F to an RN-F

There are several IDs used to route a response from a remote HN-F on Chip 2 to an RN-F on Chip 1. There are also several IDs used to route a snoop response from a remote RN-F on Chip 1 to an HN-F on Chip 2.

The following figure shows all generated IDs used to route a response from a remote HN-F on Chip 2 to an RN-F on Chip 1.

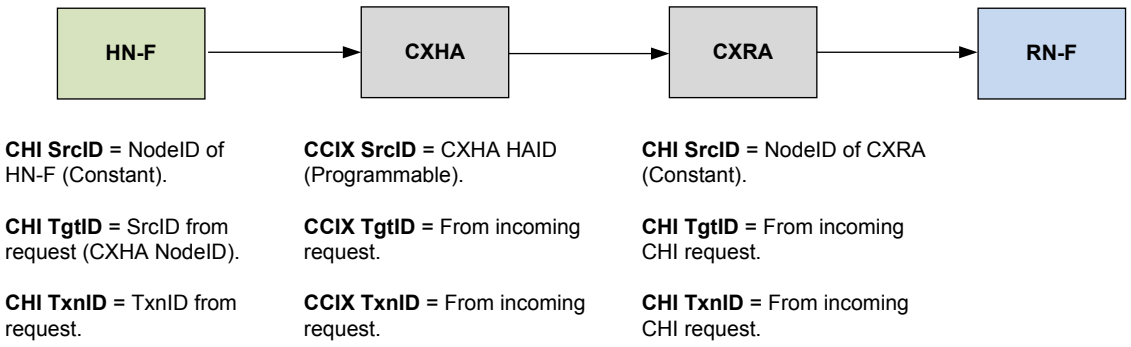

Figure 2-46 Remote HN-F to RN-F IDs for responses

The following figure shows all generated IDs used to route a snoop response from a remote RN-F on Chip 1 to an HN-F on Chip 2.

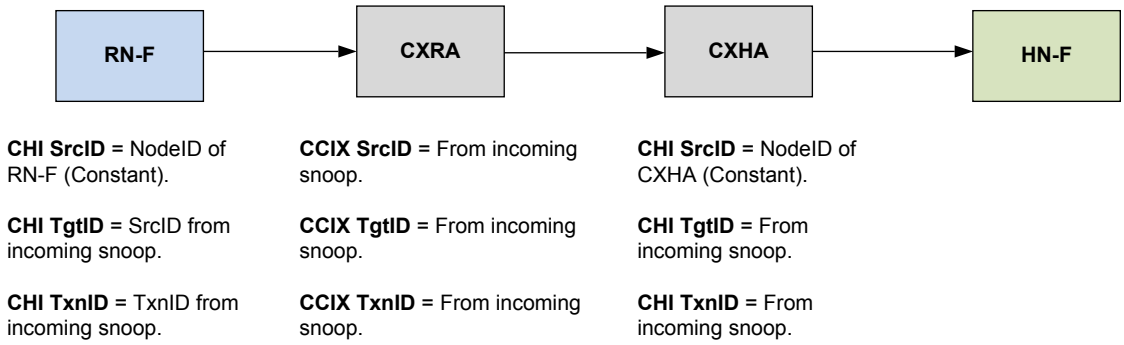

Figure 2-47 Remote HN-F to RN-F IDs for snoop responses

2.22.4 Snoop process flow

The snoop process flow is between the HN-F, CXHA, CXRA, and the remote RN-F.

The following figure shows the flow of a snoop from an HN-F to a remote RN-F.

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CHI SrcID = NodeID of HN-F (Constant).

CHI TxnID = HN-F Tracker ID.

LDID = from Snoop Filter.

CCIX SrcID = CXHA HAID (Programmable).

CCIX TgtID = O/P of LDID LUT. Incoming LDID is compared against LDID LUT to get the RAID.

CCIX TxnID = CXHA Request Tracker ID.

CHI SrcID = NodeID of CXRA (Constant).

The HN-F contains a programmable LUT to program the CXHA node ID of each remote caching agent.

Program the CXHA node ID of remote caching agents

The HN-F contains a programmable LUTT which you can program for the logical IDs of the local RN-Fs and the remote RN-Fs.

The HN-F contains the following programmable LUT to program the CXHA node ID of each remote caching agent. HN-F uses the unique LDID from the snoop vector to look up the physical CHI node ID of the CXHA where snoops are sent to. The following table shows an example programming where logical IDs 0-7 are assigned to the local RN-Fs. The logical IDs 8-15 are assigned to the remote RN-Fs. Software assigns these IDs during the Discovery process.

Table 2-45 Example program

Logical ID as index	HN-F programmable register	
	CHI node ID	ID valid
0	Local RN-F 0	1
1	Local RN-F 1	1
2	Local RN-F 2	1
…	…	…
7	Local RN-F 7	1
8	CXHA	1
9	CXHA	1
…	…	…
15	CXHA	1
16	Not programmed	0
…	Not programmed	0
n	Not programmed	0

The CXHA uses the LDID from incoming CHI snoop to perform a content match against the entries of programmable CCIX RAID to local LDID LUT. This content match results in the CCIX RAID sending a CCIX snoop, as the following figure shows.

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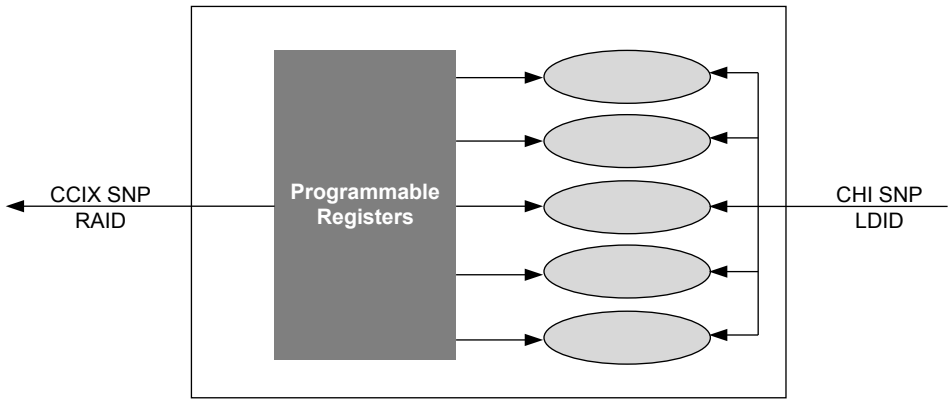

Figure 2-48 CHI SNP LDID to CCIX SNP RAID flow

The following figure shows the number of entries at build time.

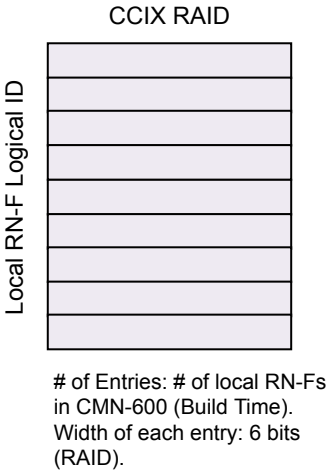

Figure 2-49 Number of entries at build time

The following figure shows the detailed flow of a CHI SNP LDID to CCIX SNP RAID conversion.

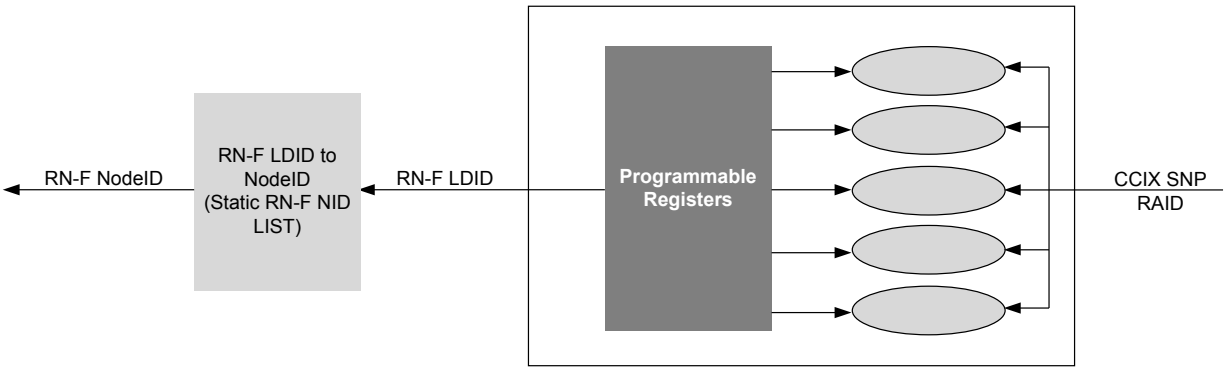

Figure 2-50 CHI SNP LDID to CCIX SNP RAID detailed flow

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2.23 128 RN-F support

CML supports asymmetric RN-F counts per chip, up to 128 RN-F total nodes in the system.

For example, a CML system could have two CMN-600 meshes with 32 RN-F nodes each and two CCIX-attached accelerators with 16 RN-F nodes each. This enables Snoop Filter tracking for any combination of up to 128 RN-F nodes across the system. This extends the previous support for up to 64 RN-F nodes.

As described in *2.22 Cross chip routing and ID mapping* on page 2-135, CCIX RAIDs of caching request agents are translated to (for incoming requests) and from (for outbound snoops) local LDIDs by the CXRA and CXHA nodes. These local LDID values are used by the HN-F for tracking cachelines in the Snoop Filter. As CCIX natively supports up to 64 Request Agents, the internal LDID fields appended to requests and snoops are 6b wide. In order to support up to 128 caching request agents (referred to as RN-Fs in CHI), an additional translation is required for the LDID value used for Requests and Snoops to/from a logical ID used by the HN-F for Snoop Filter tracking.

Logical to physical ID conversion LUTs are extended to program 128 RN-F LDIDs in the HN-F. It translates the LDID of the incoming request to the packed snoop filter *Logical ID* (LID) vector. To program the LDID conversion matrix, the HN-F configuration space contains the por_hnf_ldid_map_table_reg{0-3} registers. The fields in these registers are:

valid_cxhaX Indicates that a valid CXHA ID and pointer are programmed.

srcid_cxhaX Contains the CHI node ID of the CXHA. Each SrcID must be unique in the following table.

starting_ldid_cxhaX The LDID of the first remote RN-F behind this CXHA as seen by HN-F. All LDIDs of remote RN-F behind this CXHA must be contiguous and increasing, starting with the first LDID value.

Table 2-46 HN-F LDID mapping (cells intentionally left blank)

Valid	SrcID	Starting LDID

When the HN-F receives a request, it checks whether the request is from a remote RN-F. If so, it checks the CHI SrcID of the request against valid CXHA entries in the LDID mapping table. If the CXHA node ID has been programmed, HN-F converts the incoming LDID of the request to the internal LID as shown here:

```
HNF_LID = Starting_LDID + Request_LDID
```

Similarly, when a Snoop request is to be sent to CXHA, HN-F looks in the LDID mapping table to check if the CHI node ID of the target CXHA is valid. If so, then HN-F converts the internal LID to the associated LDID for the outgoing Snoop as shown here:

```
Snp_LDID = HNF_LID - Starting_LDID
```

Example programming for HN-F

The following figure shows an example system that contains four chips:

P0 and P1 CML-based chips with 48 RN-Fs.

A0 and A1 Accelerator chips with 16 RN-Fs and one CXHA link.

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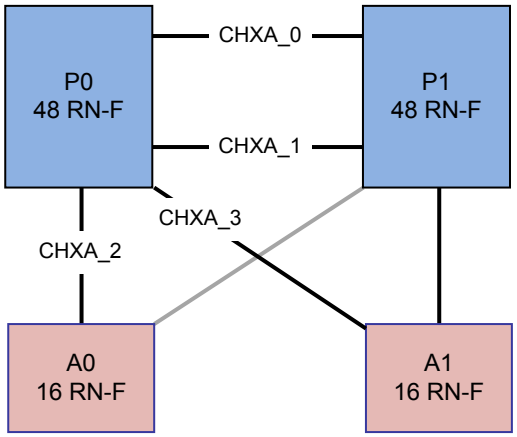

Figure 2-51 HN-F programming example system

From P0 chip perspective, P1 is connected to it through two CCIX links using Port Aggregation (CXHA_0 and CXHA_1). A0 is connected through CXHA_2 and A1 is connected through CXHA_3.

From the perspective of an HN-F on P0, requests from P0 and P1 arrive with an LDID in the range of 0-47, and requests from both accelerators A0 and A1 arrives with an LDID in the range of 0-15. Likewise, outgoing Snoops to P0 and P1 are sent with an LDID within the range 0-47, and Snoops to A0 and A1 are sent with an LDID within the range 0-15.

In this example, HN-F maps each of the 128 RN-F nodes in the system to LIDs 0-127 for Snoop Filter tracking. LDIDs corresponding to RN-Fs in the local chip (P0) are assigned to LIDs 0-47. LDIDs corresponding to remote chips (P1, A0, A1) are assigned to LIDs 48-127 as shown in the following table.

Table 2-47 HN-F Logical IDs in P0 chip

HN-F SF Logical ID	REQ/SNP Flit LDID	Chip
0	0	P0 (Local RN-Fs)
...	...	
47	47	
48	0	A0 (CXHA_2)
...	…	
63	15	
64	0	A1 (CXHA_3)
...	...	
79	15	
80	0	P1 (CXHA_0 and CXHA_1)
...	...	
127	47	

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The LDID mapping table must also be programmed to match the above LID LUT. For each CXHA CHI node ID, the Starting LDID is programmed to the value of the LID that corresponds to the first entry for the chip. The following table shows the resulting mapping table.

Table 2-48 Example LDID mapping table

Valid	SrcID	Starting LDID
1	CXHA_0	80
1	CXHA_1	80
1	CXHA_2	48
1	CXHA_3	64
0	0	0

Note

Since both CXHA_0 and CXHA_1 connect to chip P1, they are programmed with the same Starting LDID values. Requests from, or Snoops to, either CXHA port always start at the same pointer in the LDID mapping table.

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2.24 GIC communication over AXI4-Stream ports

CMN-600 supports optional master/slave *AXI4-Stream* (A4S) ports on RN-I, RN-D, and SMXP RN-F ports for communication between a *Generic Interrupt Controller* (GIC) and CPUs. Certain requirements apply to the A4S routing and signaling.

CMN-600 also supports transmission of GIC information across CCIX links for CML SMP configurations.

More system-level information is available in the *Arm® Neoverse™ N1 hyperscale reference design GIC-600 Integration using CMN-600 AXI4-Stream Interfaces White Paper* on request.

A4S routing

The A4S ports are addressed according to Logical ID, which are assigned sequentially from 0 to the number of A4S ports. To send a packet from one A4S port to the destination A4S port, the TDEST should be assigned to the Logical ID of the target A4S port, or the Logical ID of the CXRH for GIC traffic targeting the other chip. The discovery process returns the number of A4S ports and Logical ID information for each A4S port by reading corresponding RN-I, RN-D, and XP unit information registers. For more information about the discovery process, see *2.5 Discovery* on page 2-55.

Other requirements

- The **PUB_DESTID** associated with the GICD A4S port must drive the **CXRH GICD_DESTID** input. GICD drives the CMN-600 **RXA4STRI[7:0]** input (8 MSB bits of **GICD ICDRTDEST**), indicating the CCIX link of the target chip, in addition to the **RXA4STDEST[7:0]** (8 LSB bits of **GICD ICDRTDEST**) of CXRH for CML SMP configurations.

  ———— **Note** ————

  This requirement only applies to 2-chip configurations. Contact *Arm®* for information on three or more chip configurations.

  ————————————

- The A4S master must assert **valid** irrespective of **ready** state to transmit data.

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2.25 Clocking

The following sections describe the CMN-600 clock domains, inputs, and hierarchy.

This section contains the following subsections:

2.25.1 Clock domains

CMN-600 has a single, fully synchronous clock domain. This clock domain is supplied by a single global clock signal, which is known as **GCLK0**.

The following figure shows an example mesh topology and the boundaries of the CMN-600 clock domain.

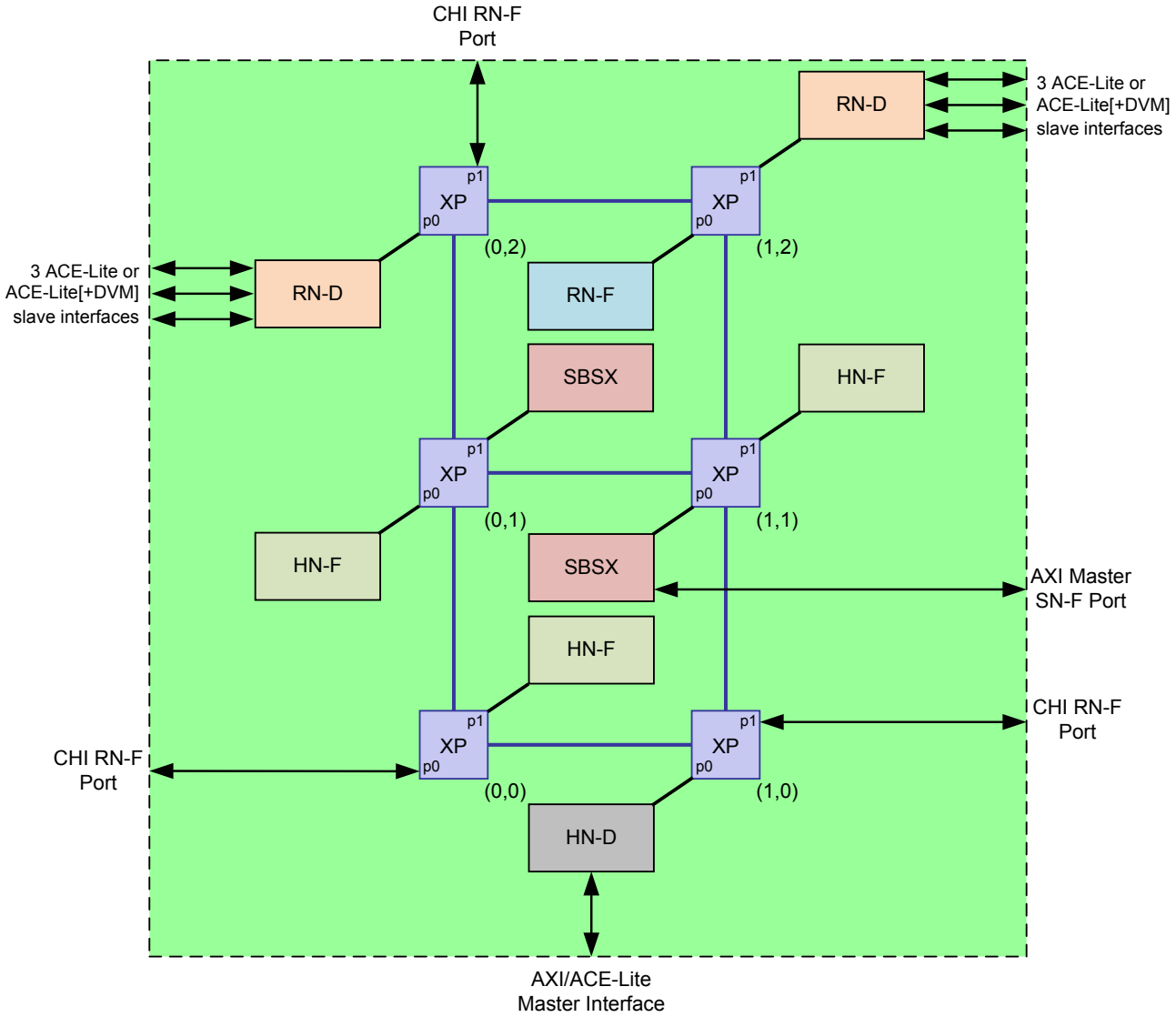

Figure 2-52 CMN-600 fully synchronous clock domain

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2.25.2 CML clock inputs

There are two extra clock inputs for the CML configuration: **CLK_CGL** and **CLK_CXS**.

CLK_CGL is a copy of the CMN clock input used by the CXRH node associated with the CXLA, **GCLK0**. A separate clock input is provided to allow gating of the CGL clock domain independent of the **GCLK0** domain. **CLK_CXS** clocks the CXS interface logic, and can be synchronous or asynchronous to **GCLK0**. **CLK_CXS** can be driven with **CLK_CGL** for synchronous configurations, as the following figure shows.

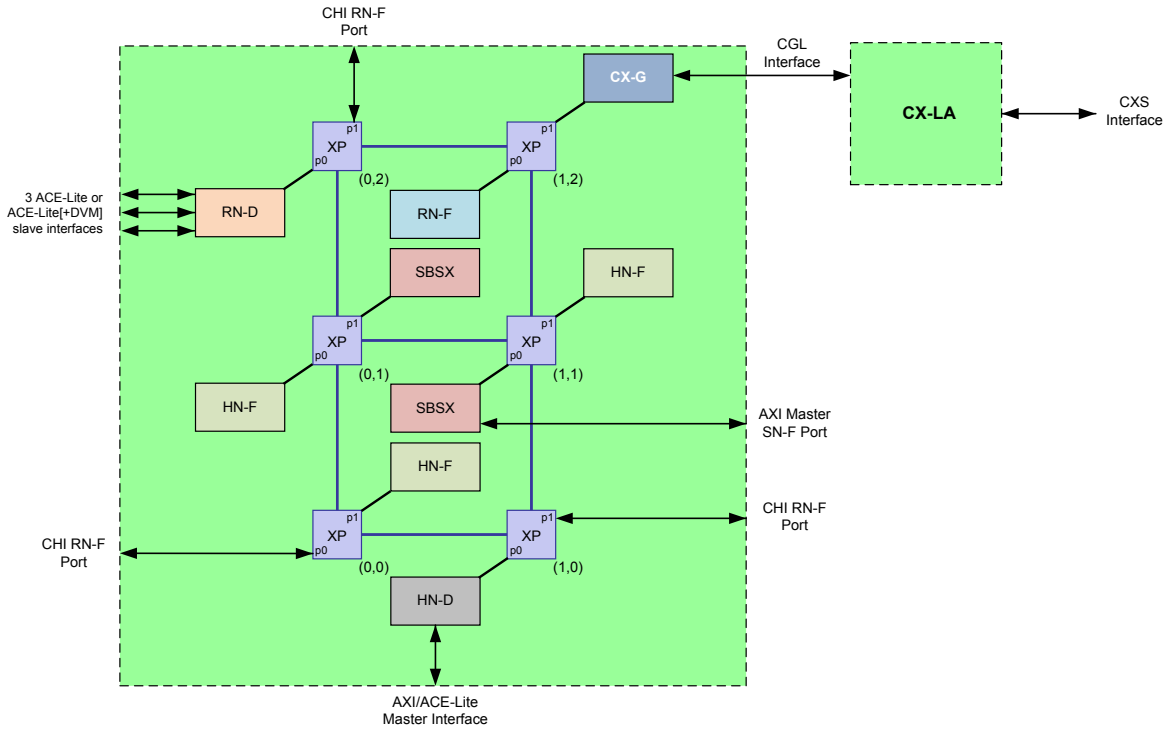

Figure 2-53 CMN-600 clock domains with synchronous CXS domain

The CXLA block contains an asynchronous domain bridge for configurations where the **CLK_CXS** domain is asynchronous to the **CLK_CGL** domain, as the following figure shows.

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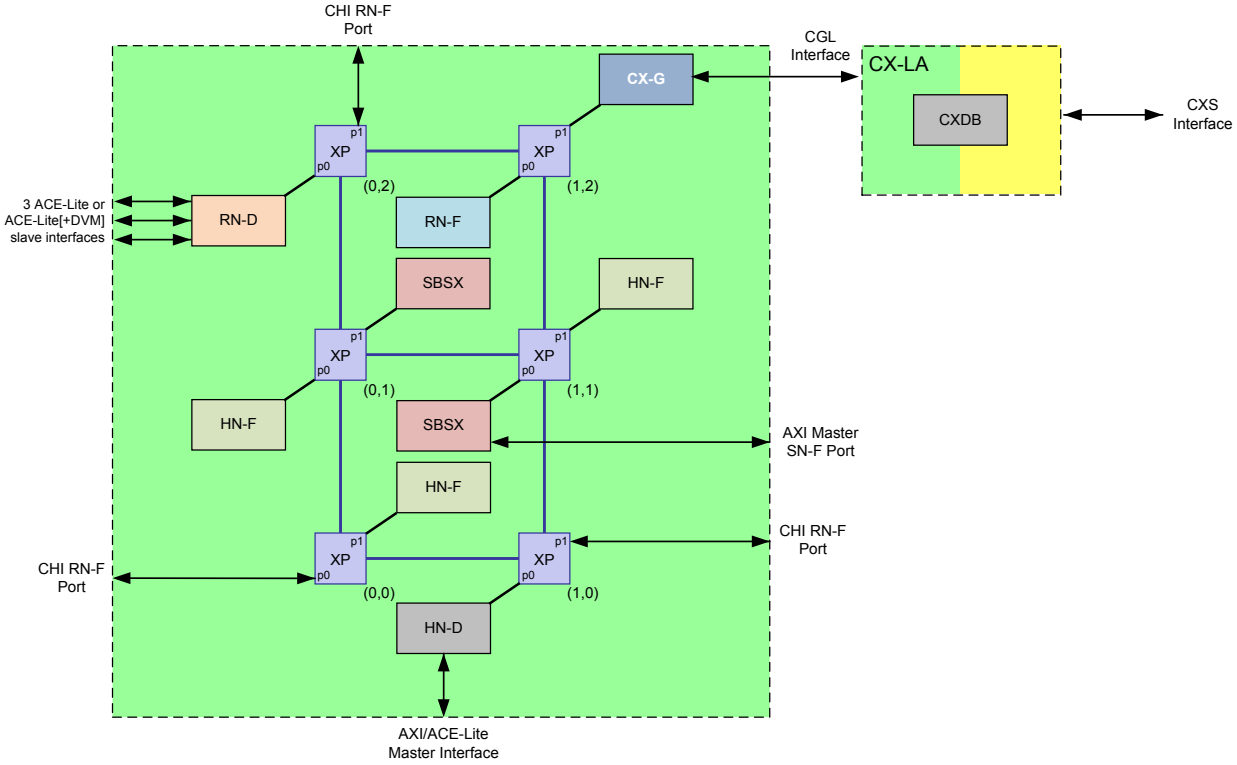

Figure 2-54 CMN-600 clock domains with asynchronous CXS domain

2.25.3 Clock hierarchy

The clocking delivery and clock gating architecture are hierarchical.

Within the clock gating hierarchy, three levels of clocks are defined:

Global clock The global clock is the clock input to the CMN-600 system. Another level of clock gating or clock control outside of the system is likely to control the global clock that is provided by the SoC. Although it is not a system requirement, CMN-600 includes support for external clock control.

Regional clocks Regional clocks are created as an output of regional clock gaters that include a coarse enable for coarse-grained clock gating under idle or mostly idle conditions. Regional clock gaters can shutdown the clock network between regional and local gaters. Therefore, this level of hierarchy enables greater power reduction than is possible using local clock gating. The regional clock gaters are instantiated in and controlled by the CMN-600 RTL. The exact set of regional clocks is internal to CMN-600 and is not described in this book.

Local clocks Local clocks are created according to the following hierarchy:

1. RTL creates fine grained enable signals.
2. Fine grained enable signals control local clock gaters.
3. Local clock gaters output local clock signals.

Local clock signals are used to directly clock sequential elements in CMN-600. The exact set of local clocks is internal to CMN-600 and is not described in this manual.

The following figure shows the clocking hierarchy.

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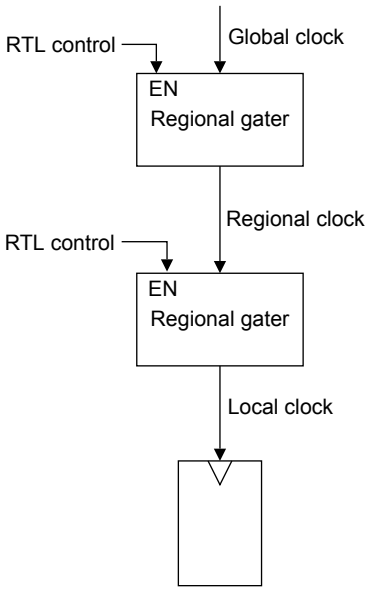

Figure 2-55 Clocking hierarchy

2.25.4 Clock enable inputs

CMN-600 includes several clock enable inputs.

The clock enable input signals are:

ACLKEN_S This input is present on each AMBA slave interface.

ACLKEN_M This input is present on each AMBA master interface.

ATCLKEN This input is present on each debug and trace ATB interface.

All clock enables, shown here as ***CLKEN***, have identical functionality, enabling the respective interfaces with which they are included to run at integer fractions of **GCLK0**. In other words, the clock enables run slower than **GCLK0**, ranging from ratios of 1:1 to 4:1. **ATCLKEN** is limited to 1:1, 2:1, and 4:1 integer fractions. This approach enables synchronous communication with slower SoC logic.

CLKEN asserts one **GCLK0** cycle before the rising edge of **SoC-CLK**. SoC control logic can change the ratio of **GCLK0** frequency to the SoC clock, **SoC-CLK**, frequency dynamically using ***CLKEN***.

The following figure shows a timing example of a ***CLKEN*** ratio change. In the example, ***CLKEN*** changes the ratio of the relevant interface frequency respective to **GCLK0** from 3:1 to 1:1.

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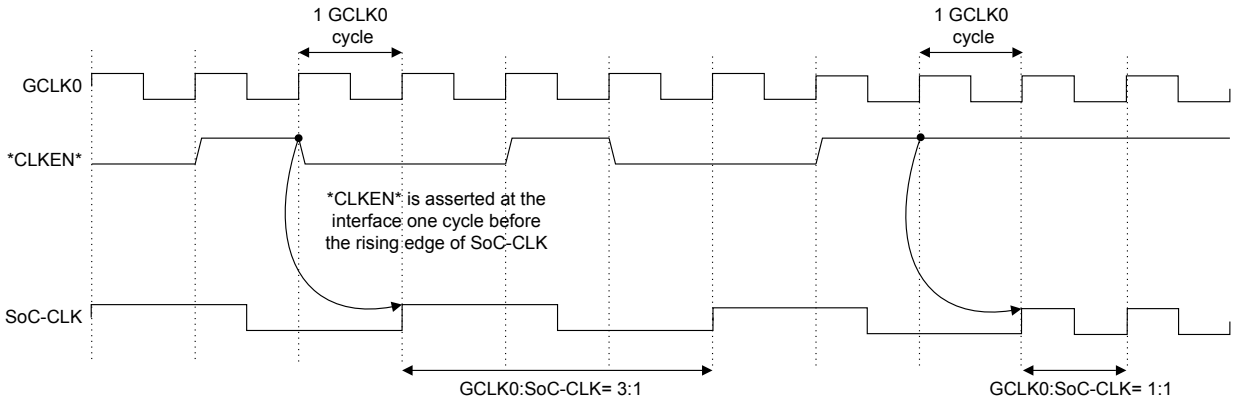

Figure 2-56 *CLKEN* with GCLK0:SoC-CLK ratio changing from 3:1 to 1:1

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2.26 Reset

CMN-600 has a single global reset input signal, **nSRESET**.

nSRESET is an active-LOW signal that can be asynchronously or synchronously asserted and deasserted.

When asserted, **nSRESET** must remain asserted for 72 clock cycles. Likewise, when deasserted, **nSRESET** must remain deasserted for 72 clock cycles. This requirement ensures that all internal CMN-600 components enter and exit their reset states correctly.

All CMN-600 clock inputs must be active during the required 72-cycle, or larger, period of **nSRESET** assertion. The clock inputs must also remain active for at least 72 cycles following deassertion of **nSRESET**.

This section contains the following subsection:

- *2.26.1 CML reset* on page 2-150.

2.26.1 CML reset

There are two extra reset inputs for the CML configuration: **nRESET_CGL** and **nRESET_CXS**.

Both **nRESET_CGL** and **nRESET_CXS** are active-LOW signals that can be asynchronously or synchronously asserted and deasserted.

When asserted, **nRESET_CGL** and **nRESET_CXS** must remain asserted for 20 **CLK_CGL** and **CLK_CXS** clock cycles respectively. Likewise, when deasserted, **nRESET_CGL** and **nRESET_CXS** must remain deasserted for 20 **CLK_CGL** and **CLK_CXS** clock cycles respectively. This requirement ensures that all CML components enter and exit their reset states correctly.

Both **CLK_CGL** and **CLK_CXS** must be active during the required 20-cycle, or larger, period of **nRESET_CGL** and **nRESET_CXS** assertion respectively and must remain active for at least 20 cycles following deassertions.

For more relationship information between the CXS and CGL domains, refer to *2.25.2 CML clock inputs* on page 2-146.

Note

There is no sequencing requirement between the CMN-600 **nSRESET** and the CML resets. However, the CML domains must exit reset before CXLA functionality is required.

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2.27 Power and clock management

CMN-600 includes several power management and clock management capabilities, that are either externally controllable or are assisted by the SoC.

The power management and clock management capabilities are:

- High-level Clock Gating that indicates inactivity in the system, enabling an External Clock Controller to disable global clock inputs during periods of inactivity. This capability significantly reduces dynamic power consumption.
- Several distinct predefined power states, including states in which all, half, or none of the SLC Tag and Data RAMs can be powered up, powered down, or in retention:
  - A state in which only the HN-F SF is active.
  - A state in which the SLC RAMs and SF RAMs are inactive.

  These power states reduce static and dynamic power consumption.
- Support for static retention in HN-F in which the SoC places SLC and SF RAMs in a retention state. This capability reduces static power consumption.
- Support for in-pipeline low-latency Data RAM retention control, in which a programmable idle counter can be used to put the SLC RAMs in retention.

This section contains the following subsections:

2.27.1 *High-level Clock Gating* (HCG)

The PCCB supports a *High-level Clock Gating* (HCG) mechanism. This mechanism notifies the SoC when CMN-600 is inactive and therefore reduces dynamic power consumption.

HCG enables an external SoC clock control unit, the *External Clock Controller* (ExtCC), to stop the **GCLK0** clock inputs. For more information about the ExtCC, see *External Clock Controller (ExtCC)* on page 2-151.

CMN-600 includes a Q-Channel interface that enables CMN-600 and the SoC to communicate to achieve HCG functionality through the PCCB. For more information, see the *Arm® AMBA® Low Power Interface Specification Arm® Q-Channel and P-Channel Interfaces*.

External Clock Controller (ExtCC)

The *External Clock Controller* (ExtCC) is used to control the clock gating flow.

The following figure shows an example of how the ExtCC controls the clock gating flow. This example clock gating sequence begins and ends with the Q-Channel in either of the following states:

- Quiescent state (Q_STOPPED), where **QREQn** and **QACCEPTn** are asserted.
- Active state (Q_RUN), where **QREQn** and **QACCEPTn** are deasserted.

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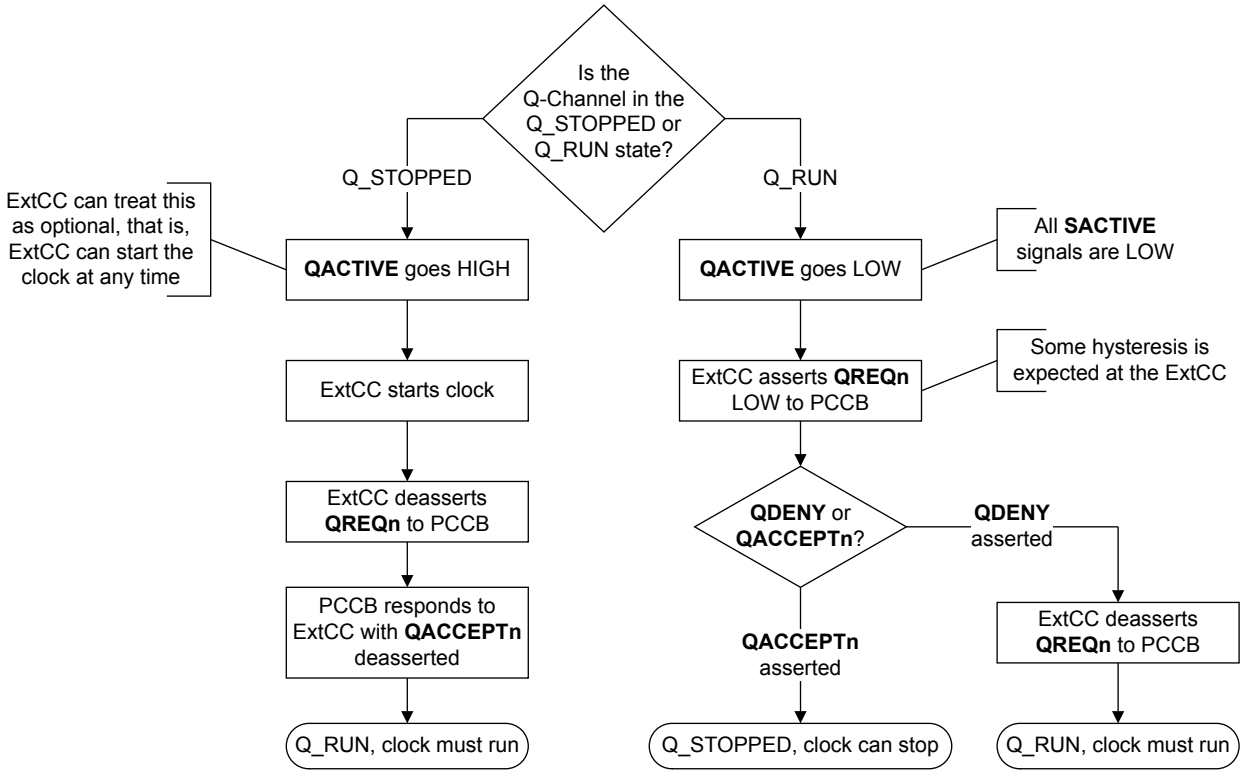

Figure 2-57 Clock gating control using ExtCC

The requirements of the ExtCC are as follows:

- It must supply a clock to CMN-600 when the Q-Channel is in any state other than Q_STOPPED.
- The ExtCC can either:
  - Choose to gate the clock to CMN-600 when the Q-Channel is in the Q_STOPPED state.
  - Choose to run the clock at any time.
- ExtCC is responsible for bringing the Q-Channel to Q_RUN state after reset deassertion.
- This manual does not describe the exact behavior of the ExtCC and its usage of **QREQn** in response to **QACTIVE** deassertion. However, the design of the ExtCC is likely to include a control loop with some hysteresis. Therefore HCG is enabled when the system is inactive for long periods, but is not enabled for short periods of inactivity. If the clocks are stopped in response to short periods of inactivity, performance of CMN-600 can be negatively affected.
- It is the responsibility of the SoC designer to fully control the clock management Q-Channel. If you require a control or configuration bit to completely enable or disable HCG functionality, it must exist outside of CMN-600. More specifically, CMN-600 has no internal means of disabling HCG.

CML clock management

CMN-600 CML configurations add two extra clock domains and corresponding Q-Channel interfaces for each CXG instance and corresponding CXS interface:

- CLK_CGL Q-Channel: Manages the CGL link and CGL domain logic in the CXG and CXLA devices.
- CLK_CXS Q-Channel: Manages the CXS link interface and CXS clock domain logic in the CXLA.

The following table shows the possible clock states for the CMN-600 and CML device clocks, where N denotes multiple CXS interfaces:

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Table 2-49 CMN-600 and CML device clock states

GCLK0	CLK_CGL[N]	CLK_CXS[N]	Description
RUN	RUN	RUN	CMN-600 and CXS[N] interface active
RUN	RUN	STOP	CXS[N] domain gated
RUN	STOP	RUN	CGL[N] inactive, transitory state
RUN	STOP	STOP	CXS[N] interface fully gated
STOP	STOP	RUN	CXS[N] active, others inactive, transitory state
STOP	STOP	STOP	CMN-600 fully gated, all CXS[N] interfaces inactive

2.27.2 Power domains

The power domains in CMN-600 are split between the logic and RAMs within the HN-F partitions.

The power domains are:

Logic
All logic except HN-F SLC Tag and Data RAMs and HN-F SF RAMs.

System Level Cache RAM0
SLC Tag and Data RAMs way[7:0] within HN-F partitions. The RAMs in each HN-F partition can be independently controlled.

System Level Cache RAM1
SLC Tag and Data RAMs way[15:8] within HN-F partitions. The RAMs in each HN-F partition can be independently controlled. The RAM1 domain for 3MB SLC size configurations includes way[11:8].

Snoop filter only mode
SF RAMs within HN-F partitions. The RAMs in each HN-F partition can be independently controlled.

The following figure shows an example power domain configuration.

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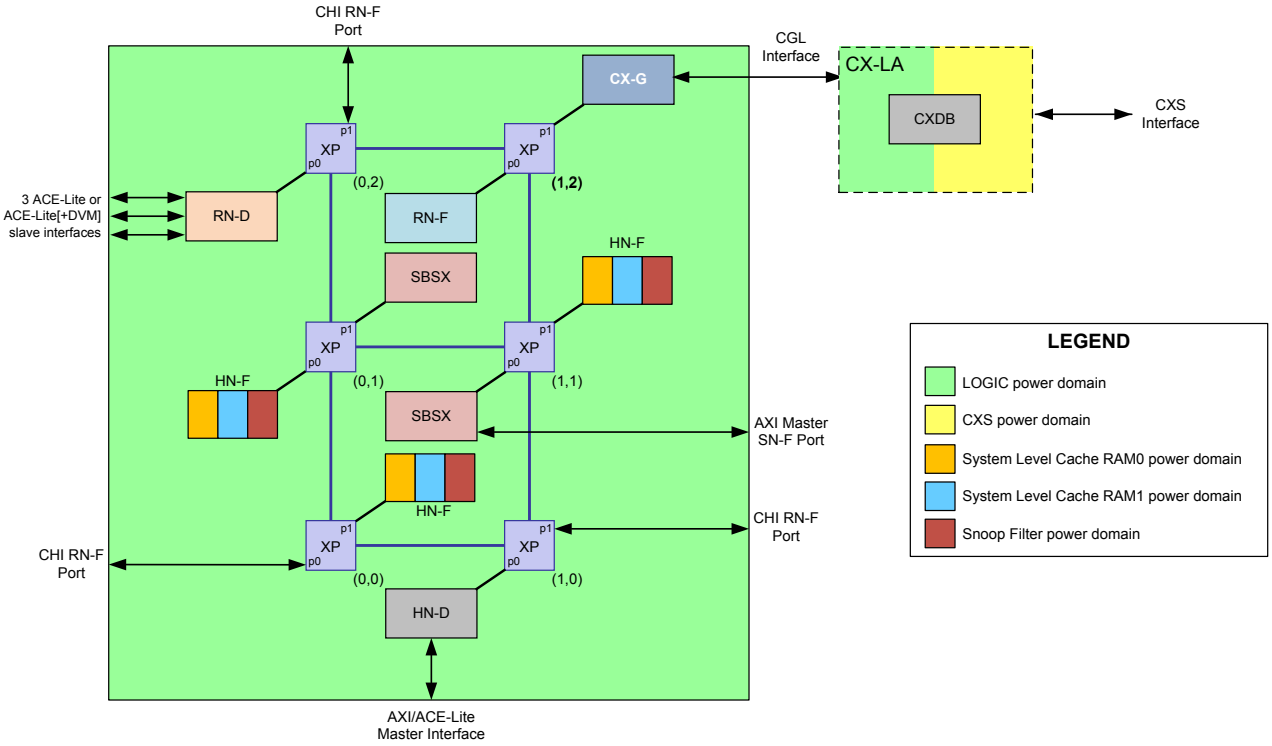

Figure 2-58 CMN-600 power domain example

2.27.3 Power domain control

The CMN-600 Logic P-Channel controls all power domains except for the RAM and CXS power domains.

In addition to controlling the Logic domain, the Logic P-Channel allows synchronization between the HN-F software-controlled power domains and the Logic domain. This synchronization is achieved through a CONFIG state, as the following figure shows.

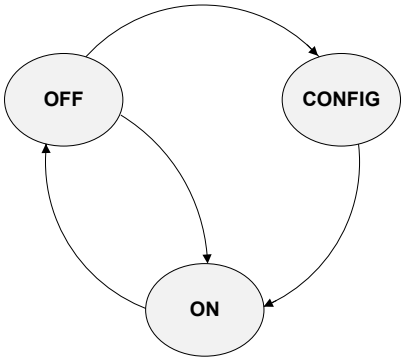

Figure 2-59 Logic domain states

There are two paths for transitioning from the OFF to ON state:

Cold reset

The Logic PSTATE OFF to ON transition also initiates NOSFSLC to FAM transition for all HN-F partitions.

Exit from HN-F Static Retention state

The Logic PSTATE transitions from OFF to CONFIG, indicating that CMN-600 is exiting a Memory Retention state, and does not initiate any HN-F partition power transitions.

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The following table contains the power modes of components within the domain and the associated PSTATE values.

Table 2-50 Power mode configurations and PSTATE values

Power mode	PSTATE	CMN-600 Logic	HN-F
OFF	0b00000	OFF	OFF/MEM_RET
CONFIG	0b11000	ON	ANY
ON	0b01000	ON	ANY

For an introduction to HN-F states, see *2.27.7 HN-F power domains* on page 2-157.

For P-Channel signal list information, see *A.4 Power management signals* on page Appx-A-1165.

CXS power gating

CML systems contain an extra power domain, the CXS power domain. CXS logic is controlled by a combination of the CXS Power Q-Channel and the CXS Q-Channel that controls the clocks. Unless both the CXS Power Q-Channel and the CXS Q-Channel are in the OFF State, power must be provided.

2.27.4 P-Channel on device reset

This section shows how to initialize the power state of a power domain.

Certain device power states might power down the control logic. When powering this control logic back on, the power controller must indicate the state that the device must power up. The device detects the required state by sampling **PSTATE** when **nSRESET** deasserts. The **PSTATE** inputs must be asserted before the deassertion of reset and remain after the deassertion of **nSRESET**, to allow reset propagation within CMN-600. The power controller must ensure that the reset sequence is complete before transitioning **PSTATE**, otherwise the device might sample an undetermined value. The following figure shows the state initialization on reset.

Note

PSTATE inputs must be static 100 cycles before deassertion of **nSRESET**, and also for 100 cycles after the deassertion of **nSRESET**.

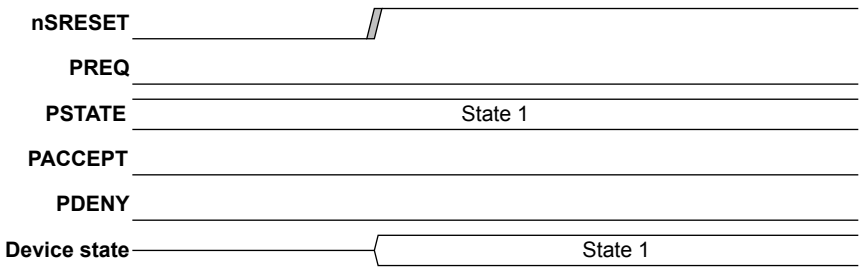

Figure 2-60 Reset state initialization

For an introduction to HN-F states, see *2.27.7 HN-F power domains* on page 2-157.

2.27.5 CXS power domain

CML systems contain an extra power domain, the CXS power domain. The CMN-600 CXS Power Q-Channel controls the CXS power domain.

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Note

If the CXS interface is inactive, the CXS power domain can be shut off.

The following table shows the possible CMN-600 LOGIC and CXS power states, where N denotes multiple CXS interfaces:

Table 2-51 CMN-600 LOGIC and CXS power states

LOGIC state	CXS[N] state	Description
ON	ON	CMN-600 and CXS[N] interface active.
ON	OFF	CXS[N] interface inactive.
OFF	ON	CXS[N] domain active, transitory state.
OFF	OFF	Shut down, all CXS[N] interfaces inactive.

2.27.6 HN-F Memory retention mode

When isolating the CMN-600 outputs, handshake protocols on certain interfaces must be followed. Follow the appropriate steps to enter and exit HN-F Memory retention mode.

Enter HN-F Memory retention mode

This task describes how to enter HN-F Memory retention mode.

To enter HN-F Memory retention mode program the HN-Fs into the required power state, quiesce the interconnect, place CMN-600 in the LOGIC_OFF state, and power off CMN-600.

Procedure

1. Program the HN-Fs to enter the required power state.
2. Quiesce the interconnect, and wait for QACTIVE to drop.
3. Place CMN-600 in LOGIC_OFF state through the Logic P-Channel.
4. Isolate the CMN-600 outputs. If the logic on the other side of the interface is being powered down or reset, this step might not be required.
5. Turn off power to CMN-600.

The HN-Fs are now in Memory retention mode.

Related tasks

Exit HN-F Memory retention mode on page 2-156

Exit HN-F Memory retention mode

This task describes how to exit HN-F Memory retention mode.

To exit HN-F Memory retention mode apply power to the HN-Fs, follow the steps to reprogram the HN-Fs, and place CMN-600 in the LOGIC_ON state.

Procedure

1. Apply power to CMN-600.
2. Assert reset.
3. Enable clocks.
4. Disable isolation of the CMN-600 outputs.
5. Deassert reset.
6. Place CMN-600 in LOGIC_CONFIG state through the logic P-Channel.
7. Reprogram the HN-F PWPR to the retention mode the HN-F was in before turning off power.

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8. Reprogram the HN-F PWPR to ON.
9. Reprogram the CMN-600 configuration registers, including the RN SAM and any other registers written during cold boot.
10. Place CMN-600 in LOGIC_ON state through the P-Channel.
11. Resume traffic for normal operation.

The HN-Fs are no longer in Memory retention mode.

Related tasks

Enter HN-F Memory retention mode on page 2-156

2.27.7 HN-F power domains

The HN-F has various power states. Transitioning between different states enables or disables different parts of the HN-F.

The HN-F has the following classes of power states:

1. Operational states, where logic is on and enabled RAMs are operating as normal
2. Functional retention states, where logic is on, and enabled RAMs are in retention
3. Memory retention states, where logic is off and enabled RAMs are in retention

Within these power states, the HN-Fs in an SCG operate in four modes:

FAM *Full Associativity Mode* (FAM), where the SF and the entire SLC are enabled.

HAM *Half-Associativity Mode* (HAM), where the SF is enabled but the upper half of the SLC ways are disabled and powered off.

SFONLY *Snoop filter only mode* (SFONLY), where the SF is enabled but the whole SLC is powered off.

NOSFSLC *No-SLC Mode* (NOSFSLC), where the SF and SLC are disabled and powered off.

The following constraints apply to the power states and transitions:

- If SLC size is 0KB, the HN-F does not support transitions to FAM or HAM modes.
- After initialization, the power status register indicates FAM instead of SFONLY for 0KB SLC configurations.
- When a power transition is initiated, another must not be initiated until the first one completes.

The following table shows the valid HN-F power states and their requirements.

Table 2-52 HN-F power states

State	Description	Control logic	SF power state	SLC way[7:0] power state	SLC way[15:8] power state
FAM	Full Run mode	On	On	On	On
HAM	Run mode with SLCH2 (SLC upper ways) disabled.	On	On	On	Off
SF	Run mode with SLCH1 and SLCH2 disabled.	On	On	Off	Off
NOSFSLC	Run mode with SLCH1, SLCH2, and SF disabled.	On	Off	Off	Off
FAM FUNC_RET	Run mode with SLCH1, SLCH2, and SF in dynamic retention.	On	Retention	Retention	Retention
HAM FUNC_RET	Run mode with SLCH1 and SF in retention, and SLCH2 in power down.	On	Retention	Retention	Off

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Table 2-52 HN-F power states (continued)

State	Description	Control logic	SF power state	SLC way[7:0] power state	SLC way[15:8] power state
SF FUNC_RET	Run mode with SF in retention, and SLCH1 and SLCH2 in power down.	On	Retention	Off	Off
FAM MEM_RET	Shut down with SLCH1, SLCH2, and SF in retention	Off	Retention	Retention	Retention
HAM MEM_RET	Shut down with SLCH1 and SF in retention, and SLCH2 in power down	Off	Retention	Retention	Off
SF MEM_RET	Shut down with SF in retention, and SLCH1 and SLCH2 in power down	Off	Retention	Off	Off
OFF	Shutdown	Off	Off	Off	Off

The following figure shows the valid power states and transitions for a CMN-600 system.

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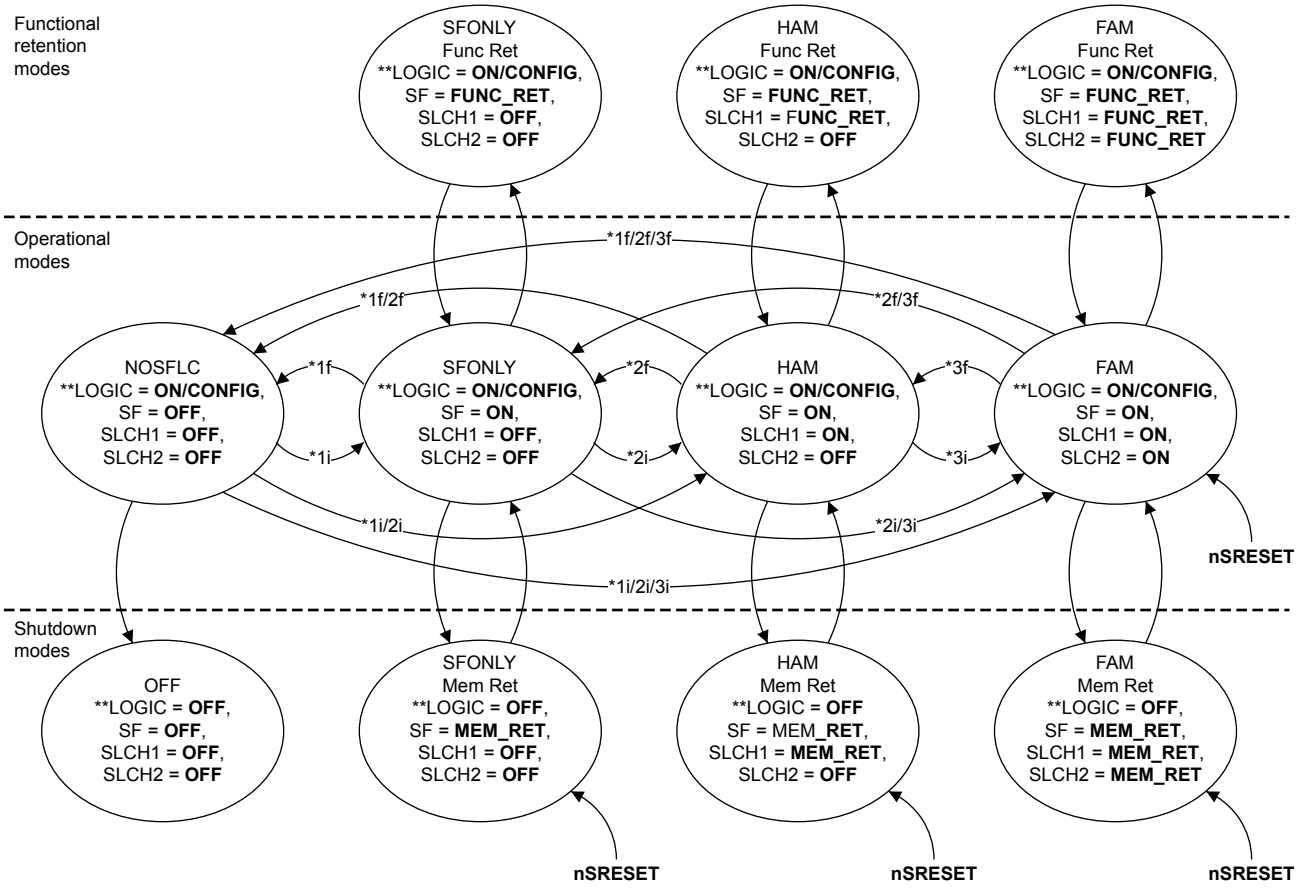

Note: **BOLD** text shows the required power state.

* Automatic initialization and flushing actions:
1i: Initialize snoop filter RAMs.
2i: Initialize lower ways of tag RAMs.
3i: Initialize upper ways of tag RAMs.
1f: Flush (force back-invalidations as necessary and invalidate) snoop filter RAMs.
2f: Flush (clean/invalidate) lower ways of tag/data RAMs.
3f: Flush (clean/invalidate) upper ways of tag/data RAMs.

** All designations refer to P-state values required to enter the respective state.

Figure 2-61 Power state transitions

The SF does not track RN-F coherence while the HN-F is in NOSFSLC state. Therefore, the RN-F caches must be flushed before transitioning from NOSFSLC to SFONLY, HAM, or FAM states.

These HN-F power states are transitioned using configuration register writes that must target all HN-Fs in the SCG region. Also, the logic domain P-Channel interface can initiate a NOSFSLC→FAM transition.

To transition HN-F partitions to a required power state, write to the following por_hnf_ppu_pwpr register fields:

- policy
- op_mode

When the power state transition is complete, the following por_hnf_ppu_pwsr register fields are updated:

- pow_status
- op_mode_status

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If either the SLC, the SF, or both are flushed as part of a power transition, then the power state transition can take many thousands of clock cycles. Also, the **INTREQPPU** interrupt output can be used to indicate the completion of the HN-F power state transitions.

From the FAM, HAM, or SFONLY modes, the HN-F can enter a dynamic retention mode using configuration register writes, where:

- The logic power is on
- The voltage to the RAMs is on, but is reduced to a level that is sufficient for bitcell retention but insufficient for normal operation
- The array pipeline is blocked, and a handshake occurs to allow array access when exiting the retention state

These dynamic power transitions are executed autonomously within each HN-F partition. Each HN-F has a programmable idle cycle counter and initiates a P-Channel handshake with the corresponding RAMs to enter the dynamic retention state. The pipeline then blocks transactions that target the HN-F RAMs. A coherent transaction triggers an exit from the dynamic retention state, initiates another P-Channel handshake, and takes the RAMs out of dynamic retention mode.

From these states, the SLC can also enter a Memory retention mode, where:

- The logic power is turned off
- The voltage to the RAMs is on, but is reduced to a level that is sufficient for bitcell retention but insufficient for normal operation
- Reset deassertion is essential when exiting retention after logic power down

A P-Channel interface controls the CMN-600 logic domain power state. This P-Channel interface also interacts with the HN-F power control logic using an internal bus. The HN-F power control logic waits for a command on the deassertion of **nSRESET**, depending on the overall power state transition that is required. For the Cold reset HN-F FAM transition case, the PCCB block initiates the HN-F NOSFSLC→FAM command. To exit static retention cases, the SCP initiates configuration register writes to the HN-F to indicate the HN-F power state.

The circumstances where the HN-F enters dynamic retention modes or static retention modes are different. Dynamic retention is entered because of a dynamic activity or inactivity indicator from the HN-F to the SoC. This indicator is an output of the HN-F, and is used to determine periods of inactivity long enough to warrant entering retention mode. However the inactivity is either not long enough or not the type of inactivity to make the SoC place the SLC and SF into static retention. In addition to the static retention modes, the control logic can be powered down from the NOSFSLC state, at which point CMN-600 is fully off.

The HN-Fs perform all activity that is required to enable safe transition between the respective power states automatically in response to input P-Channel PSTATE transitions. It is not necessary for the SoC logic to perform any extra activity to enable transitions between power states. For example, the HN-F performs clean and invalidation of half of the ways of the SLC and clean and invalidation of all ways of the SLC. This clean and invalidation activity occurs as required by the respective power state transitions.

Note

CMN-600 cannot make any power transitions while the control logic is powered off. Consider a transition from FAM static retention to OFF. To complete this transition, the power state must first move through FAM and NOSFSLC states while the LOGIC power domain is on. These transitions allow the SLC and SF to be flushed.

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The following table shows the PSTATE encodings for the HN-F and power domains including RAM configurations for the different operational modes.

Note

HN-F cannot process any transactions while in static retention (FUNC_RET or MEM_RET). HN-F must be in the ON state before sending any transactions to HN-F in this case. If HN-F is in dynamic retention, any activity autonomously takes HN-F out of dynamic retention.

Table 2-53 Power modes, operational modes, and RAM configurations

Operational mode	Power mode	PSTATE	Bank 0 RAM	Bank 1 RAM	SF RAM
FAM	ON	11_1000	ON	ON	ON
	FUNC_RET	11_0111	RET	RET	RET
	MEM_RET	11_0010	RET	RET	RET
HAM	ON	10_1000	ON	OFF	ON
	FUNC_RET	10_0111	RET	OFF	RET
	MEM_RET	10_0010	RET	OFF	RET
SFONLY	ON	01_1000	OFF	OFF	ON
	FUNC_RET	01_0111	OFF	OFF	RET
	MEM_RET	01_0010	OFF	OFF	RET
NOSFSLC	MEM_OFF	00_0110	OFF	OFF	OFF
	OFF	00_0000	OFF	OFF	OFF

2.27.8 HN-F RAM PCSM Interface

Each HN-F RAM interface contains a *Power Control State Machine* (PCSM).

The following items depend on the completion of all P-Channel transactions:

- Each PCSM P-Channel interface that can be used to convert power state transitions into technology-specific controls
- The overall HN-F partition power state transition

The following table lists the valid **PSTATE** values for this interface.

Table 2-54 PSTATE Encodings

PSTATE	Value
ON	0b1000
FUNC_RET	0b0111
MEM_RET	0b0010
OFF	0b0000

Note

This interface does not have a **PDENY** signal.

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2.27.9 HN-F power domain completion interrupt

The PCCB can be configured to generate interrupt **INTREQPPU** on completion of power state transitions for a collection of HN-Fs.

The PCCB contains a global status register, por_ppu_int_status, which indicates HN-F power state transition completion. The PCCB also contains a mask register, por_ppu_int_mask, which allows filtering on all or a subset of the HN-Fs in the CMN-600 configuration. The bit positions in the por_ppu_int_status and por_ppu_int_mask registers correspond to the logical ID of the HN-Fs.

INTREQPPU asserts when the HN-F power transition completion sets all por_ppu_int_status register bits and the corresponding por_ppu_int_mask register bit.

To deassert **INTREQPPU**, write 1 to the bits of the por_ppu_int_status register that correspond to the masked group of HN-Fs that completed the power transitions.

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2.28 RN entry to and exit from Snoop and DVM domains

CMN-600 includes a feature that allows RNs to be included or excluded from the system coherency domain. This domain is also known as the Snoop domain or DVM domain. This feature ensures correct operations of Snoops and DVMs when:

- An RN is taken out of reset.
- An RN is powered down and then later powered up.

RN-Fs behave as follows:

- If an RN-F is included in the system coherency domain, it must respond to Snoop and DVM requests from CMN-600.
- If an RN-F is excluded from the system coherency domain, it does not receive Snoop or DVM requests from CMN-600.

RN-Ds behave as follows:

- If an RN-D is included in the system coherency domain, it must respond to DVM requests from CMN-600.
- If an RN-D is excluded from the system coherency domain, it does not receive DVM requests from CMN-600.

This section contains the following subsections:

- *2.28.1 Hardware interface* on page 2-163.
- *2.28.2 Software interface* on page 2-164.

2.28.1 Hardware interface

This section describes the hardware interface for RN inclusion into and exclusion from system coherency domain.

CMN-600 provides two signals for RN system coherency entry and exit:

- **SYSCOREQ** input (to CMN-600).
- **SYSCOACK** output (from CMN-600).

These two signals implement a four-phase handshake between the RN and CMN-600 with the four states as specified in the following table.

Table 2-55 RN system coherency states

SYSCOREQ	SYSCOACK	State
0	0	DISABLED
1	0	CONNECT
1	1	ENABLED
0	1	DISCONNECT

Coming out of Reset, the RN is in the DISABLED system coherency state.

CONNECT

To enter system coherency, RN must assert **SYSCOREQ** and transition to CONNECT state. The RN must be ready to receive and respond to Snoop and DVM requests in this state.

ENABLED

Next, CMN-600 asserts **SYSCOACK** and transitions to ENABLED state. The RN is now included in the system coherency domain. The RN can receive and must respond to Snoop and DVM requests in this state.

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DISCONNECT

When the RN is ready to exit system coherency, it must deassert **SYSCOREQ** and transition to DISCONNECT state. The RN continues to receive and must respond to Snoop and DVM requests in this state.

DISABLED

When all outstanding Snoop and DVM responses have been received, CMN-600 deasserts **SYSCOACK** and transitions to DISABLED state. In this state, no snoop or DVM transactions are sent to the RN which can now be powered down.

——— **Note** ———

The following rules must be obeyed to adhere to the four-phase handshake protocol.

- When **SYSCOREQ** is asserted, it must remain asserted until **SYSCOACK** is asserted.
- When **SYSCOREQ** is deasserted, it must remain deasserted until **SYSCOACK** is deasserted.

———————————

2.28.2 Software interface

This section describes the software interface for RN inclusion into and exclusion from system coherency domain.

CMN-600 provides two *Configuration Registers* (CRs) for system coherency entry and exit:

RN-F
- por_mxp_p{1,0}_syscoreq_ctl
- por_mxp_p{1,0}_syscoack_status

RN-D
- por_rnd_syscoreq_ctl
- por_rnd_syscoack_status

Reading and writing to these CRs provides a software alternative to the four-phase hardware handshake.

——— **Note** ———

It is possible the CRs contain multiple bits where each bit corresponds to a different RN. The following description is about the Read and Write of the CR bit that corresponds to a given RN. When configuring the system coherency entry or exit for a given RN, software must adopt a Read-Modify-Write strategy. This strategy ensures CR bits corresponding to other RNs are not modified when writing into the syscoreq_ctl CR.

———————————

Coming out of Reset, both CRs are cleared, indicating DISABLED state.

CONNECT

To initiate an RN entry into the system coherency domain, software must first poll both CRs. This poll ensures the CR bits corresponding to that RN are set to `0b0`. When the RN is ready to receive and respond to Snoop and DVM requests, software must write a 1 into the corresponding bit in the syscoreq_ctl CR. This write process transitions the RN to CONNECT state.

ENABLED

Next, CMN-600 indicates a transition to ENABLED state by setting the corresponding CR bit in the syscoack_status register to `0b1`. The RN is now inside the system coherency domain. Software can poll the syscoack_status register to determine this state transition.

DISCONNECT

To initiate an RN exit from the system coherency domain, software must first poll both CRs. After ensuring that the CR bits corresponding to that RN are set, software must clear the corresponding syscoreq_ctl bit to transition the RN to DISCONNECT state. The RN continues to receive and must respond to Snoop and DVM requests in this state.

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DISABLED

When all outstanding Snoop and DVM responses have been received, CMN-600 clears the corresponding syscoack_status bit indicating the transition to DISABLED state. In this state, no Snoop or DVM transactions are sent to the RN. Software must poll the syscoack_status register to ensure that this state transition has occurred before initiating RN powerdown.

Note

To adhere to the four-phase handshake protocol, the following rules apply:

- The hardware interface is intended as the primary interface. The software interface is provided as an alternative for legacy RN devices and systems that do not support the hardware interface.
- Either hardware or software interface must be used, but not both. Coming out of Reset, the hardware interface is enabled by default. The first write into the syscoreq_ctl register disables hardware interface and enables software interface. There must be a Reset to re-enable hardware interface.
- When software interface is employed, **SYSCOREQ** must remain deasserted.
- When hardware interface is employed, software must not write to the syscoreq_ctl CR.

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2.29 Link layer

CMN-600 provides link initialization, flow-control, and link deactivation functionality at the RN-F and SN-F device interfaces.

This functionality comprises the following mechanisms:

- A link initialization mechanism by which the receiving device communicates link layer credits, on each CHI channel that is present, to a transmitting device.
- A flow-control mechanism by which the transmitting device uses link layer credits to send CHI flits. The transmitting device uses one credit per flit. The receiving device sends these credits back to the transmitting device, one at a time, after processing each flit. Subsequent flit transfers can then occur.

  ——— **Note** ———

  This section refers to the credit roundtrip latency. This latency is measured in clock cycles, and is between:

  1. The time a transmitting device uses a link layer credit to send a flit to the receiving device.
  2. The earliest time when the transmitting device can receive that credit back from the receiving device and send a subsequent flit.

  ———————————
- A link deactivation mechanism. The transmitting device sends all unused link layer credits on each CHI channel back to the receiving device by sending corresponding link flits.

On flit upload channels, RN-F or SN-F is the transmitting device and CMN-600 is the receiving device. On flit download channels, CMN-600 is the transmitting device and RN-F or SN-F is the receiving device.

For a description of the functional requirements of the CHI link layer, see the *Arm® AMBA® 5 CHI Architecture Specification*.

This section contains the following subsection:

- *2.29.1 Flit buffer sizing requirements* on page 2-166.

2.29.1 Flit buffer sizing requirements

There are specific size requirements for the CMN-600 flit buffers.

Flit buffer sizing at a receiving device is based on the following two factors:

1. A transmitting device must be able to send flits continuously in a pipelined fashion without stalling due to insufficient link layer credits from the receiving device. This requirement ensures that the system can achieve the full link bandwidth. For a specific system, there is a minimum number of link layer credits that are required so that pipeline stalls can be prevented. You can use the credit roundtrip latency between the transmitting device and receiving device as a measure of the required number of link layer credits.
2. A receiving device must be able to accept and process as many flits as the number of link layer credits it has outstanding at the transmitting device. Therefore, the number of link layer credits that a receiving device sends must not exceed its flit buffering and processing capabilities.

Therefore, flit buffer sizing and corresponding link layer crediting must reflect the credit roundtrip latency. If this requirement is met, the system can achieve optimal flit transfer bandwidth between transmitting and receiving devices. For more information about flit buffer sizing and link layer crediting for flit uploads and downloads at RN-F and SN-F interfaces, see the following sections:

- *Flit uploads from RN-F or SN-F* on page 2-166
- *Flit downloads with RN-F or SN-F* on page 2-167

Flit uploads from RN-F or SN-F

For flit uploads, the `RXBUF_NUM_ENTRIES` parameter specifies the number of flit buffers in CMN-600.

For more information about `RXBUF_NUM_ENTRIES`, refer to *1.5 Configurable options* on page 1-21.

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For optimal flit transfer bandwidth, this parameter must be set equal to the upload credit roundtrip latency (UpCrdLat<ch>) which is computed using the following equation.

UpCrdLat<ch> = UpCrdLatInt<ch> + UpCrdLatExt<ch>, where:

- <ch> is the CHI channel (REQ, RSP, SNP, or DAT).
- UpCrdLatInt<ch> is the upload credit latency inside CMN-600. This latency is measured in clock cycles between the following time points:
  1. The time that the RN-F or SN-F asserts the RX<ch>FLITV input for a flit that is uploaded to CMN-600.
  2. The earliest time when CMN-600 asserts the RX<ch>LCRDV output to the RN-F or SN-F after the flit is processed and the credit sent back.

  At the RN-F/SN-F interfaces, UpCrdLatInt<ch> = 1 on all CHI channels.
- UpCrdLatExt<ch> is the upload credit latency outside CMN-600. This latency is measured in clock cycles between the following time points:
  1. The time that CMN-600 asserts the RX<ch>LCRDV output when the credit is sent back to the RN-F or SN-F.
  2. The earliest time when the RN-F or SN-F asserts the RX<ch>FLITV input when the credit is used to send a subsequent flit.

Flit downloads with RN-F or SN-F

For optimal flit downloads, the RN-F or SN-F must size its input buffers to reflect the download credit roundtrip latency (DnCrdLat<ch>).

DnCrdLat<ch> is computed using the following equation.

DnCrdLat<ch> = DnCrdLatInt<ch> + DnCrdLatExt<ch>, where:

- <ch> is the CHI channel (REQ, RSP, SNP, or DAT).
- DnCrdLatInt<ch> is the download credit latency inside CMN-600. This latency is measured, in clock cycles, between the following time points:
  - The time that the RN-F or SN-F asserts the RX<ch>LCRDV input is asserted to CMN-600
  - The earliest time when CMN-600 asserts the RX<ch>FLITV output to the RN-F or SN-F for a flit using that credit. At the RN-F or SN-F interfaces, DnCrdLatInt<ch> = 2 on all CHI channels.
- DnCrdLatExt<ch> is the download credit latency outside CMN-600. This latency is measured, in clock cycles, between the following time points:
  - The time that CMN-600 asserts the RX<ch>FLITV output for a flit downloaded to the RN-F or SN-F
  - The earliest time when RX<ch>LCRDV input is asserted when the RN-F or SN-F returns the corresponding credit to CMN-600.

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2.30 CML Symmetric Multiprocessor support

A *Symmetric Multiprocessor* (SMP) allows for a shared, common OS and memory to operate on multiple chips.

CML supports SMP systems if the systems were built using CMLs generated by CMN-600.

When set, the provided SMP mode option enables DVM, GIC-D, Exclusives, and CPU-Event communication across CCIX links using micro-architected mechanism.

Microarchitecture support for propagating Trace Tag across CCIX links (called Remote Trace Tag) is also enabled in SMP mode only. Propagation of Remote Trace Tag is achieved by the sender CXG only on the outgoing CCIX request, and by the receiving CXG only from the incoming CCIX request. This feature ensures all subsequent CCIX messages that are part of the same transaction use the same CCIX TxnID. Similarly, the sender CXG only completes propagation of remote Trace Tag on the outgoing CCIX Snoop, and the receiving CXG only from the incoming CCIX snoop.

For more information about programming CMN-600 for SMP mode, see *3.5 CML programming* on page 3-1071.

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2.31 CML CCIX Slave Agent support

CML supports CCIX-independent memory expansion where the CCIX link is used to communicate only with the Slave Agent on the remote chip.

For more information, see the *Cache Coherent Interconnect for Accelerators CCIX Base Specification Revision 1.0 Version 0.9*.

To enable this support, set the cxsa_mode_en bit in the por_cxg_ra_cfg_ctl register. See *por_cxg_ra_cfg_ctl* on page 3-956.

In this mode, CXRA accepts ReadNoSnp, WriteNoSnp, and CMO requests from HN-Fs and sends them to the Slave Agent on the remote chip. An HN-F SAM range-based memory region is programmed with both of the following items:

- The address range of the remote Slave Agent.
- The node ID of the corresponding CXG block that communicates with that remote Slave Agent.

The RA SAM inside CXRA is programmed with the CCIX Source ID (HAID) and Target ID (SAID) which are used in the CCIX header.

For further CXSA programming requirements, see *3.5 CML programming* on page 3-1071.

For more details about the CXSA, see the *Arm® AMBA® CXS Protocol Specification*.

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Chapter 3
Programmer's model

This chapter describes the programmer's model.

It contains the following sections:

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3.1 About the programmers model

A CMN-600 interconnect consists of various components, such as XPs, RN-Is, or DTCs, that are accessed through memory mapped registers for configuration, topology, and status information.

The memory mapped registers are organized in a series of 16KB regions. They are accessed through CHI read and write commands.

A full description of a CMN-600 interconnect consists of a list of components, the compile-time configuration options for each component, and the connectivity between the components. Software can determine the full configuration of the CMN-600 interconnect through a sequence of accesses to the configuration register space.

This section contains the following subsections:

3.1.1 Node configuration register address mapping

All CMN-600 configuration registers are mapped to an address range starting at PERIPHBASE with a maximum size of 64MB for a system with the maximum X and Y dimensions of eight or less.

The **CFGM_PERIPHBASE** input signal controls the reset value of PERIPHBASE.

All configuration, information, and status registers in a CMN-600 interconnect are grouped into 16KB regions each associated with a CMN-600 component instance. The base address of each region can be determined at compile time, or determined at run time through a software discovery mechanism.

Software discovery consists of three steps:

1. Read information in the 16KB region at ROOTNODEBASE. This information determines the number of XPs in CMN-600 and the offset from PERIPHBASE for the 16KB region of each XP.
2. Read information in the 16KB region that is associated with each XP. This information determines the components that are associated with that XP, topology information for those components, and the offset from PERIPHBASE for each component 16KB region.
3. Read information in the 16KB region that is associated with the component. This information determines the type of block and the configuration details of the component.

For more information on these steps, see *2.5.4 Discovery tree structure* on page 2-64.

With this sequence, software can build a list of all components in the system and the addresses of their respective 16KB configuration regions.

3.1.2 Global configuration register region

The 16KB block at ROOTNODEBASE contains global information and configuration for CMN-600, and the first level of discovery information for components in the system.

Each XP Base Address register contains the offset from PERIPHBASE for a 16KB region that contains the information about one XP. The XP Base Address register also contains discovery information for components that are associated with that XP. The XP Base address refers to the relative address of the XP configuration registers. The first level of Discovery points to each por_mxp_node_info register of the XPs.

For more register information, see *3.3.1 Configuration master register descriptions* on page 3-197.

3.1.3 XP configuration register region

Each XP has a 16KB configuration register region with information about that XP and all associated components.

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Refer to *3.2.6 XP register summary* on page 3-184 for more information.

3.1.4 Component configuration register region

Each non-XP component has a 16KB configuration register region. This region has programmable information, status, and configuration options for that component.

The contents are listed in the following table, including the number of 8B registers which fit in the space.

Table 3-1 Configuration register region values

Register sections	Relative offset	Absolute offset	Description
Discovery register section			
NODE INFO (node type, node ID)	`0x0`	`0x0`	Up to 16 registers
CHILD INFO (number of children, offset of the first child pointer register = `0x100`)	`0x80`	`0x80`	Up to 16 registers
CHILD POINTER registers	`0x100`	`0x100`	Up to 256 registers
UNIT REGISTER section	`0x900`	Unit-specific registers	
UNIT INFO	`0x0`	`0x900`	Up to 16 registers
UNIT SECURITY	`0x80`	`0x980`	Up to 16 registers
UNIT CTRL	`0x100`	`0xA00`	Up to 16 registers
UNIT QoS	`0x180`	`0xA80`	Up to 32 registers
UNIT DEBUG	`0x280`	`0xB80`	Up to 16 registers
UNIT OTHER	`0x300`	`0xC00`	Up to 128 registers
UNIT POWER	`0x700`	`0x1000`	4KB-aligned space – 512 registers
UNIT PMU	`0x1700`	`0x2000`	4KB-aligned space – 512 registers
UNIT RAS (Secure RAS registers)	`0x2700`	`0x3000`	4KB-aligned space – 512 registers
UNIT RAS (Non-secure RAS registers)	`0x2800`	`0x3100`	4KB-aligned space – 512 registers

3.1.5 Requirements of configuration register reads and writes

Reads and writes to the CMN-600 configuration registers must meet certain requirements.

If the following requirements are not met, UNPREDICTABLE behavior can occur:

- All accesses must be of device type, either:
  - Device, Strongly Ordered.
  - nGnRE, nGnRnE.
- All accesses must have a data size of 32 bits or 64 bits.
- All accesses must be natively aligned, that is:
  - 32-bit accesses must be aligned to a 32-bit boundary.
  - 64-bit accesses must be aligned to a 64-bit boundary.
- For configuration register writes, all bits, 32 or 64, must be written, that is, all byte lanes must be valid:
  - **WRSTB** must indicate that all byte lanes are valid if the write transaction is from an AMBA AXI or ACE-Lite interface.
  - **BE** must indicate that all byte lanes are valid if the write transaction is sent from an AMBA 5 CHI interface.
- Secure registers can only be accessed through a Secure access, that is, NS = 0. Non-secure registers can be accessed through either a Secure or Non-secure access.

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For more information on error signal handling, see *2.14 Reliability, Availability, and Serviceability* on page 2-83.

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3.2 Register summary

This section contains summary tables for all registers in CMN-600.

This section contains the following subsections:

3.2.1 Configuration master register summary

This section lists the configuration master registers used in CMN-600.

CFGM register summary

The following table shows the *CFGM* registers in offset order from the base memory address.

Table 3-2 CFGM register summary

Offset	Name	Type	Description
0x0	por_cfgm_node_info	RO	*por_cfgm_node_info* on page 3-197
0x8	por_cfgm_periph_id_0_periph_id_1	RO	*por_cfgm_periph_id_0_periph_id_1* on page 3-198
0x10	por_cfgm_periph_id_2_periph_id_3	RO	*por_cfgm_periph_id_2_periph_id_3* on page 3-198
0x18	por_cfgm_periph_id_4_periph_id_5	RO	*por_cfgm_periph_id_4_periph_id_5* on page 3-200
0x20	por_cfgm_periph_id_6_periph_id_7	RO	*por_cfgm_periph_id_6_periph_id_7* on page 3-201
0x28	por_cfgm_component_id_0_component_id_1	RO	*por_cfgm_component_id_0_component_id_1* on page 3-202
0x30	por_cfgm_component_id_2_component_id_3	RO	*por_cfgm_component_id_2_component_id_3* on page 3-203
0x80	por_cfgm_child_info	RO	*por_cfgm_child_info* on page 3-204
0x980	por_cfgm_secure_access	RW	*por_cfgm_secure_access* on page 3-205
0x3000	por_cfgm_errgsr0	RO	*por_cfgm_errgsr0* on page 3-206
0x3008	por_cfgm_errgsr1	RO	*por_cfgm_errgsr1* on page 3-207
0x3010	por_cfgm_errgsr2	RO	*por_cfgm_errgsr2* on page 3-208
0x3018	por_cfgm_errgsr3	RO	*por_cfgm_errgsr3* on page 3-208
0x3020	por_cfgm_errgsr4	RO	*por_cfgm_errgsr4* on page 3-209
0x3080	por_cfgm_errgsr5	RO	*por_cfgm_errgsr5* on page 3-210
0x3088	por_cfgm_errgsr6	RO	*por_cfgm_errgsr6* on page 3-211
0x3090	por_cfgm_errgsr7	RO	*por_cfgm_errgsr7* on page 3-212
0x3098	por_cfgm_errgsr8	RO	*por_cfgm_errgsr8* on page 3-213

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Table 3-2 CFGM register summary (continued)

Offset	Name	Type	Description
0x30A0	por_cfgm_errgsr9	RO	*por_cfgm_errgsr9* on page 3-213
0x3100	por_cfgm_errgsr0_NS	RO	*por_cfgm_errgsr0_NS* on page 3-214
0x3108	por_cfgm_errgsr1_NS	RO	*por_cfgm_errgsr1_NS* on page 3-215
0x3110	por_cfgm_errgsr2_NS	RO	*por_cfgm_errgsr2_NS* on page 3-216
0x3118	por_cfgm_errgsr3_NS	RO	*por_cfgm_errgsr3_NS* on page 3-217
0x3120	por_cfgm_errgsr4_NS	RO	*por_cfgm_errgsr4_NS* on page 3-218
0x3180	por_cfgm_errgsr5_NS	RO	*por_cfgm_errgsr5_NS* on page 3-218
0x3188	por_cfgm_errgsr6_NS	RO	*por_cfgm_errgsr6_NS* on page 3-219
0x3190	por_cfgm_errgsr7_NS	RO	*por_cfgm_errgsr7_NS* on page 3-220
0x3198	por_cfgm_errgsr8_NS	RO	*por_cfgm_errgsr8_NS* on page 3-221
0x31A0	por_cfgm_errgsr9_NS	RO	*por_cfgm_errgsr9_NS* on page 3-222
0x3FA8	por_cfgm_errdevaff	RO	*por_cfgm_errdevaff* on page 3-223
0x3FB8	por_cfgm_errdevarch	RO	*por_cfgm_errdevarch* on page 3-223
0x3FC8	por_cfgm_erridr	RO	*por_cfgm_erridr* on page 3-224
0x3FD0	por_cfgm_errpidr45	RO	*por_cfgm_errpidr45* on page 3-225
0x3FD8	por_cfgm_errpidr67	RO	*por_cfgm_errpidr67* on page 3-226
0x3FE0	por_cfgm_errpidr01	RO	*por_cfgm_errpidr01* on page 3-227
0x3FE8	por_cfgm_errpidr23	RO	*por_cfgm_errpidr23* on page 3-228
0x3FF0	por_cfgm_errcidr01	RO	*por_cfgm_errcidr01* on page 3-229
0x3FF8	por_cfgm_errcidr23	RO	*por_cfgm_errcidr23* on page 3-230
0x900	por_info_global	RO	*por_info_global* on page 3-231
0x1000	por_ppu_int_enable	RW	*por_ppu_int_enable* on page 3-233
0x1008	por_ppu_int_status	W1C	*por_ppu_int_status* on page 3-234
0x1010	por_ppu_qactive_hyst	RW	*por_ppu_qactive_hyst* on page 3-235
0x100	por_cfgm_child_pointer_0	RO	*por_cfgm_child_pointer_0* on page 3-236

3.2.2 DN register summary

This section lists the DN registers used in CMN-600.

DN register summary

The following table shows the *DN* registers in offset order from the base memory address

Table 3-3 DN register summary

Offset	Name	Type	Description
0x0	por_dn_node_info	RO	*por_dn_node_info* on page 3-238
0x80	por_dn_child_info	RO	*por_dn_child_info* on page 3-239

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Table 3-3 DN register summary (continued)

Offset	Name	Type	Description
0x900	por_dn_build_info	RO	*por_dn_build_info* on page 3-239
0x980	por_dn_secure_register_groups_override	RW	*por_dn_secure_register_groups_override* on page 3-240
0xA00	por_dn_aux_ctl	RW	*por_dn_aux_ctl* on page 3-241
0xC00	por_dn_vmf0_ctrl	RW	*por_dn_vmf0_ctrl* on page 3-242
0xC08	por_dn_vmf0_rnf0	RW	*por_dn_vmf0_rnf0* on page 3-244
0xC10	por_dn_vmf0_rnd	RW	*por_dn_vmf0_rnd* on page 3-245
0xC18	por_dn_vmf0_cxra	RW	*por_dn_vmf0_cxra* on page 3-246
0xC20	por_dn_vmf1_ctrl	RW	*por_dn_vmf1_ctrl* on page 3-247
0xC28	por_dn_vmf1_rnf0	RW	*por_dn_vmf1_rnf0* on page 3-248
0xC30	por_dn_vmf1_rnd	RW	*por_dn_vmf1_rnd* on page 3-249
0xC38	por_dn_vmf1_cxra	RW	*por_dn_vmf1_cxra* on page 3-250
0xC40	por_dn_vmf2_ctrl	RW	*por_dn_vmf2_ctrl* on page 3-251
0xC48	por_dn_vmf2_rnf0	RW	*por_dn_vmf2_rnf0* on page 3-252
0xC50	por_dn_vmf2_rnd	RW	*por_dn_vmf2_rnd* on page 3-253
0xC58	por_dn_vmf2_cxra	RW	*por_dn_vmf2_cxra* on page 3-254
0xC60	por_dn_vmf3_ctrl	RW	*por_dn_vmf3_ctrl* on page 3-255
0xC68	por_dn_vmf3_rnf0	RW	*por_dn_vmf3_rnf0* on page 3-257
0xC70	por_dn_vmf3_rnd	RW	*por_dn_vmf3_rnd* on page 3-257
0xC78	por_dn_vmf3_cxra	RW	*por_dn_vmf3_cxra* on page 3-258
0xC80	por_dn_vmf4_ctrl	RW	*por_dn_vmf4_ctrl* on page 3-259
0xC88	por_dn_vmf4_rnf0	RW	*por_dn_vmf4_rnf0* on page 3-261
0xC90	por_dn_vmf4_rnd	RW	*por_dn_vmf4_rnd* on page 3-262
0xC98	por_dn_vmf4_cxra	RW	*por_dn_vmf4_cxra* on page 3-263
0xCA0	por_dn_vmf5_ctrl	RW	*por_dn_vmf5_ctrl* on page 3-264
0xCA8	por_dn_vmf5_rnf0	RW	*por_dn_vmf5_rnf0* on page 3-265
0xCB0	por_dn_vmf5_rnd	RW	*por_dn_vmf5_rnd* on page 3-266
0xCB8	por_dn_vmf5_cxra	RW	*por_dn_vmf5_cxra* on page 3-267
0xCC0	por_dn_vmf6_ctrl	RW	*por_dn_vmf6_ctrl* on page 3-268
0xCC8	por_dn_vmf6_rnf0	RW	*por_dn_vmf6_rnf0* on page 3-269
0xCD0	por_dn_vmf6_rnd	RW	*por_dn_vmf6_rnd* on page 3-270
0xCD8	por_dn_vmf6_cxra	RW	*por_dn_vmf6_cxra* on page 3-271
0xCE0	por_dn_vmf7_ctrl	RW	*por_dn_vmf7_ctrl* on page 3-272
0xCE8	por_dn_vmf7_rnf0	RW	*por_dn_vmf7_rnf0* on page 3-273
0xCF0	por_dn_vmf7_rnd	RW	*por_dn_vmf7_rnd* on page 3-274
0xCF8	por_dn_vmf7_cxra	RW	*por_dn_vmf7_cxra* on page 3-275

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Table 3-3 DN register summary (continued)

Offset	Name	Type	Description
0xD00	por_dn_vmf8_ctrl	RW	*por_dn_vmf8_ctrl* on page 3-276
0xD08	por_dn_vmf8_rnf0	RW	*por_dn_vmf8_rnf0* on page 3-277
0xD10	por_dn_vmf8_rnd	RW	*por_dn_vmf8_rnd* on page 3-278
0xD18	por_dn_vmf8_cxra	RW	*por_dn_vmf8_cxra* on page 3-279
0xD20	por_dn_vmf9_ctrl	RW	*por_dn_vmf9_ctrl* on page 3-280
0xD28	por_dn_vmf9_rnf0	RW	*por_dn_vmf9_rnf0* on page 3-281
0xD30	por_dn_vmf9_rnd	RW	*por_dn_vmf9_rnd* on page 3-282
0xD38	por_dn_vmf9_cxra	RW	*por_dn_vmf9_cxra* on page 3-283
0xD40	por_dn_vmf10_ctrl	RW	*por_dn_vmf10_ctrl* on page 3-284
0xD48	por_dn_vmf10_rnf0	RW	*por_dn_vmf10_rnf0* on page 3-285
0xD50	por_dn_vmf10_rnd	RW	*por_dn_vmf10_rnd* on page 3-286
0xD58	por_dn_vmf10_cxra	RW	*por_dn_vmf10_cxra* on page 3-287
0xD60	por_dn_vmf11_ctrl	RW	*por_dn_vmf11_ctrl* on page 3-288
0xD68	por_dn_vmf11_rnf0	RW	*por_dn_vmf11_rnf0* on page 3-289
0xD70	por_dn_vmf11_rnd	RW	*por_dn_vmf11_rnd* on page 3-290
0xD78	por_dn_vmf11_cxra	RW	*por_dn_vmf11_cxra* on page 3-291
0xD80	por_dn_vmf12_ctrl	RW	*por_dn_vmf12_ctrl* on page 3-292
0xD88	por_dn_vmf12_rnf0	RW	*por_dn_vmf12_rnf0* on page 3-293
0xD90	por_dn_vmf12_rnd	RW	*por_dn_vmf12_rnd* on page 3-294
0xD98	por_dn_vmf12_cxra	RW	*por_dn_vmf12_cxra* on page 3-295
0xDA0	por_dn_vmf13_ctrl	RW	*por_dn_vmf13_ctrl* on page 3-296
0xDA8	por_dn_vmf13_rnf0	RW	*por_dn_vmf13_rnf0* on page 3-297
0xDB0	por_dn_vmf13_rnd	RW	*por_dn_vmf13_rnd* on page 3-298
0xDB8	por_dn_vmf13_cxra	RW	*por_dn_vmf13_cxra* on page 3-299
0xDC0	por_dn_vmf14_ctrl	RW	*por_dn_vmf14_ctrl* on page 3-300
0xDC8	por_dn_vmf14_rnf0	RW	*por_dn_vmf14_rnf0* on page 3-301
0xDD0	por_dn_vmf14_rnd	RW	*por_dn_vmf14_rnd* on page 3-302
0xDD8	por_dn_vmf14_cxra	RW	*por_dn_vmf14_cxra* on page 3-303
0xDE0	por_dn_vmf15_ctrl	RW	*por_dn_vmf15_ctrl* on page 3-304
0xDE8	por_dn_vmf15_rnf0	RW	*por_dn_vmf15_rnf0* on page 3-305
0xDF0	por_dn_vmf15_rnd	RW	*por_dn_vmf15_rnd* on page 3-306
0xDF8	por_dn_vmf15_cxra	RW	*por_dn_vmf15_cxra* on page 3-307
0x2000	por_dn_pmu_event_sel	RW	*por_dn_pmu_event_sel* on page 3-308

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3.2.3 Debug and trace register summary

This section lists the debug and trace registers used in CMN-600.

DT register summary

The following table shows the *DT* registers in offset order from the base memory address

Table 3-4 DT register summary

Offset	Name	Type	Description
0x0	por_dt_node_info	RO	*por_dt_node_info* on page 3-310
0x80	por_dt_child_info	RO	*por_dt_child_info* on page 3-311
0x980	por_dt_secure_access	RW	*por_dt_secure_access* on page 3-311
0xA00	por_dt_dtc_ctl	RW	*por_dt_dtc_ctl* on page 3-313
0xA10	por_dt_trigger_status	RO	*por_dt_trigger_status* on page 3-314
0xA20	por_dt_trigger_status_clr	WO	*por_dt_trigger_status_clr* on page 3-315
0xA30	por_dt_trace_control	RW	*por_dt_trace_control* on page 3-316
0xA48	por_dt_traceid	RW	*por_dt_traceid* on page 3-317
0x2000	por_dt_pmevcntAB	RW	*por_dt_pmevcntAB* on page 3-318
0x2010	por_dt_pmevcntCD	RW	*por_dt_pmevcntCD* on page 3-319
0x2020	por_dt_pmevcntEF	RW	*por_dt_pmevcntEF* on page 3-320
0x2030	por_dt_pmevcntGH	RW	*por_dt_pmevcntGH* on page 3-321
0x2040	por_dt_pmccntr	RW	*por_dt_pmccntr* on page 3-321
0x2050	por_dt_pmevcntsrAB	RW	*por_dt_pmevcntsrAB* on page 3-322
0x2060	por_dt_pmevcntsrCD	RW	*por_dt_pmevcntsrCD* on page 3-323
0x2070	por_dt_pmevcntsrEF	RW	*por_dt_pmevcntsrEF* on page 3-324
0x2080	por_dt_pmevcntsrGH	RW	*por_dt_pmevcntsrGH* on page 3-325
0x2090	por_dt_pmccntrsr	RW	*por_dt_pmccntrsr* on page 3-326
0x2100	por_dt_pmcr	RW	*por_dt_pmcr* on page 3-327
0x2118	por_dt_pmovsr	RO	*por_dt_pmovsr* on page 3-328
0x2120	por_dt_pmovsr_clr	WO	*por_dt_pmovsr_clr* on page 3-329
0x2128	por_dt_pmssr	RO	*por_dt_pmssr* on page 3-330
0x2130	por_dt_pmsrr	WO	*por_dt_pmsrr* on page 3-331
0x2DA0	por_dt_claim	RW	*por_dt_claim* on page 3-332
0x2DA8	por_dt_devaff	RO	*por_dt_devaff* on page 3-333
0x2DB0	por_dt_lsr	RO	*por_dt_lsr* on page 3-333
0x2DB8	por_dt_authstatus_devarch	RO	*por_dt_authstatus_devarch* on page 3-334
0x2DC0	por_dt_devid	RO	*por_dt_devid* on page 3-335
0x2DC8	por_dt_devtype	RO	*por_dt_devtype* on page 3-336
0x2DD0	por_dt_pidr45	RO	*por_dt_pidr45* on page 3-337

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Table 3-4 DT register summary (continued)

Offset	Name	Type	Description
0x2DD8	por_dt_pidr67	RO	*por_dt_pidr67* on page 3-338
0x2DE0	por_dt_pidr01	RO	*por_dt_pidr01* on page 3-339
0x2DE8	por_dt_pidr23	RO	*por_dt_pidr23* on page 3-340
0x2DF0	por_dt_cidr01	RO	*por_dt_cidr01* on page 3-341
0x2DF8	por_dt_cidr23	RO	*por_dt_cidr23* on page 3-342

3.2.4 HN-F register summary

This section lists the HN-F registers used in CMN-600.

HNF register summary

The following table shows the *HNF* registers in offset order from the base memory address.

Table 3-5 HNF register summary

Offset	Name	Type	Description
0x0	por_hnf_node_info	RO	*por_hnf_node_info* on page 3-344
0x80	por_hnf_child_info	RO	*por_hnf_child_info* on page 3-345
0x980	por_hnf_secure_register_groups_override	RW	*por_hnf_secure_register_groups_override* on page 3-345
0x900	por_hnf_unit_info	RO	*por_hnf_unit_info* on page 3-347
0xA00	por_hnf_cfg_ctl	RW	*por_hnf_cfg_ctl* on page 3-348
0xA08	por_hnf_aux_ctl	RW	*por_hnf_aux_ctl* on page 3-350
0xA10	por_hnf_r2_aux_ctl	RW	*por_hnf_r2_aux_ctl* on page 3-354
0x1000	por_hnf_ppu_pwpr	RW	*por_hnf_ppu_pwpr* on page 3-355
0x1008	por_hnf_ppu_pwsr	RO	*por_hnf_ppu_pwsr* on page 3-356
0x1014	por_hnf_ppu_misr	RO	*por_hnf_ppu_misr* on page 3-357
0x1FB0	por_hnf_ppu_idr0	RO	*por_hnf_ppu_idr0* on page 3-358
0x1FB4	por_hnf_ppu_idr1	RO	*por_hnf_ppu_idr1* on page 3-360
0x1FC8	por_hnf_ppu_iidr	RO	*por_hnf_ppu_iidr* on page 3-361
0x1FCC	por_hnf_ppu_aidr	RO	*por_hnf_ppu_aidr* on page 3-362
0x1100	por_hnf_ppu_dyn_ret_threshold	RW	*por_hnf_ppu_dyn_ret_threshold* on page 3-362
0xA80	por_hnf_qos_band	RO	*por_hnf_qos_band* on page 3-363
0xA88	por_hnf_qos_reservation	RW	*por_hnf_qos_reservation* on page 3-364
0xA90	por_hnf_rn_starvation	RW	*por_hnf_rn_starvation* on page 3-366
0x3000	por_hnf_errfr	RO	*por_hnf_errfr* on page 3-368
0x3008	por_hnf_errctlr	RW	*por_hnf_errctlr* on page 3-369
0x3010	por_hnf_errstatus	W1C	*por_hnf_errstatus* on page 3-370
0x3018	por_hnf_erraddr	RW	*por_hnf_erraddr* on page 3-372

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Table 3-5 HNF register summary (continued)

Offset	Name	Type	Description
0x3020	por_hnf_errmisc	RW	*por_hnf_errmisc* on page 3-373
0x3030	por_hnf_err_inj	RW	*por_hnf_err_inj* on page 3-375
0x3038	por_hnf_byte_par_err_inj	WO	*por_hnf_byte_par_err_inj* on page 3-376
0x3100	por_hnf_errfr_NS	RO	*por_hnf_errfr_NS* on page 3-377
0x3108	por_hnf_errctlr_NS	RW	*por_hnf_errctlr_NS* on page 3-379
0x3110	por_hnf_errstatus_NS	W1C	*por_hnf_errstatus_NS* on page 3-380
0x3118	por_hnf_erraddr_NS	RW	*por_hnf_erraddr_NS* on page 3-382
0x3120	por_hnf_errmisc_NS	RW	*por_hnf_errmisc_NS* on page 3-383
0xC00	por_hnf_slc_lock_ways	RW	*por_hnf_slc_lock_ways* on page 3-385
0xC08	por_hnf_slc_lock_base0	RW	*por_hnf_slc_lock_base0* on page 3-386
0xC10	por_hnf_slc_lock_base1	RW	*por_hnf_slc_lock_base1* on page 3-387
0xC18	por_hnf_slc_lock_base2	RW	*por_hnf_slc_lock_base2* on page 3-388
0xC20	por_hnf_slc_lock_base3	RW	*por_hnf_slc_lock_base3* on page 3-389
0xC30	por_hnf_rni_region_vec	RW	*por_hnf_rni_region_vec* on page 3-390
0xC38	por_hnf_rnf_region_vec	RW	*por_hnf_rnf_region_vec* on page 3-391
0xC40	por_hnf_rnd_region_vec	RW	*por_hnf_rnd_region_vec* on page 3-392
0xC48	por_hnf_slcway_partition0_rnf_vec	RW	*por_hnf_slcway_partition0_rnf_vec* on page 3-393
0xC50	por_hnf_slcway_partition1_rnf_vec	RW	*por_hnf_slcway_partition1_rnf_vec* on page 3-394
0xC58	por_hnf_slcway_partition2_rnf_vec	RW	*por_hnf_slcway_partition2_rnf_vec* on page 3-395
0xC60	por_hnf_slcway_partition3_rnf_vec	RW	*por_hnf_slcway_partition3_rnf_vec* on page 3-396
0xC28	por_hnf_rnf_region_vec1	RW	*por_hnf_rnf_region_vec1* on page 3-397
0xCB0	por_hnf_slcway_partition0_rnf_vec1	RW	*por_hnf_slcway_partition0_rnf_vec1* on page 3-398
0xCB8	por_hnf_slcway_partition1_rnf_vec1	RW	*por_hnf_slcway_partition1_rnf_vec1* on page 3-399
0xCC0	por_hnf_slcway_partition2_rnf_vec1	RW	*por_hnf_slcway_partition2_rnf_vec1* on page 3-399
0xCC8	por_hnf_slcway_partition3_rnf_vec1	RW	*por_hnf_slcway_partition3_rnf_vec1* on page 3-400
0xC68	por_hnf_slcway_partition0_rni_vec	RW	*por_hnf_slcway_partition0_rni_vec* on page 3-401
0xC70	por_hnf_slcway_partition1_rni_vec	RW	*por_hnf_slcway_partition1_rni_vec* on page 3-402
0xC78	por_hnf_slcway_partition2_rni_vec	RW	*por_hnf_slcway_partition2_rni_vec* on page 3-403
0xC80	por_hnf_slcway_partition3_rni_vec	RW	*por_hnf_slcway_partition3_rni_vec* on page 3-404
0xC88	por_hnf_slcway_partition0_rnd_vec	RW	*por_hnf_slcway_partition0_rnd_vec* on page 3-405
0xC90	por_hnf_slcway_partition1_rnd_vec	RW	*por_hnf_slcway_partition1_rnd_vec* on page 3-405
0xC98	por_hnf_slcway_partition2_rnd_vec	RW	*por_hnf_slcway_partition2_rnd_vec* on page 3-406
0xCA0	por_hnf_slcway_partition3_rnd_vec	RW	*por_hnf_slcway_partition3_rnd_vec* on page 3-407
0xCA8	por_hnf_rn_region_lock	RW	*por_hnf_rn_region_lock* on page 3-408
0xD00	por_hnf_sam_control	RW	*por_hnf_sam_control* on page 3-409

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Table 3-5 HNF register summary (continued)

Offset	Name	Type	Description
0xD08	por_hnf_sam_memregion0	RW	*por_hnf_sam_memregion0* on page 3-411
0xD10	por_hnf_sam_memregion1	RW	*por_hnf_sam_memregion1* on page 3-412
0xD18	por_hnf_sam_sn_properties	RW	*por_hnf_sam_sn_properties* on page 3-414
0xD20	por_hnf_sam_6sn_nodeid	RW	*por_hnf_sam_6sn_nodeid* on page 3-417
0xD28	por_hnf_rn_phys_id0	RW	*por_hnf_rn_phys_id0* on page 3-418
0xD30	por_hnf_rn_phys_id1	RW	*por_hnf_rn_phys_id1* on page 3-420
0xD38	por_hnf_rn_phys_id2	RW	*por_hnf_rn_phys_id2* on page 3-422
0xD40	por_hnf_rn_phys_id3	RW	*por_hnf_rn_phys_id3* on page 3-424
0xD48	por_hnf_rn_phys_id4	RW	*por_hnf_rn_phys_id4* on page 3-426
0xD50	por_hnf_rn_phys_id5	RW	*por_hnf_rn_phys_id5* on page 3-428
0xD58	por_hnf_rn_phys_id6	RW	*por_hnf_rn_phys_id6* on page 3-430
0xD60	por_hnf_rn_phys_id7	RW	*por_hnf_rn_phys_id7* on page 3-432
0xD68	por_hnf_rn_phys_id8	RW	*por_hnf_rn_phys_id8* on page 3-434
0xD70	por_hnf_rn_phys_id9	RW	*por_hnf_rn_phys_id9* on page 3-436
0xD78	por_hnf_rn_phys_id10	RW	*por_hnf_rn_phys_id10* on page 3-438
0xD80	por_hnf_rn_phys_id11	RW	*por_hnf_rn_phys_id11* on page 3-440
0xD88	por_hnf_rn_phys_id12	RW	*por_hnf_rn_phys_id12* on page 3-442
0xD90	por_hnf_rn_phys_id13	RW	*por_hnf_rn_phys_id13* on page 3-444
0xD98	por_hnf_rn_phys_id14	RW	*por_hnf_rn_phys_id14* on page 3-446
0xDA0	por_hnf_rn_phys_id15	RW	*por_hnf_rn_phys_id15* on page 3-448
0xDA8	por_hnf_rn_phys_id16	RW	*por_hnf_rn_phys_id16* on page 3-450
0xDB0	por_hnf_rn_phys_id17	RW	*por_hnf_rn_phys_id17* on page 3-452
0xDB8	por_hnf_rn_phys_id18	RW	*por_hnf_rn_phys_id18* on page 3-454
0xDC0	por_hnf_rn_phys_id19	RW	*por_hnf_rn_phys_id19* on page 3-456
0xDC8	por_hnf_rn_phys_id20	RW	*por_hnf_rn_phys_id20* on page 3-458
0xDD0	por_hnf_rn_phys_id21	RW	*por_hnf_rn_phys_id21* on page 3-460
0xDD8	por_hnf_rn_phys_id22	RW	*por_hnf_rn_phys_id22* on page 3-462
0xDE0	por_hnf_rn_phys_id23	RW	*por_hnf_rn_phys_id23* on page 3-464
0xDE8	por_hnf_rn_phys_id24	RW	*por_hnf_rn_phys_id24* on page 3-466
0xDF0	por_hnf_rn_phys_id25	RW	*por_hnf_rn_phys_id25* on page 3-468
0xDF8	por_hnf_rn_phys_id26	RW	*por_hnf_rn_phys_id26* on page 3-470
0xE00	por_hnf_rn_phys_id27	RW	*por_hnf_rn_phys_id27* on page 3-472
0xE08	por_hnf_rn_phys_id28	RW	*por_hnf_rn_phys_id28* on page 3-474
0xE10	por_hnf_rn_phys_id29	RW	*por_hnf_rn_phys_id29* on page 3-476
0xE18	por_hnf_rn_phys_id30	RW	*por_hnf_rn_phys_id30* on page 3-478

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Table 3-5 HNF register summary (continued)

Offset	Name	Type	Description
0xE20	por_hnf_rn_phys_id31	RW	*por_hnf_rn_phys_id31* on page 3-480
0xF00	por_hnf_sf_cxg_blocked_ways	RW	*por_hnf_sf_cxg_blocked_ways* on page 3-482
0xF10	por_hnf_cml_port_aggr_grp0_add_mask	RW	*por_hnf_cml_port_aggr_grp0_add_mask* on page 3-483
0xF18	por_hnf_cml_port_aggr_grp1_add_mask	RW	*por_hnf_cml_port_aggr_grp1_add_mask* on page 3-484
0xF28	por_hnf_cml_port_aggr_grp0_reg	RW	*por_hnf_cml_port_aggr_grp0_reg* on page 3-485
0xF30	por_hnf_cml_port_aggr_grp1_reg	RW	*por_hnf_cml_port_aggr_grp1_reg* on page 3-487
0xF40	hn_sam_hash_addr_mask_reg	RW	*hn_sam_hash_addr_mask_reg* on page 3-488
0xF48	hn_sam_region_cmp_addr_mask_reg	RW	*hn_sam_region_cmp_addr_mask_reg* on page 3-489
0xF50	por_hnf_abf_lo_addr	RW	*por_hnf_abf_lo_addr* on page 3-490
0xF58	por_hnf_abf_hi_addr	RW	*por_hnf_abf_hi_addr* on page 3-491
0xF60	por_hnf_abf_pr	RW	*por_hnf_abf_pr* on page 3-492
0xF68	por_hnf_abf_sr	RO	*por_hnf_abf_sr* on page 3-493
0xE28	por_hnf_rn_phys_id32	RW	*por_hnf_rn_phys_id32* on page 3-494
0xE30	por_hnf_rn_phys_id33	RW	*por_hnf_rn_phys_id33* on page 3-496
0xE38	por_hnf_rn_phys_id34	RW	*por_hnf_rn_phys_id34* on page 3-498
0xE40	por_hnf_rn_phys_id35	RW	*por_hnf_rn_phys_id35* on page 3-500
0xE48	por_hnf_rn_phys_id36	RW	*por_hnf_rn_phys_id36* on page 3-502
0xE50	por_hnf_rn_phys_id37	RW	*por_hnf_rn_phys_id37* on page 3-504
0xE58	por_hnf_rn_phys_id38	RW	*por_hnf_rn_phys_id38* on page 3-506
0xE60	por_hnf_rn_phys_id39	RW	*por_hnf_rn_phys_id39* on page 3-508
0xE68	por_hnf_rn_phys_id40	RW	*por_hnf_rn_phys_id40* on page 3-510
0xE70	por_hnf_rn_phys_id41	RW	*por_hnf_rn_phys_id41* on page 3-512
0xE78	por_hnf_rn_phys_id42	RW	*por_hnf_rn_phys_id42* on page 3-514
0xE80	por_hnf_rn_phys_id43	RW	*por_hnf_rn_phys_id43* on page 3-516
0xE88	por_hnf_rn_phys_id44	RW	*por_hnf_rn_phys_id44* on page 3-518
0xE90	por_hnf_rn_phys_id45	RW	*por_hnf_rn_phys_id45* on page 3-520
0xE98	por_hnf_rn_phys_id46	RW	*por_hnf_rn_phys_id46* on page 3-522
0xEA0	por_hnf_rn_phys_id47	RW	*por_hnf_rn_phys_id47* on page 3-524
0xEA8	por_hnf_rn_phys_id48	RW	*por_hnf_rn_phys_id48* on page 3-526
0xEB0	por_hnf_rn_phys_id49	RW	*por_hnf_rn_phys_id49* on page 3-528
0xEB8	por_hnf_rn_phys_id50	RW	*por_hnf_rn_phys_id50* on page 3-530
0xEC0	por_hnf_rn_phys_id51	RW	*por_hnf_rn_phys_id51* on page 3-532
0xEC8	por_hnf_rn_phys_id52	RW	*por_hnf_rn_phys_id52* on page 3-534
0xED0	por_hnf_rn_phys_id53	RW	*por_hnf_rn_phys_id53* on page 3-536
0xED8	por_hnf_rn_phys_id54	RW	*por_hnf_rn_phys_id54* on page 3-538

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Table 3-5 HNF register summary (continued)

Offset	Name	Type	Description
0xEE0	por_hnf_rn_phys_id55	RW	*por_hnf_rn_phys_id55* on page 3-540
0xEE8	por_hnf_rn_phys_id56	RW	*por_hnf_rn_phys_id56* on page 3-542
0xEF0	por_hnf_rn_phys_id57	RW	*por_hnf_rn_phys_id57* on page 3-544
0xEF8	por_hnf_rn_phys_id58	RW	*por_hnf_rn_phys_id58* on page 3-546
0xF70	por_hnf_rn_phys_id59	RW	*por_hnf_rn_phys_id59* on page 3-548
0xF78	por_hnf_rn_phys_id60	RW	*por_hnf_rn_phys_id60* on page 3-550
0xF80	por_hnf_rn_phys_id61	RW	*por_hnf_rn_phys_id61* on page 3-552
0xF88	por_hnf_rn_phys_id62	RW	*por_hnf_rn_phys_id62* on page 3-554
0xF90	por_hnf_rn_phys_id63	RW	*por_hnf_rn_phys_id63* on page 3-556
0xF98	por_hnf_ldid_map_table_reg0	RW	*por_hnf_ldid_map_table_reg0* on page 3-558
0xFA0	por_hnf_ldid_map_table_reg1	RW	*por_hnf_ldid_map_table_reg1* on page 3-560
0xFA8	por_hnf_ldid_map_table_reg2	RW	*por_hnf_ldid_map_table_reg2* on page 3-561
0xFB0	por_hnf_ldid_map_table_reg3	RW	*por_hnf_ldid_map_table_reg3* on page 3-562
0xB80	por_hnf_cfg_slcsf_dbgrd	WO	*por_hnf_cfg_slcsf_dbgrd* on page 3-564
0xB88	por_hnf_slc_cache_access_slc_tag	RO	*por_hnf_slc_cache_access_slc_tag* on page 3-565
0xB90	por_hnf_slc_cache_access_slc_data	RO	*por_hnf_slc_cache_access_slc_data* on page 3-566
0xB98	por_hnf_slc_cache_access_sf_tag	RO	*por_hnf_slc_cache_access_sf_tag* on page 3-567
0xBA0	por_hnf_slc_cache_access_sf_tag1	RO	*por_hnf_slc_cache_access_sf_tag1* on page 3-568
0xBA8	por_hnf_slc_cache_access_sf_tag2	RO	*por_hnf_slc_cache_access_sf_tag2* on page 3-568
0x2000	por_hnf_pmu_event_sel	RW	*por_hnf_pmu_event_sel* on page 3-569

3.2.5 HN-I register summary

This section lists the HN-I registers used in CMN-600.

HNI register summary

The following table shows the *HNI* registers in offset order from the base memory address

Table 3-6 HNI register summary

Offset	Name	Type	Description
0x0	por_hni_node_info	RO	*por_hni_node_info* on page 3-574
0x80	por_hni_child_info	RO	*por_hni_child_info* on page 3-575
0x980	por_hni_secure_register_groups_override	RW	*por_hni_secure_register_groups_override* on page 3-575
0x900	por_hni_unit_info	RO	*por_hni_unit_info* on page 3-576
0xC00	por_hni_sam_addrregion0_cfg	RW	*por_hni_sam_addrregion0_cfg* on page 3-578
0xC08	por_hni_sam_addrregion1_cfg	RW	*por_hni_sam_addrregion1_cfg* on page 3-579
0xC10	por_hni_sam_addrregion2_cfg	RW	*por_hni_sam_addrregion2_cfg* on page 3-581

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Table 3-6 HNI register summary (continued)

Offset	Name	Type	Description
0xC18	por_hni_sam_addrregion3_cfg	RW	*por_hni_sam_addrregion3_cfg* on page 3-583
0xA00	por_hni_cfg_ctl	RW	*por_hni_cfg_ctl* on page 3-584
0xA08	por_hni_aux_ctl	RW	*por_hni_aux_ctl* on page 3-585
0x3000	por_hni_errfr	RO	*por_hni_errfr* on page 3-586
0x3008	por_hni_errctlr	RW	*por_hni_errctlr* on page 3-587
0x3010	por_hni_errstatus	W1C	*por_hni_errstatus* on page 3-589
0x3018	por_hni_erraddr	RW	*por_hni_erraddr* on page 3-590
0x3020	por_hni_errmisc	RW	*por_hni_errmisc* on page 3-591
0x3100	por_hni_errfr_NS	RO	*por_hni_errfr_NS* on page 3-593
0x3108	por_hni_errctlr_NS	RW	*por_hni_errctlr_NS* on page 3-595
0x3110	por_hni_errstatus_NS	W1C	*por_hni_errstatus_NS* on page 3-596
0x3118	por_hni_erraddr_NS	RW	*por_hni_erraddr_NS* on page 3-598
0x3120	por_hni_errmisc_NS	RW	*por_hni_errmisc_NS* on page 3-599
0x2000	por_hni_pmu_event_sel	RW	*por_hni_pmu_event_sel* on page 3-601

3.2.6 XP register summary

This section lists the XP registers used in CMN-600.

XP register summary

The following table shows the *MXP* registers in offset order from the base memory address

Table 3-7 MXP register summary

Offset	Name	Type	Description
0x0	por_mxp_node_info	RO	*por_mxp_node_info* on page 3-604
0x8	por_mxp_device_port_connect_info_p0	RO	*por_mxp_device_port_connect_info_p0* on page 3-605
0x10	por_mxp_device_port_connect_info_p1	RO	*por_mxp_device_port_connect_info_p1* on page 3-607
0x18	por_mxp_mesh_port_connect_info_east	RO	*por_mxp_mesh_port_connect_info_east* on page 3-609
0x20	por_mxp_mesh_port_connect_info_north	RO	*por_mxp_mesh_port_connect_info_north* on page 3-610
0x80	por_mxp_child_info	RO	*por_mxp_child_info* on page 3-611
0x100	por_mxp_child_pointer_0	RO	*por_mxp_child_pointer_0* on page 3-612
0x108	por_mxp_child_pointer_1	RO	*por_mxp_child_pointer_1* on page 3-613
0x110	por_mxp_child_pointer_2	RO	*por_mxp_child_pointer_2* on page 3-614
0x118	por_mxp_child_pointer_3	RO	*por_mxp_child_pointer_3* on page 3-615
0x120	por_mxp_child_pointer_4	RO	*por_mxp_child_pointer_4* on page 3-616
0x128	por_mxp_child_pointer_5	RO	*por_mxp_child_pointer_5* on page 3-617
0x130	por_mxp_child_pointer_6	RO	*por_mxp_child_pointer_6* on page 3-618

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Table 3-7 MXP register summary (continued)

Offset	Name	Type	Description
0x138	por_mxp_child_pointer_7	RO	*por_mxp_child_pointer_7* on page 3-619
0x140	por_mxp_child_pointer_8	RO	*por_mxp_child_pointer_8* on page 3-620
0x148	por_mxp_child_pointer_9	RO	*por_mxp_child_pointer_9* on page 3-621
0x150	por_mxp_child_pointer_10	RO	*por_mxp_child_pointer_10* on page 3-622
0x158	por_mxp_child_pointer_11	RO	*por_mxp_child_pointer_11* on page 3-623
0x160	por_mxp_child_pointer_12	RO	*por_mxp_child_pointer_12* on page 3-624
0x168	por_mxp_child_pointer_13	RO	*por_mxp_child_pointer_13* on page 3-625
0x170	por_mxp_child_pointer_14	RO	*por_mxp_child_pointer_14* on page 3-626
0x178	por_mxp_child_pointer_15	RO	*por_mxp_child_pointer_15* on page 3-627
0x900	por_mxp_p0_info	RO	*por_mxp_p0_info* on page 3-628
0x908	por_mxp_p1_info	RO	*por_mxp_p1_info* on page 3-629
0x980	por_mxp_secure_register_groups_override	RW	*por_mxp_secure_register_groups_override* on page 3-631
0xA00	por_mxp_aux_ctl	RW	*por_mxp_aux_ctl* on page 3-632
0xA80	por_mxp_p0_qos_control	RW	*por_mxp_p0_qos_control* on page 3-633
0xA88	por_mxp_p0_qos_lat_tgt	RW	*por_mxp_p0_qos_lat_tgt* on page 3-634
0xA90	por_mxp_p0_qos_lat_scale	RW	*por_mxp_p0_qos_lat_scale* on page 3-635
0xA98	por_mxp_p0_qos_lat_range	RW	*por_mxp_p0_qos_lat_range* on page 3-636
0xAA0	por_mxp_p1_qos_control	RW	*por_mxp_p1_qos_control* on page 3-637
0xAA8	por_mxp_p1_qos_lat_tgt	RW	*por_mxp_p1_qos_lat_tgt* on page 3-639
0xAB0	por_mxp_p1_qos_lat_scale	RW	*por_mxp_p1_qos_lat_scale* on page 3-639
0xAB8	por_mxp_p1_qos_lat_range	RW	*por_mxp_p1_qos_lat_range* on page 3-641
0x2000	por_mxp_pmu_event_sel	RW	*por_mxp_pmu_event_sel* on page 3-642
0x3000	por_mxp_errfr	RO	*por_mxp_errfr* on page 3-643
0x3008	por_mxp_errctlr	RW	*por_mxp_errctlr* on page 3-644
0x3010	por_mxp_errstatus	W1C	*por_mxp_errstatus* on page 3-646
0x3028	por_mxp_errmisc	RW	*por_mxp_errmisc* on page 3-647
0x3030	por_mxp_p0_byte_par_err_inj	WO	*por_mxp_p0_byte_par_err_inj* on page 3-649
0x3038	por_mxp_p1_byte_par_err_inj	WO	*por_mxp_p1_byte_par_err_inj* on page 3-650
0x3100	por_mxp_errfr_NS	RO	*por_mxp_errfr_NS* on page 3-651
0x3108	por_mxp_errctlr_NS	RW	*por_mxp_errctlr_NS* on page 3-652
0x3110	por_mxp_errstatus_NS	W1C	*por_mxp_errstatus_NS* on page 3-653
0x3128	por_mxp_errmisc_NS	RW	*por_mxp_errmisc_NS* on page 3-655
0x1000	por_mxp_p0_syscoreq_ctl	RW	*por_mxp_p0_syscoreq_ctl* on page 3-657
0x1008	por_mxp_p1_syscoreq_ctl	RW	*por_mxp_p1_syscoreq_ctl* on page 3-658
0x1010	por_mxp_p0_syscoack_status	RO	*por_mxp_p0_syscoack_status* on page 3-659

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Table 3-7 MXP register summary (continued)

Offset	Name	Type	Description
0x1018	por_mxp_p1_syscoack_status	RO	*por_mxp_p1_syscoack_status* on page 3-660
0x2100	por_dtm_control	RW	*por_dtm_control* on page 3-662
0x2118	por_dtm_fifo_entry_ready	W1C	*por_dtm_fifo_entry_ready* on page 3-663
0x2120	por_dtm_fifo_entry0_0	RO	*por_dtm_fifo_entry0_0* on page 3-664
0x2128	por_dtm_fifo_entry0_1	RO	*por_dtm_fifo_entry0_1* on page 3-665
0x2130	por_dtm_fifo_entry0_2	RO	*por_dtm_fifo_entry0_2* on page 3-665
0x2138	por_dtm_fifo_entry1_0	RO	*por_dtm_fifo_entry1_0* on page 3-666
0x2140	por_dtm_fifo_entry1_1	RO	*por_dtm_fifo_entry1_1* on page 3-667
0x2148	por_dtm_fifo_entry1_2	RO	*por_dtm_fifo_entry1_2* on page 3-668
0x2150	por_dtm_fifo_entry2_0	RO	*por_dtm_fifo_entry2_0* on page 3-669
0x2158	por_dtm_fifo_entry2_1	RO	*por_dtm_fifo_entry2_1* on page 3-670
0x2160	por_dtm_fifo_entry2_2	RO	*por_dtm_fifo_entry2_2* on page 3-670
0x2168	por_dtm_fifo_entry3_0	RO	*por_dtm_fifo_entry3_0* on page 3-671
0x2170	por_dtm_fifo_entry3_1	RO	*por_dtm_fifo_entry3_1* on page 3-672
0x2178	por_dtm_fifo_entry3_2	RO	*por_dtm_fifo_entry3_2* on page 3-673
0x21A0	por_dtm_wp0_config	RW	*por_dtm_wp0_config* on page 3-674
0x21A8	por_dtm_wp0_val	RW	*por_dtm_wp0_val* on page 3-676
0x21B0	por_dtm_wp0_mask	RW	*por_dtm_wp0_mask* on page 3-677
0x21B8	por_dtm_wp1_config	RW	*por_dtm_wp1_config* on page 3-678
0x21C0	por_dtm_wp1_val	RW	*por_dtm_wp1_val* on page 3-680
0x21C8	por_dtm_wp1_mask	RW	*por_dtm_wp1_mask* on page 3-680
0x21D0	por_dtm_wp2_config	RW	*por_dtm_wp2_config* on page 3-681
0x21D8	por_dtm_wp2_val	RW	*por_dtm_wp2_val* on page 3-683
0x21E0	por_dtm_wp2_mask	RW	*por_dtm_wp2_mask* on page 3-684
0x21E8	por_dtm_wp3_config	RW	*por_dtm_wp3_config* on page 3-685
0x21F0	por_dtm_wp3_val	RW	*por_dtm_wp3_val* on page 3-687
0x21F8	por_dtm_wp3_mask	RW	*por_dtm_wp3_mask* on page 3-688
0x2200	por_dtm_pmsicr	RW	*por_dtm_pmsicr* on page 3-689
0x2208	por_dtm_pmsirr	RW	*por_dtm_pmsirr* on page 3-689
0x2210	por_dtm_pmu_config	RW	*por_dtm_pmu_config* on page 3-690
0x2220	por_dtm_pmevcnt	RW	*por_dtm_pmevcnt* on page 3-694
0x2240	por_dtm_pmevcntsr	RW	*por_dtm_pmevcntsr* on page 3-695

3.2.7 RN-D register summary

This section lists the RN-D registers used in CMN-600.

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RND register summary

The following table shows the *RND* registers in offset order from the base memory address

Table 3-8 RND register summary

Offset	Name	Type	Description
0x0	por_rnd_node_info	RO	*por_rnd_node_info* on page 3-697
0x80	por_rnd_child_info	RO	*por_rnd_child_info* on page 3-698
0x980	por_rnd_secure_register_groups_override	RW	*por_rnd_secure_register_groups_override* on page 3-698
0x900	por_rnd_unit_info	RO	*por_rnd_unit_info* on page 3-699
0xA00	por_rnd_cfg_ctl	RW	*por_rnd_cfg_ctl* on page 3-701
0xA08	por_rnd_aux_ctl	RW	*por_rnd_aux_ctl* on page 3-703
0xA10	por_rnd_s0_port_control	RW	*por_rnd_s0_port_control* on page 3-704
0xA18	por_rnd_s1_port_control	RW	*por_rnd_s1_port_control* on page 3-705
0xA20	por_rnd_s2_port_control	RW	*por_rnd_s2_port_control* on page 3-706
0xA80	por_rnd_s0_qos_control	RW	*por_rnd_s0_qos_control* on page 3-707
0xA88	por_rnd_s0_qos_lat_tgt	RW	*por_rnd_s0_qos_lat_tgt* on page 3-709
0xA90	por_rnd_s0_qos_lat_scale	RW	*por_rnd_s0_qos_lat_scale* on page 3-710
0xA98	por_rnd_s0_qos_lat_range	RW	*por_rnd_s0_qos_lat_range* on page 3-712
0xAA0	por_rnd_s1_qos_control	RW	*por_rnd_s1_qos_control* on page 3-713
0xAA8	por_rnd_s1_qos_lat_tgt	RW	*por_rnd_s1_qos_lat_tgt* on page 3-715
0xAB0	por_rnd_s1_qos_lat_scale	RW	*por_rnd_s1_qos_lat_scale* on page 3-716
0xAB8	por_rnd_s1_qos_lat_range	RW	*por_rnd_s1_qos_lat_range* on page 3-717
0xAC0	por_rnd_s2_qos_control	RW	*por_rnd_s2_qos_control* on page 3-718
0xAC8	por_rnd_s2_qos_lat_tgt	RW	*por_rnd_s2_qos_lat_tgt* on page 3-720
0xAD0	por_rnd_s2_qos_lat_scale	RW	*por_rnd_s2_qos_lat_scale* on page 3-721
0xAD8	por_rnd_s2_qos_lat_range	RW	*por_rnd_s2_qos_lat_range* on page 3-723
0x2000	por_rnd_pmu_event_sel	RW	*por_rnd_pmu_event_sel* on page 3-724
0x1000	por_rnd_syscoreq_ctl	RW	*por_rnd_syscoreq_ctl* on page 3-726
0x1008	por_rnd_syscoack_status	RO	*por_rnd_syscoack_status* on page 3-727

3.2.8 RN-I register summary

This section lists the RN-I registers used in CMN-600.

RNI register summary

The following table shows the *RNI* registers in offset order from the base memory address

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Table 3-9 RNI register summary

Offset	Name	Type	Description
0x0	por_rni_node_info	RO	*por_rni_node_info* on page 3-729
0x80	por_rni_child_info	RO	*por_rni_child_info* on page 3-730
0x980	por_rni_secure_register_groups_override	RW	*por_rni_secure_register_groups_override* on page 3-730
0x900	por_rni_unit_info	RO	*por_rni_unit_info* on page 3-731
0xA00	por_rni_cfg_ctl	RW	*por_rni_cfg_ctl* on page 3-733
0xA08	por_rni_aux_ctl	RW	*por_rni_aux_ctl* on page 3-735
0xA10	por_rni_s0_port_control	RW	*por_rni_s0_port_control* on page 3-736
0xA18	por_rni_s1_port_control	RW	*por_rni_s1_port_control* on page 3-737
0xA20	por_rni_s2_port_control	RW	*por_rni_s2_port_control* on page 3-738
0xA80	por_rni_s0_qos_control	RW	*por_rni_s0_qos_control* on page 3-739
0xA88	por_rni_s0_qos_lat_tgt	RW	*por_rni_s0_qos_lat_tgt* on page 3-741
0xA90	por_rni_s0_qos_lat_scale	RW	*por_rni_s0_qos_lat_scale* on page 3-742
0xA98	por_rni_s0_qos_lat_range	RW	*por_rni_s0_qos_lat_range* on page 3-743
0xAA0	por_rni_s1_qos_control	RW	*por_rni_s1_qos_control* on page 3-745
0xAA8	por_rni_s1_qos_lat_tgt	RW	*por_rni_s1_qos_lat_tgt* on page 3-747
0xAB0	por_rni_s1_qos_lat_scale	RW	*por_rni_s1_qos_lat_scale* on page 3-748
0xAB8	por_rni_s1_qos_lat_range	RW	*por_rni_s1_qos_lat_range* on page 3-749
0xAC0	por_rni_s2_qos_control	RW	*por_rni_s2_qos_control* on page 3-750
0xAC8	por_rni_s2_qos_lat_tgt	RW	*por_rni_s2_qos_lat_tgt* on page 3-752
0xAD0	por_rni_s2_qos_lat_scale	RW	*por_rni_s2_qos_lat_scale* on page 3-753
0xAD8	por_rni_s2_qos_lat_range	RW	*por_rni_s2_qos_lat_range* on page 3-755
0x2000	por_rni_pmu_event_sel	RW	*por_rni_pmu_event_sel* on page 3-756

3.2.9 RN SAM register summary

This section lists the RN SAM registers used in CMN-600.

RNSAM register summary

The following table shows the *RNSAM* registers in offset order from the base memory address.

Table 3-10 RNSAM register summary

Offset	Name	Type	Description
0x0	por_rnsam_node_info	RO	*por_rnsam_node_info* on page 3-759
0x80	por_rnsam_child_info	RO	*por_rnsam_child_info* on page 3-760
0x980	por_rnsam_secure_register_groups_override	RW	*por_rnsam_secure_register_groups_override* on page 3-761
0x900	por_rnsam_unit_info	RO	*por_rnsam_unit_info* on page 3-761
0xC00	rnsam_status	RW	*rnsam_status* on page 3-762
0xC08	non_hash_mem_region_reg0	RW	*non_hash_mem_region_reg0* on page 3-764

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Table 3-10 RNSAM register summary (continued)

Offset	Name	Type	Description
0xC10	non_hash_mem_region_reg1	RW	*non_hash_mem_region_reg1* on page 3-766
0xC18	non_hash_mem_region_reg2	RW	*non_hash_mem_region_reg2* on page 3-768
0xC20	non_hash_mem_region_reg3	RW	*non_hash_mem_region_reg3* on page 3-770
0xC28	non_hash_mem_region_reg4	RW	*non_hash_mem_region_reg4* on page 3-772
0xCA0	non_hash_mem_region_reg5	RW	*non_hash_mem_region_reg5* on page 3-774
0xCA8	non_hash_mem_region_reg6	RW	*non_hash_mem_region_reg6* on page 3-776
0xCB0	non_hash_mem_region_reg7	RW	*non_hash_mem_region_reg7* on page 3-778
0xCB8	non_hash_mem_region_reg8	RW	*non_hash_mem_region_reg8* on page 3-780
0xCC0	non_hash_mem_region_reg9	RW	*non_hash_mem_region_reg9* on page 3-782
0xC30	non_hash_tgt_nodeid0	RW	*non_hash_tgt_nodeid0* on page 3-784
0xC38	non_hash_tgt_nodeid1	RW	*non_hash_tgt_nodeid1* on page 3-785
0xC40	non_hash_tgt_nodeid2	RW	*non_hash_tgt_nodeid2* on page 3-786
0xCE0	non_hash_tgt_nodeid3	RW	*non_hash_tgt_nodeid3* on page 3-788
0xCE8	non_hash_tgt_nodeid4	RW	*non_hash_tgt_nodeid4* on page 3-789
0xC48	sys_cache_grp_region0	RW	*sys_cache_grp_region0* on page 3-790
0xC50	sys_cache_grp_region1	RW	*sys_cache_grp_region1* on page 3-792
0xC58	sys_cache_grp_hn_nodeid_reg0	RW	*sys_cache_grp_hn_nodeid_reg0* on page 3-794
0xC60	sys_cache_grp_hn_nodeid_reg1	RW	*sys_cache_grp_hn_nodeid_reg1* on page 3-796
0xC68	sys_cache_grp_hn_nodeid_reg2	RW	*sys_cache_grp_hn_nodeid_reg2* on page 3-797
0xC70	sys_cache_grp_hn_nodeid_reg3	RW	*sys_cache_grp_hn_nodeid_reg3* on page 3-798
0xC78	sys_cache_grp_hn_nodeid_reg4	RW	*sys_cache_grp_hn_nodeid_reg4* on page 3-799
0xC80	sys_cache_grp_hn_nodeid_reg5	RW	*sys_cache_grp_hn_nodeid_reg5* on page 3-800
0xC88	sys_cache_grp_hn_nodeid_reg6	RW	*sys_cache_grp_hn_nodeid_reg6* on page 3-802
0xC90	sys_cache_grp_hn_nodeid_reg7	RW	*sys_cache_grp_hn_nodeid_reg7* on page 3-803
0xC98	sys_cache_grp_nonhash_nodeid	RW	*sys_cache_grp_nonhash_nodeid* on page 3-804
0xD00	sys_cache_group_hn_count	RW	*sys_cache_group_hn_count* on page 3-805
0xD08	sys_cache_grp_sn_nodeid_reg0	RW	*sys_cache_grp_sn_nodeid_reg0* on page 3-807
0xD10	sys_cache_grp_sn_nodeid_reg1	RW	*sys_cache_grp_sn_nodeid_reg1* on page 3-808
0xD18	sys_cache_grp_sn_nodeid_reg2	RW	*sys_cache_grp_sn_nodeid_reg2* on page 3-809
0xD20	sys_cache_grp_sn_nodeid_reg3	RW	*sys_cache_grp_sn_nodeid_reg3* on page 3-810
0xD28	sys_cache_grp_sn_nodeid_reg4	RW	*sys_cache_grp_sn_nodeid_reg4* on page 3-812
0xD30	sys_cache_grp_sn_nodeid_reg5	RW	*sys_cache_grp_sn_nodeid_reg5* on page 3-813
0xD38	sys_cache_grp_sn_nodeid_reg6	RW	*sys_cache_grp_sn_nodeid_reg6* on page 3-814
0xD40	sys_cache_grp_sn_nodeid_reg7	RW	*sys_cache_grp_sn_nodeid_reg7* on page 3-815
0xD48	sys_cache_grp_sn_sam_cfg0	RW	*sys_cache_grp_sn_sam_cfg0* on page 3-817

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Table 3-10 RNSAM register summary (continued)

Offset	Name	Type	Description
0xD50	sys_cache_grp_sn_sam_cfg1	RW	*sys_cache_grp_sn_sam_cfg1* on page 3-818
0xD58	gic_mem_region_reg	RW	*gic_mem_region_reg* on page 3-820
0xD60	sys_cache_grp_sn_attr	RW	*sys_cache_grp_sn_attr* on page 3-821
0xD68	sys_cache_grp_hn_cpa_en_reg	RW	*sys_cache_grp_hn_cpa_en_reg* on page 3-824
0xD70	sys_cache_grp_hn_cpa_grp_reg	RW	*sys_cache_grp_hn_cpa_grp_reg* on page 3-825
0xE00	cml_port_aggr_mode_ctrl_reg	RW	*cml_port_aggr_mode_ctrl_reg* on page 3-826
0xE30	cml_port_aggr_mode_ctrl_reg1	RW	*cml_port_aggr_mode_ctrl_reg1* on page 3-829
0xE08	cml_port_aggr_grp0_add_mask	RW	*cml_port_aggr_grp0_add_mask* on page 3-834
0xE10	cml_port_aggr_grp1_add_mask	RW	*cml_port_aggr_grp1_add_mask* on page 3-835
0xE40	cml_port_aggr_grp0_reg	RW	*cml_port_aggr_grp0_reg* on page 3-836
0xE48	cml_port_aggr_grp1_reg	RW	*cml_port_aggr_grp1_reg* on page 3-838
0xF00	sys_cache_grp_secondary_reg0	RW	*sys_cache_grp_secondary_reg0* on page 3-839
0xF08	sys_cache_grp_secondary_reg1	RW	*sys_cache_grp_secondary_reg1* on page 3-841
0xF10	sys_cache_grp_cal_mode_reg	RW	*sys_cache_grp_cal_mode_reg* on page 3-843
0xF18	rnsam_hash_addr_mask_reg	RW	*rnsam_hash_addr_mask_reg* on page 3-845
0xF20	rnsam_region_cmp_addr_mask_reg	RW	*rnsam_region_cmp_addr_mask_reg* on page 3-845
0xF58	sys_cache_grp_hn_nodeid_reg8	RW	*sys_cache_grp_hn_nodeid_reg8* on page 3-846
0xF60	sys_cache_grp_hn_nodeid_reg9	RW	*sys_cache_grp_hn_nodeid_reg9* on page 3-848
0xF68	sys_cache_grp_hn_nodeid_reg10	RW	*sys_cache_grp_hn_nodeid_reg10* on page 3-849
0xF70	sys_cache_grp_hn_nodeid_reg11	RW	*sys_cache_grp_hn_nodeid_reg11* on page 3-850
0xF78	sys_cache_grp_hn_nodeid_reg12	RW	*sys_cache_grp_hn_nodeid_reg12* on page 3-851
0xF80	sys_cache_grp_hn_nodeid_reg13	RW	*sys_cache_grp_hn_nodeid_reg13* on page 3-853
0xF88	sys_cache_grp_hn_nodeid_reg14	RW	*sys_cache_grp_hn_nodeid_reg14* on page 3-854
0xF90	sys_cache_grp_hn_nodeid_reg15	RW	*sys_cache_grp_hn_nodeid_reg15* on page 3-855
0x1008	sys_cache_grp_sn_nodeid_reg8	RW	*sys_cache_grp_sn_nodeid_reg8* on page 3-856
0x1010	sys_cache_grp_sn_nodeid_reg9	RW	*sys_cache_grp_sn_nodeid_reg9* on page 3-858
0x1018	sys_cache_grp_sn_nodeid_reg10	RW	*sys_cache_grp_sn_nodeid_reg10* on page 3-859
0x1020	sys_cache_grp_sn_nodeid_reg11	RW	*sys_cache_grp_sn_nodeid_reg11* on page 3-860
0x1028	sys_cache_grp_sn_nodeid_reg12	RW	*sys_cache_grp_sn_nodeid_reg12* on page 3-861
0x1030	sys_cache_grp_sn_nodeid_reg13	RW	*sys_cache_grp_sn_nodeid_reg13* on page 3-863
0x1038	sys_cache_grp_sn_nodeid_reg14	RW	*sys_cache_grp_sn_nodeid_reg14* on page 3-864
0x1040	sys_cache_grp_sn_nodeid_reg15	RW	*sys_cache_grp_sn_nodeid_reg15* on page 3-865

3.2.10 SBSX register summary

This section lists the SBSX registers used in CMN-600.

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SBSX register summary

The following table shows the *SBSX* registers in offset order from the base memory address

Table 3-11 SBSX register summary

Offset	Name	Type	Description
0x0	por_sbsx_node_info	RO	*por_sbsx_node_info* on page 3-867
0x80	por_sbsx_child_info	RO	*por_sbsx_child_info* on page 3-868
0x900	por_sbsx_unit_info	RO	*por_sbsx_unit_info* on page 3-868
0xA08	por_sbsx_aux_ctl	RW	*por_sbsx_aux_ctl* on page 3-870
0x3000	por_sbsx_errfr	RO	*por_sbsx_errfr* on page 3-871
0x3008	por_sbsx_errctlr	RW	*por_sbsx_errctlr* on page 3-872
0x3010	por_sbsx_errstatus	W1C	*por_sbsx_errstatus* on page 3-873
0x3018	por_sbsx_erraddr	RW	*por_sbsx_erraddr* on page 3-875
0x3020	por_sbsx_errmisc	RW	*por_sbsx_errmisc* on page 3-876
0x3100	por_sbsx_errfr_NS	RO	*por_sbsx_errfr_NS* on page 3-877
0x3108	por_sbsx_errctlr_NS	RW	*por_sbsx_errctlr_NS* on page 3-879
0x3110	por_sbsx_errstatus_NS	W1C	*por_sbsx_errstatus_NS* on page 3-880
0x3118	por_sbsx_erraddr_NS	RW	*por_sbsx_erraddr_NS* on page 3-882
0x3120	por_sbsx_errmisc_NS	RW	*por_sbsx_errmisc_NS* on page 3-883
0x2000	por_sbsx_pmu_event_sel	RW	*por_sbsx_pmu_event_sel* on page 3-884

3.2.11 CXHA register summary

This section lists the CXHA registers used in CMN-600.

CXG_HA register summary

The following table shows the *CXG_HA* registers in offset order from the base memory address

Table 3-12 CXG_HA register summary

Offset	Name	Type	Description
0x0	por_cxg_ha_node_info	RO	*por_cxg_ha_node_info* on page 3-887
0x8	por_cxg_ha_id	RW	*por_cxg_ha_id* on page 3-888
0x80	por_cxg_ha_child_info	RO	*por_cxg_ha_child_info* on page 3-888
0xA08	por_cxg_ha_aux_ctl	RW	*por_cxg_ha_aux_ctl* on page 3-889
0x980	por_cxg_ha_secure_register_groups_override	RW	*por_cxg_ha_secure_register_groups_override* on page 3-891
0x900	por_cxg_ha_unit_info	RO	*por_cxg_ha_unit_info* on page 3-892
0xC00	por_cxg_ha_rnf_raid_to_ldid_reg0	RW	*por_cxg_ha_rnf_raid_to_ldid_reg0* on page 3-893
0xC08	por_cxg_ha_rnf_raid_to_ldid_reg1	RW	*por_cxg_ha_rnf_raid_to_ldid_reg1* on page 3-895
0xC10	por_cxg_ha_rnf_raid_to_ldid_reg2	RW	*por_cxg_ha_rnf_raid_to_ldid_reg2* on page 3-897
0xC18	por_cxg_ha_rnf_raid_to_ldid_reg3	RW	*por_cxg_ha_rnf_raid_to_ldid_reg3* on page 3-899

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Table 3-12 CXG_HA register summary (continued)

Offset	Name	Type	Description
0xC20	por_cxg_ha_rnf_raid_to_ldid_reg4	RW	*por_cxg_ha_rnf_raid_to_ldid_reg4* on page 3-901
0xC28	por_cxg_ha_rnf_raid_to_ldid_reg5	RW	*por_cxg_ha_rnf_raid_to_ldid_reg5* on page 3-903
0xC30	por_cxg_ha_rnf_raid_to_ldid_reg6	RW	*por_cxg_ha_rnf_raid_to_ldid_reg6* on page 3-905
0xC38	por_cxg_ha_rnf_raid_to_ldid_reg7	RW	*por_cxg_ha_rnf_raid_to_ldid_reg7* on page 3-907
0xC40	por_cxg_ha_agentid_to_linkid_reg0	RW	*por_cxg_ha_agentid_to_linkid_reg0* on page 3-909
0xC48	por_cxg_ha_agentid_to_linkid_reg1	RW	*por_cxg_ha_agentid_to_linkid_reg1* on page 3-911
0xC50	por_cxg_ha_agentid_to_linkid_reg2	RW	*por_cxg_ha_agentid_to_linkid_reg2* on page 3-913
0xC58	por_cxg_ha_agentid_to_linkid_reg3	RW	*por_cxg_ha_agentid_to_linkid_reg3* on page 3-915
0xC60	por_cxg_ha_agentid_to_linkid_reg4	RW	*por_cxg_ha_agentid_to_linkid_reg4* on page 3-916
0xC68	por_cxg_ha_agentid_to_linkid_reg5	RW	*por_cxg_ha_agentid_to_linkid_reg5* on page 3-918
0xC70	por_cxg_ha_agentid_to_linkid_reg6	RW	*por_cxg_ha_agentid_to_linkid_reg6* on page 3-920
0xC78	por_cxg_ha_agentid_to_linkid_reg7	RW	*por_cxg_ha_agentid_to_linkid_reg7* on page 3-921
0xD00	por_cxg_ha_agentid_to_linkid_val	RW	*por_cxg_ha_agentid_to_linkid_val* on page 3-923
0xD08	por_cxg_ha_rnf_raid_to_ldid_val	RW	*por_cxg_ha_rnf_raid_to_ldid_val* on page 3-924
0x2000	por_cxg_ha_pmu_event_sel	RW	*por_cxg_ha_pmu_event_sel* on page 3-925
0x1000	por_cxg_ha_cxprtcl_link0_ctl	RW	*por_cxg_ha_cxprtcl_link0_ctl* on page 3-926
0x1008	por_cxg_ha_cxprtcl_link0_status	RO	*por_cxg_ha_cxprtcl_link0_status* on page 3-928
0x1010	por_cxg_ha_cxprtcl_link1_ctl	RW	*por_cxg_ha_cxprtcl_link1_ctl* on page 3-930
0x1018	por_cxg_ha_cxprtcl_link1_status	RO	*por_cxg_ha_cxprtcl_link1_status* on page 3-932
0x1020	por_cxg_ha_cxprtcl_link2_ctl	RW	*por_cxg_ha_cxprtcl_link2_ctl* on page 3-933
0x1028	por_cxg_ha_cxprtcl_link2_status	RO	*por_cxg_ha_cxprtcl_link2_status* on page 3-935
0x3000	por_cxg_ha_errfr	RO	*por_cxg_ha_errfr* on page 3-937
0x3008	por_cxg_ha_errctlr	RW	*por_cxg_ha_errctlr* on page 3-938
0x3010	por_cxg_ha_errstatus	W1C	*por_cxg_ha_errstatus* on page 3-939
0x3018	por_cxg_ha_erraddr	RW	*por_cxg_ha_erraddr* on page 3-941
0x3020	por_cxg_ha_errmisc	RW	*por_cxg_ha_errmisc* on page 3-942
0x3100	por_cxg_ha_errfr_NS	RO	*por_cxg_ha_errfr_NS* on page 3-944
0x3108	por_cxg_ha_errctlr_NS	RW	*por_cxg_ha_errctlr_NS* on page 3-945
0x3110	por_cxg_ha_errstatus_NS	W1C	*por_cxg_ha_errstatus_NS* on page 3-946
0x3118	por_cxg_ha_erraddr_NS	RW	*por_cxg_ha_erraddr_NS* on page 3-948
0x3120	por_cxg_ha_errmisc_NS	RW	*por_cxg_ha_errmisc_NS* on page 3-949

3.2.12 CXRA register summary

This section lists the CXRA registers used in CMN-600.

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CXG_RA register summary

The following table shows the *CXG_RA* registers in offset order from the base memory address.

Table 3-13 CXG_RA register summary

Offset	Name	Type	Description
0x0	por_cxg_ra_node_info	RO	*por_cxg_ra_node_info* on page 3-952
0x80	por_cxg_ra_child_info	RO	*por_cxg_ra_child_info* on page 3-953
0x980	por_cxg_ra_secure_register_groups_override	RW	*por_cxg_ra_secure_register_groups_override* on page 3-953
0x900	por_cxg_ra_unit_info	RO	*por_cxg_ra_unit_info* on page 3-954
0xA00	por_cxg_ra_cfg_ctl	RW	*por_cxg_ra_cfg_ctl* on page 3-956
0xA08	por_cxg_ra_aux_ctl	RW	*por_cxg_ra_aux_ctl* on page 3-957
0xDA8	por_cxg_ra_sam_addr_region_reg0	RW	*por_cxg_ra_sam_addr_region_reg0* on page 3-959
0xDB0	por_cxg_ra_sam_addr_region_reg1	RW	*por_cxg_ra_sam_addr_region_reg1* on page 3-960
0xDB8	por_cxg_ra_sam_addr_region_reg2	RW	*por_cxg_ra_sam_addr_region_reg2* on page 3-962
0xDC0	por_cxg_ra_sam_addr_region_reg3	RW	*por_cxg_ra_sam_addr_region_reg3* on page 3-963
0xDC8	por_cxg_ra_sam_addr_region_reg4	RW	*por_cxg_ra_sam_addr_region_reg4* on page 3-964
0xDD0	por_cxg_ra_sam_addr_region_reg5	RW	*por_cxg_ra_sam_addr_region_reg5* on page 3-965
0xDD8	por_cxg_ra_sam_addr_region_reg6	RW	*por_cxg_ra_sam_addr_region_reg6* on page 3-967
0xDE0	por_cxg_ra_sam_addr_region_reg7	RW	*por_cxg_ra_sam_addr_region_reg7* on page 3-968
0xE60	por_cxg_ra_agentid_to_linkid_reg0	RW	*por_cxg_ra_agentid_to_linkid_reg0* on page 3-969
0xE68	por_cxg_ra_agentid_to_linkid_reg1	RW	*por_cxg_ra_agentid_to_linkid_reg1* on page 3-971
0xE70	por_cxg_ra_agentid_to_linkid_reg2	RW	*por_cxg_ra_agentid_to_linkid_reg2* on page 3-973
0xE78	por_cxg_ra_agentid_to_linkid_reg3	RW	*por_cxg_ra_agentid_to_linkid_reg3* on page 3-974
0xE80	por_cxg_ra_agentid_to_linkid_reg4	RW	*por_cxg_ra_agentid_to_linkid_reg4* on page 3-976
0xE88	por_cxg_ra_agentid_to_linkid_reg5	RW	*por_cxg_ra_agentid_to_linkid_reg5* on page 3-978
0xE90	por_cxg_ra_agentid_to_linkid_reg6	RW	*por_cxg_ra_agentid_to_linkid_reg6* on page 3-979
0xE98	por_cxg_ra_agentid_to_linkid_reg7	RW	*por_cxg_ra_agentid_to_linkid_reg7* on page 3-981
0xEA0	por_cxg_ra_rnf_ldid_to_raid_reg0	RW	*por_cxg_ra_rnf_ldid_to_raid_reg0* on page 3-983
0xEA8	por_cxg_ra_rnf_ldid_to_raid_reg1	RW	*por_cxg_ra_rnf_ldid_to_raid_reg1* on page 3-984
0xEB0	por_cxg_ra_rnf_ldid_to_raid_reg2	RW	*por_cxg_ra_rnf_ldid_to_raid_reg2* on page 3-986
0xEB8	por_cxg_ra_rnf_ldid_to_raid_reg3	RW	*por_cxg_ra_rnf_ldid_to_raid_reg3* on page 3-988
0xEC0	por_cxg_ra_rnf_ldid_to_raid_reg4	RW	*por_cxg_ra_rnf_ldid_to_raid_reg4* on page 3-989
0xEC8	por_cxg_ra_rnf_ldid_to_raid_reg5	RW	*por_cxg_ra_rnf_ldid_to_raid_reg5* on page 3-991
0xED0	por_cxg_ra_rnf_ldid_to_raid_reg6	RW	*por_cxg_ra_rnf_ldid_to_raid_reg6* on page 3-993
0xED8	por_cxg_ra_rnf_ldid_to_raid_reg7	RW	*por_cxg_ra_rnf_ldid_to_raid_reg7* on page 3-994
0xEE0	por_cxg_ra_rni_ldid_to_raid_reg0	RW	*por_cxg_ra_rni_ldid_to_raid_reg0* on page 3-996
0xEE8	por_cxg_ra_rni_ldid_to_raid_reg1	RW	*por_cxg_ra_rni_ldid_to_raid_reg1* on page 3-998
0xEF0	por_cxg_ra_rni_ldid_to_raid_reg2	RW	*por_cxg_ra_rni_ldid_to_raid_reg2* on page 3-999

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Table 3-13 CXG_RA register summary (continued)

Offset	Name	Type	Description
0xEF8	por_cxg_ra_rni_ldid_to_raid_reg3	RW	*por_cxg_ra_rni_ldid_to_raid_reg3* on page 3-1001
0xF00	por_cxg_ra_rnd_ldid_to_raid_reg0	RW	*por_cxg_ra_rnd_ldid_to_raid_reg0* on page 3-1003
0xF08	por_cxg_ra_rnd_ldid_to_raid_reg1	RW	*por_cxg_ra_rnd_ldid_to_raid_reg1* on page 3-1004
0xF10	por_cxg_ra_rnd_ldid_to_raid_reg2	RW	*por_cxg_ra_rnd_ldid_to_raid_reg2* on page 3-1006
0xF18	por_cxg_ra_rnd_ldid_to_raid_reg3	RW	*por_cxg_ra_rnd_ldid_to_raid_reg3* on page 3-1008
0xF20	por_cxg_ra_agentid_to_linkid_val	RW	*por_cxg_ra_agentid_to_linkid_val* on page 3-1009
0xF28	por_cxg_ra_rnf_ldid_to_raid_val	RW	*por_cxg_ra_rnf_ldid_to_raid_val* on page 3-1010
0xF30	por_cxg_ra_rni_ldid_to_raid_val	RW	*por_cxg_ra_rni_ldid_to_raid_val* on page 3-1011
0xF38	por_cxg_ra_rnd_ldid_to_raid_val	RW	*por_cxg_ra_rnd_ldid_to_raid_val* on page 3-1012
0x2000	por_cxg_ra_pmu_event_sel	RW	*por_cxg_ra_pmu_event_sel* on page 3-1013
0x1000	por_cxg_ra_cxprtcl_link0_ctl	RW	*por_cxg_ra_cxprtcl_link0_ctl* on page 3-1015
0x1008	por_cxg_ra_cxprtcl_link0_status	RO	*por_cxg_ra_cxprtcl_link0_status* on page 3-1017
0x1010	por_cxg_ra_cxprtcl_link1_ctl	RW	*por_cxg_ra_cxprtcl_link1_ctl* on page 3-1018
0x1018	por_cxg_ra_cxprtcl_link1_status	RO	*por_cxg_ra_cxprtcl_link1_status* on page 3-1020
0x1020	por_cxg_ra_cxprtcl_link2_ctl	RW	*por_cxg_ra_cxprtcl_link2_ctl* on page 3-1022
0x1028	por_cxg_ra_cxprtcl_link2_status	RO	*por_cxg_ra_cxprtcl_link2_status* on page 3-1024

3.2.13 CXLA register summary

This section lists the CXLA registers used in CMN-600.

CXLA register summary

The following table shows the *CXLA* registers in offset order from the base memory address

Table 3-14 CXLA register summary

Offset	Name	Type	Description
0x0	por_cxla_node_info	RO	*por_cxla_node_info* on page 3-1026
0x80	por_cxla_child_info	RO	*por_cxla_child_info* on page 3-1027
0x980	por_cxla_secure_register_groups_override	RW	*por_cxla_secure_register_groups_override* on page 3-1027
0x900	por_cxla_unit_info	RO	*por_cxla_unit_info* on page 3-1028
0xA08	por_cxla_aux_ctl	RW	*por_cxla_aux_ctl* on page 3-1030
0xC00	por_cxla_ccix_prop_capabilities	RO	*por_cxla_ccix_prop_capabilities* on page 3-1034
0xC08	por_cxla_ccix_prop_configured	RW	*por_cxla_ccix_prop_configured* on page 3-1035
0xC10	por_cxla_tx_cxs_attr_capabilities	RO	*por_cxla_tx_cxs_attr_capabilities* on page 3-1037
0xC18	por_cxla_rx_cxs_attr_capabilities	RO	*por_cxla_rx_cxs_attr_capabilities* on page 3-1039
0xC30	por_cxla_agentid_to_linkid_reg0	RW	*por_cxla_agentid_to_linkid_reg0* on page 3-1041
0xC38	por_cxla_agentid_to_linkid_reg1	RW	*por_cxla_agentid_to_linkid_reg1* on page 3-1042

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Table 3-14 CXLA register summary (continued)

Offset	Name	Type	Description
0xC40	por_cxla_agentid_to_linkid_reg2	RW	*por_cxla_agentid_to_linkid_reg2* on page 3-1044
0xC48	por_cxla_agentid_to_linkid_reg3	RW	*por_cxla_agentid_to_linkid_reg3* on page 3-1046
0xC50	por_cxla_agentid_to_linkid_reg4	RW	*por_cxla_agentid_to_linkid_reg4* on page 3-1047
0xC58	por_cxla_agentid_to_linkid_reg5	RW	*por_cxla_agentid_to_linkid_reg5* on page 3-1049
0xC60	por_cxla_agentid_to_linkid_reg6	RW	*por_cxla_agentid_to_linkid_reg6* on page 3-1051
0xC68	por_cxla_agentid_to_linkid_reg7	RW	*por_cxla_agentid_to_linkid_reg7* on page 3-1052
0xC70	por_cxla_agentid_to_linkid_val	RW	*por_cxla_agentid_to_linkid_val* on page 3-1054
0xC78	por_cxla_linkid_to_pcie_bus_num	RW	*por_cxla_linkid_to_pcie_bus_num* on page 3-1055
0xC80	por_cxla_tlp_hdr_fields	RW	*por_cxla_tlp_hdr_fields* on page 3-1056
0xD00	por_cxla_permsg_pyld_0_63	RW	*por_cxla_permsg_pyld_0_63* on page 3-1057
0xD08	por_cxla_permsg_pyld_64_127	RW	*por_cxla_permsg_pyld_64_127* on page 3-1058
0xD10	por_cxla_permsg_pyld_128_191	RW	*por_cxla_permsg_pyld_128_191* on page 3-1059
0xD18	por_cxla_permsg_pyld_192_255	RW	*por_cxla_permsg_pyld_192_255* on page 3-1060
0xD20	por_cxla_permsg_ctl	RW	*por_cxla_permsg_ctl* on page 3-1061
0xD28	por_cxla_err_agent_id	RW	*por_cxla_err_agent_id* on page 3-1062
0x2000	por_cxla_pmu_event_sel	RW	*por_cxla_pmu_event_sel* on page 3-1063
0x2210	por_cxla_pmu_config	RW	*por_cxla_pmu_config* on page 3-1065
0x2220	por_cxla_pmevcnt	RW	*por_cxla_pmevcnt* on page 3-1066
0x2240	por_cxla_pmevcntsr	RW	*por_cxla_pmevcntsr* on page 3-1067

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3.3 Register descriptions

This section contains register descriptions.

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3.3.1 Configuration master register descriptions

This section lists the configuration registers.

por_cfgm_node_info

Provides component identification information.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h0
Register reset Configuration dependent
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

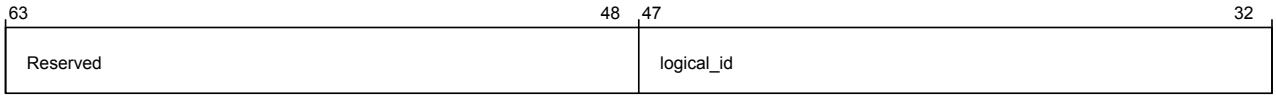

Figure 3-1 por_cfgm_node_info (high)

The following table shows the por_cfgm_node_info higher register bit assignments.

Table 3-15 por_cfgm_node_info (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	logical_id	Component logical ID	RO	Configuration dependent

The following image shows the lower register bit assignments.

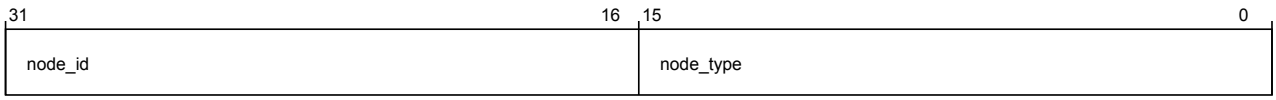

Figure 3-2 por_cfgm_node_info (low)

The following table shows the por_cfgm_node_info lower register bit assignments.

Table 3-16 por_cfgm_node_info (low)

Bits	Field name	Description	Type	Reset
31:16	node_id	Component CHI node ID	RO	Configuration dependent
15:0	node_type	CMN-600 node type identifier	RO	16'h0002

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por_cfgm_periph_id_0_periph_id_1

Functions as the peripheral ID 0 and peripheral ID 1 register.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h8
Register reset Configuration dependent
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

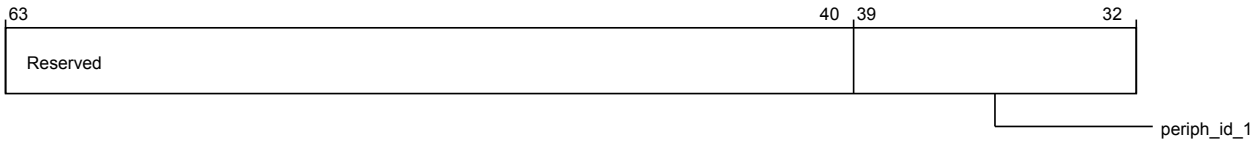

Figure 3-3 por_cfgm_periph_id_0_periph_id_1 (high)

The following table shows the por_cfgm_periph_id_0_periph_id_1 higher register bit assignments.

Table 3-17 por_cfgm_periph_id_0_periph_id_1 (high)

Bits	Field name	Description	Type	Reset
63:40	Reserved	Reserved	RO	-
39:32	periph_id_1	Peripheral ID 1	RO	8'b10110100

The following image shows the lower register bit assignments.

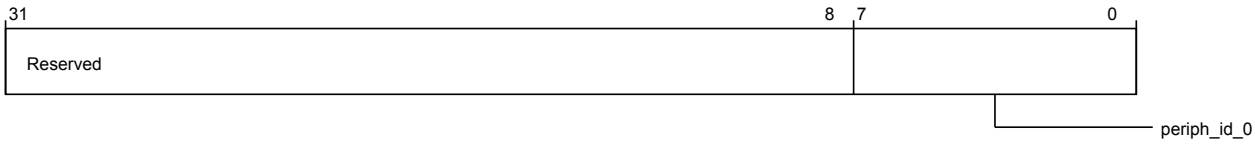

Figure 3-4 por_cfgm_periph_id_0_periph_id_1 (low)

The following table shows the por_cfgm_periph_id_0_periph_id_1 lower register bit assignments.

Table 3-18 por_cfgm_periph_id_0_periph_id_1 (low)

Bits	Field name	Description	Type	Reset
31:8	Reserved	Reserved	RO	-
7:0	periph_id_0	Peripheral ID 0	RO	Configuration dependent

por_cfgm_periph_id_2_periph_id_3

Functions as the peripheral ID 2 and peripheral ID 3 register.

Its characteristics are:

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Type RO
Register width (Bits) 64
Address offset 14'h10
Register reset Configuration dependent
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

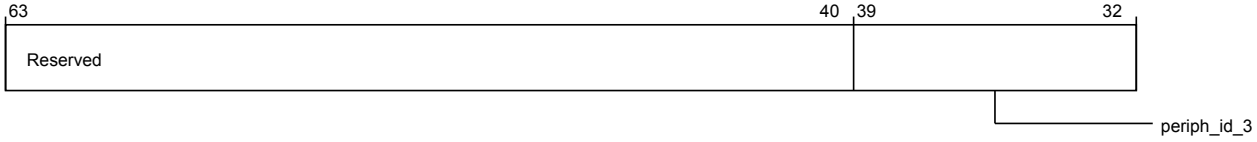

Figure 3-5 por_cfgm_periph_id_2_periph_id_3 (high)

The following table shows the por_cfgm_periph_id_2_periph_id_3 higher register bit assignments.

Table 3-19 por_cfgm_periph_id_2_periph_id_3 (high)

Bits	Field name	Description	Type	Reset
63:40	Reserved	Reserved	RO	-
39:32	periph_id_3	Peripheral ID 3	RO	8'b0

The following image shows the lower register bit assignments.

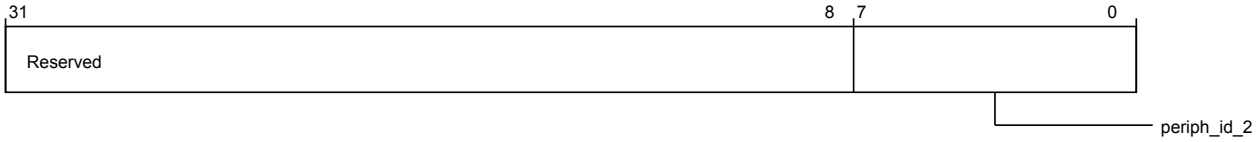

Figure 3-6 por_cfgm_periph_id_2_periph_id_3 (low)

The following table shows the por_cfgm_periph_id_2_periph_id_3 lower register bit assignments.

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Table 3-20 por_cfgm_periph_id_2_periph_id_3 (low)

Bits	Field name	Description	Type	Reset
31:8	Reserved	Reserved	RO	-
7:0	periph_id_2	Peripheral ID 2 [7:4] indicates revision: 0x0 r1p0 0x1 r1p1 0x2 r1p2 0x3 r1p3 0x4 r2p0 0x5 r3p0 0x6 r3p1 [3] JEDEC JEP106 identity code, 1'b1 [2:0] JEP106 identity code [6:4], 0'b011	RO	Configuration dependent

por_cfgm_periph_id_4_periph_id_5

Functions as the peripheral ID 4 and peripheral ID 5 register.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h18
Register reset 64'b011000100
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

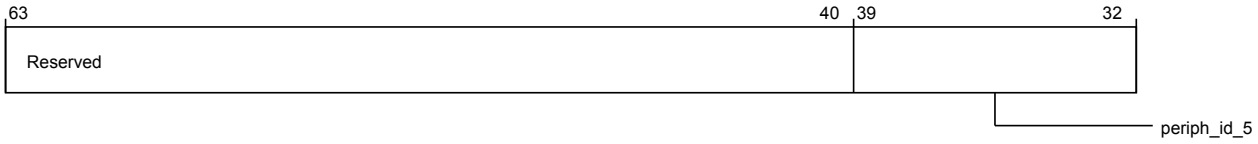

Figure 3-7 por_cfgm_periph_id_4_periph_id_5 (high)

The following table shows the por_cfgm_periph_id_4_periph_id_5 higher register bit assignments.

Table 3-21 por_cfgm_periph_id_4_periph_id_5 (high)

Bits	Field name	Description	Type	Reset
63:40	Reserved	Reserved	RO	-
39:32	periph_id_5	Peripheral ID 5	RO	8'b0

The following image shows the lower register bit assignments.

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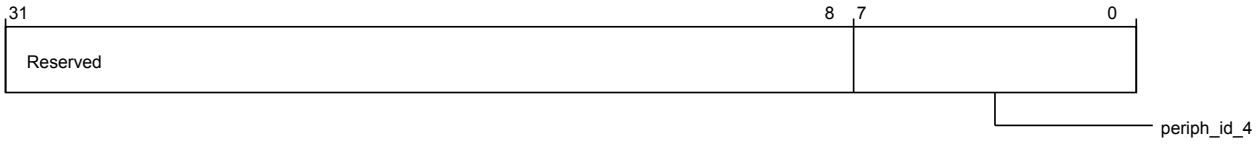

Figure 3-8 por_cfgm_periph_id_4_periph_id_5 (low)

The following table shows the por_cfgm_periph_id_4_periph_id_5 lower register bit assignments.

Table 3-22 por_cfgm_periph_id_4_periph_id_5 (low)

Bits	Field name	Description	Type	Reset
31:8	Reserved	Reserved	RO	-
7:0	periph_id_4	Peripheral ID 4	RO	8'b11000100

por_cfgm_periph_id_6_periph_id_7

Functions as the peripheral ID 6 and peripheral ID 7 register.

Its characteristics are:

Type RO

Register width (Bits) 64

Address offset 14'h20

Register reset 64'b0

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

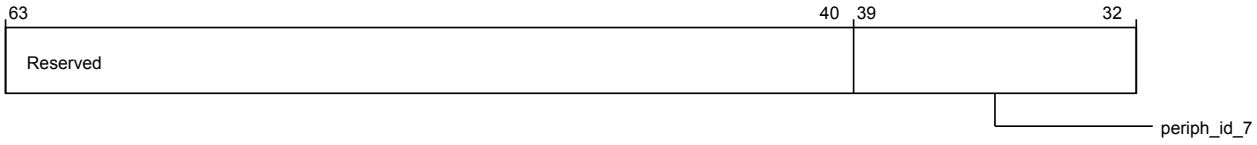

Figure 3-9 por_cfgm_periph_id_6_periph_id_7 (high)

The following table shows the por_cfgm_periph_id_6_periph_id_7 higher register bit assignments.

Table 3-23 por_cfgm_periph_id_6_periph_id_7 (high)

Bits	Field name	Description	Type	Reset
63:40	Reserved	Reserved	RO	-
39:32	periph_id_7	Peripheral ID 7	RO	8'b0

The following image shows the lower register bit assignments.

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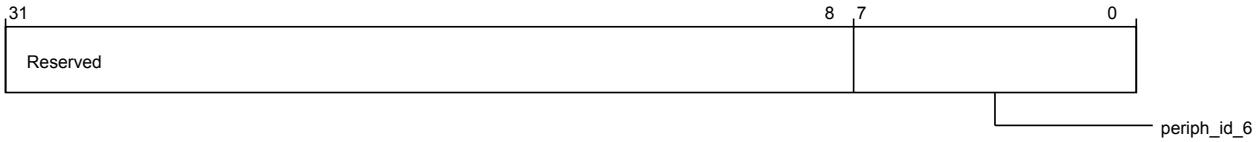

Figure 3-10 por_cfgm_periph_id_6_periph_id_7 (low)

The following table shows the por_cfgm_periph_id_6_periph_id_7 lower register bit assignments.

Table 3-24 por_cfgm_periph_id_6_periph_id_7 (low)

Bits	Field name	Description	Type	Reset
31:8	Reserved	Reserved	RO	-
7:0	periph_id_6	Peripheral ID 6	RO	8'b0

por_cfgm_component_id_0_component_id_1

Functions as the component ID 0 and component ID 1 register.

Its characteristics are:

Type RO

Register width (Bits) 64

Address offset 14'h28

Register reset 64'b1111000000001101

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

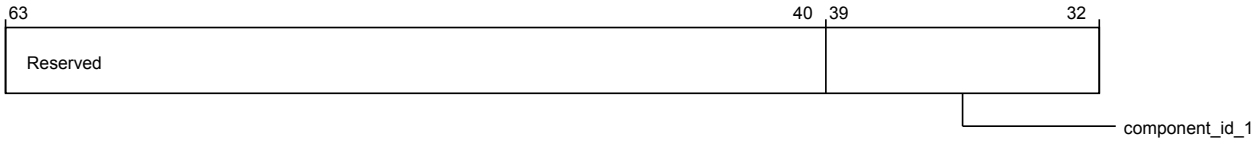

Figure 3-11 por_cfgm_component_id_0_component_id_1 (high)

The following table shows the por_cfgm_component_id_0_component_id_1 higher register bit assignments.

Table 3-25 por_cfgm_component_id_0_component_id_1 (high)

Bits	Field name	Description	Type	Reset
63:40	Reserved	Reserved	RO	-
39:32	component_id_1	Component ID 1	RO	8'b11110000

The following image shows the lower register bit assignments.

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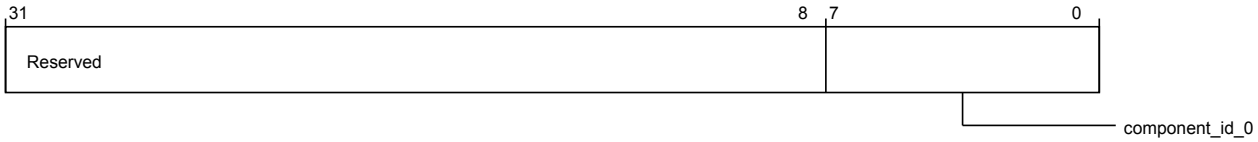

Figure 3-12 por_cfgm_component_id_0_component_id_1 (low)

The following table shows the por_cfgm_component_id_0_component_id_1 lower register bit assignments.

Table 3-26 por_cfgm_component_id_0_component_id_1 (low)

Bits	Field name	Description	Type	Reset
31:8	Reserved	Reserved	RO	-
7:0	component_id_0	Component ID 0	RO	8'b00001101

por_cfgm_component_id_2_component_id_3

Functions as the component ID 2 and component ID 3 register.

Its characteristics are:

Type RO

Register width (Bits) 64

Address offset 14'h30

Register reset 64'b1011000100000101

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

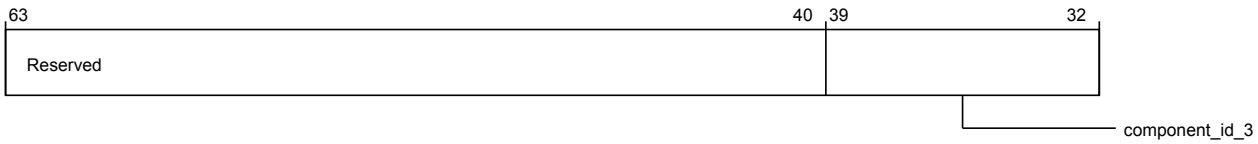

Figure 3-13 por_cfgm_component_id_2_component_id_3 (high)

The following table shows the por_cfgm_component_id_2_component_id_3 higher register bit assignments.

Table 3-27 por_cfgm_component_id_2_component_id_3 (high)

Bits	Field name	Description	Type	Reset
63:40	Reserved	Reserved	RO	-
39:32	component_id_3	Component ID 3	RO	8'b10110001

The following image shows the lower register bit assignments.

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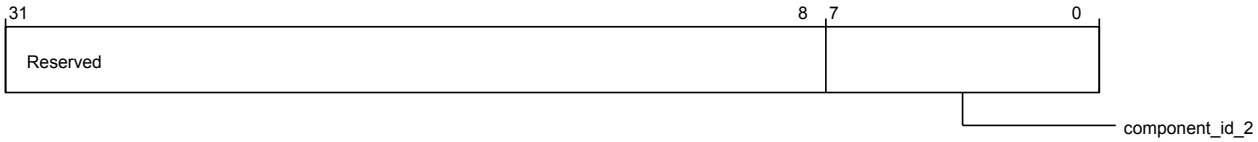

Figure 3-14 por_cfgm_component_id_2_component_id_3 (low)

The following table shows the por_cfgm_component_id_2_component_id_3 lower register bit assignments.

Table 3-28 por_cfgm_component_id_2_component_id_3 (low)

Bits	Field name	Description	Type	Reset
31:8	Reserved	Reserved	RO	-
7:0	component_id_2	Component ID 2	RO	8'b00000101

por_cfgm_child_info

Provides component child identification information.

Its characteristics are:

Type RO

Register width (Bits) 64

Address offset 14'h80

Register reset Configuration dependent

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

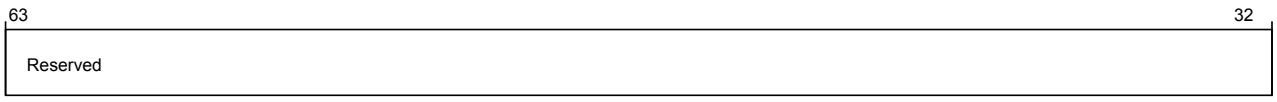

Figure 3-15 por_cfgm_child_info (high)

The following table shows the por_cfgm_child_info higher register bit assignments.

Table 3-29 por_cfgm_child_info (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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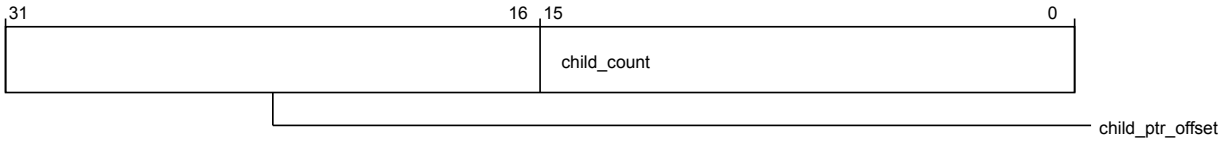

Figure 3-16 por_cfgm_child_info (low)

The following table shows the por_cfgm_child_info lower register bit assignments.

Table 3-30 por_cfgm_child_info (low)

Bits	Field name	Description	Type	Reset
31:16	child_ptr_offset	Starting register offset which contains pointers to the child nodes	RO	16'h100
15:0	child_count	Number of child nodes; used in discovery process	RO	Configuration dependent

por_cfgm_secure_access

Functions as the secure access control register. This register must be set up at boot time. Before initiating a write to this register, software must ensure that no other configuration accesses are in flight. Once this write is initiated, no other configuration accesses are initiated until complete.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h980

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

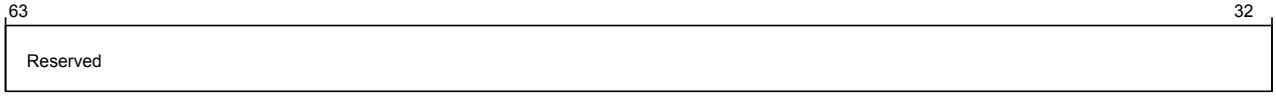

Figure 3-17 por_cfgm_secure_access (high)

The following table shows the por_cfgm_secure_access higher register bit assignments.

Table 3-31 por_cfgm_secure_access (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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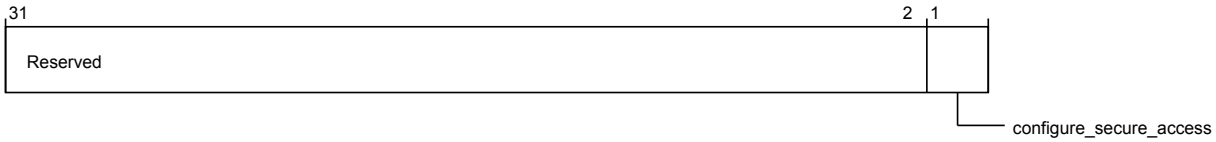

Figure 3-18 por_cfgm_secure_access (low)

The following table shows the por_cfgm_secure_access lower register bit assignments.

Table 3-32 por_cfgm_secure_access (low)

Bits	Field name	Description	Type	Reset
31:2	Reserved	Reserved	RO	-
1:0	configure_secure_access	Secure access mode 2'b00: Default operation 2'b01: Allows Non-secure access to secure registers 2'b10: Allows Secure access only to any configuration register regardless of its security status 2'b11: Undefined behavior	RW	2'b0

por_cfgm_errgsr0

Provides the XP <n> secure error status.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h3000
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

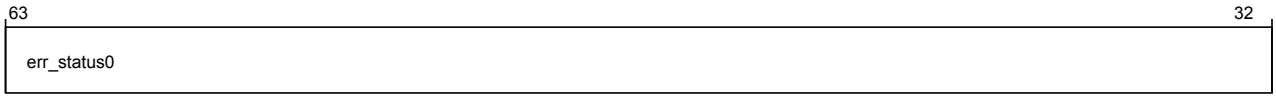

Figure 3-19 por_cfgm_errgsr0 (high)

The following table shows the por_cfgm_errgsr0 higher register bit assignments.

Table 3-33 por_cfgm_errgsr0 (high)

Bits	Field name	Description	Type	Reset
63:32	err_status0	Read-only copy of por_mxp_err<n>status	RO	64'h0

The following image shows the lower register bit assignments.

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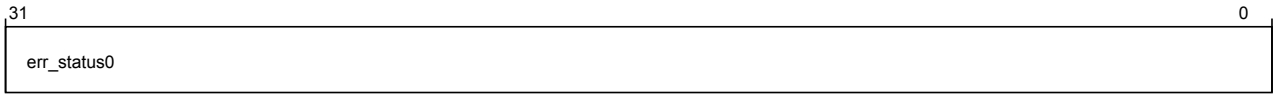

Figure 3-20 por_cfgm_errgsr0 (low)

The following table shows the por_cfgm_errgsr0 lower register bit assignments.

Table 3-34 por_cfgm_errgsr0 (low)

Bits	Field name	Description	Type	Reset
31:0	err_status0	Read-only copy of por_mxp_err<n>status	RO	64'h0

por_cfgm_errgsr1

Provides the HN-I <n> secure error status.

Its characteristics are:

Type RO

Register width (Bits) 64

Address offset 14'h3008

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

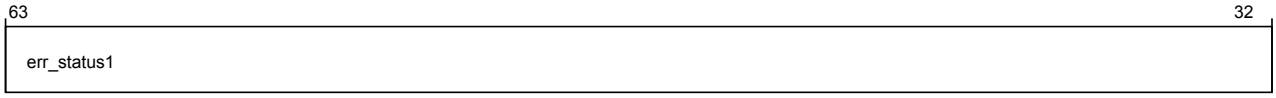

Figure 3-21 por_cfgm_errgsr1 (high)

The following table shows the por_cfgm_errgsr1 higher register bit assignments.

Table 3-35 por_cfgm_errgsr1 (high)

Bits	Field name	Description	Type	Reset
63:32	err_status1	Read-only copy of por_hni_err<n>status	RO	64'h0

The following image shows the lower register bit assignments.

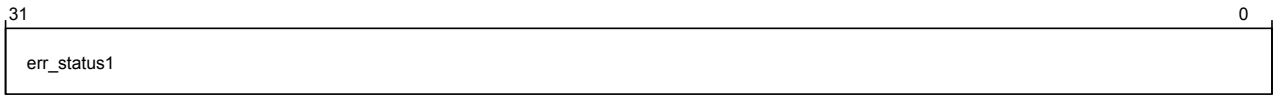

Figure 3-22 por_cfgm_errgsr1 (low)

The following table shows the por_cfgm_errgsr1 lower register bit assignments.

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Table 3-36 por_cfgm_errgsr1 (low)

Bits	Field name	Description	Type	Reset
31:0	err_status1	Read-only copy of por_hni_err<n>status	RO	64'h0

por_cfgm_errgsr2

Provides the HN-F <n> secure error status.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h3010
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

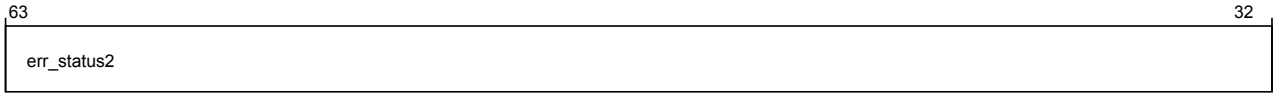

Figure 3-23 por_cfgm_errgsr2 (high)

The following table shows the por_cfgm_errgsr2 higher register bit assignments.

Table 3-37 por_cfgm_errgsr2 (high)

Bits	Field name	Description	Type	Reset
63:32	err_status2	Read-only copy of por_hnf_err<n>status	RO	64'h0

The following image shows the lower register bit assignments.

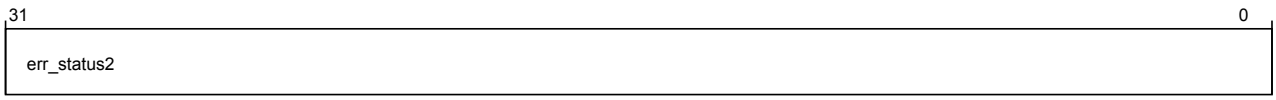

Figure 3-24 por_cfgm_errgsr2 (low)

The following table shows the por_cfgm_errgsr2 lower register bit assignments.

Table 3-38 por_cfgm_errgsr2 (low)

Bits	Field name	Description	Type	Reset
31:0	err_status2	Read-only copy of por_hnf_err<n>status	RO	64'h0

por_cfgm_errgsr3

Provides the SBSX <n> secure error status.

Its characteristics are:

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Type RO
Register width (Bits) 64
Address offset 14'h3018
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

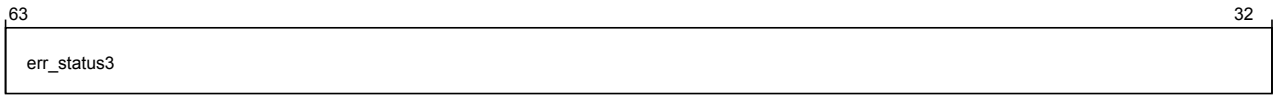

Figure 3-25 por_cfgm_errgsr3 (high)

The following table shows the por_cfgm_errgsr3 higher register bit assignments.

Table 3-39 por_cfgm_errgsr3 (high)

Bits	Field name	Description	Type	Reset
63:32	err_status3	Read-only copy of por_sbsx_err<n>status	RO	64'h0

The following image shows the lower register bit assignments.

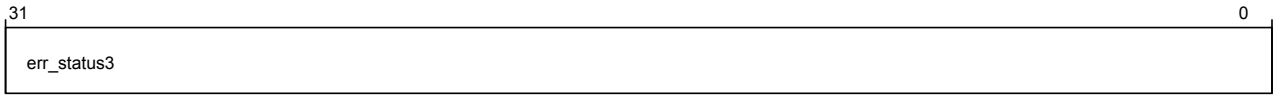

Figure 3-26 por_cfgm_errgsr3 (low)

The following table shows the por_cfgm_errgsr3 lower register bit assignments.

Table 3-40 por_cfgm_errgsr3 (low)

Bits	Field name	Description	Type	Reset
31:0	err_status3	Read-only copy of por_sbsx_err<n>status	RO	64'h0

por_cfgm_errgsr4

Provides the CXG <n> secure error status.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h3020
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

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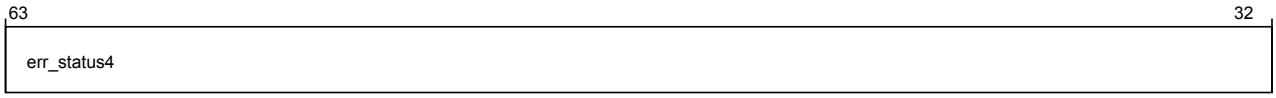

Figure 3-27 por_cfgm_errgsr4 (high)

The following table shows the por_cfgm_errgsr4 higher register bit assignments.

Table 3-41 por_cfgm_errgsr4 (high)

Bits	Field name	Description	Type	Reset
63:32	err_status4	Read-only copy of por_cxg_err<n>status	RO	64'h0

The following image shows the lower register bit assignments.

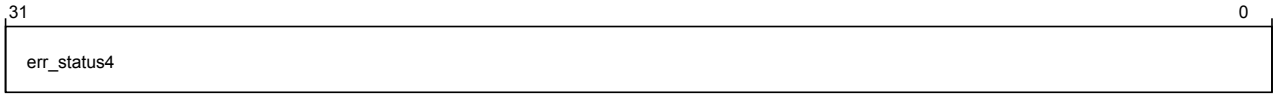

Figure 3-28 por_cfgm_errgsr4 (low)

The following table shows the por_cfgm_errgsr4 lower register bit assignments.

Table 3-42 por_cfgm_errgsr4 (low)

Bits	Field name	Description	Type	Reset
31:0	err_status4	Read-only copy of por_cxg_err<n>status	RO	64'h0

por_cfgm_errgsr5

Provides the XP <n> secure fault status.

Its characteristics are:

Type RO

Register width (Bits) 64

Address offset 14'h3080

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

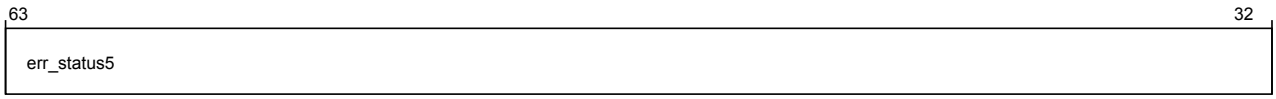

Figure 3-29 por_cfgm_errgsr5 (high)

The following table shows the por_cfgm_errgsr5 higher register bit assignments.

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Table 3-43 por_cfgm_errgsr5 (high)

Bits	Field name	Description	Type	Reset
63:32	err_status5	Read-only copy of por_mxp_err<n>status	RO	64'h0

The following image shows the lower register bit assignments.

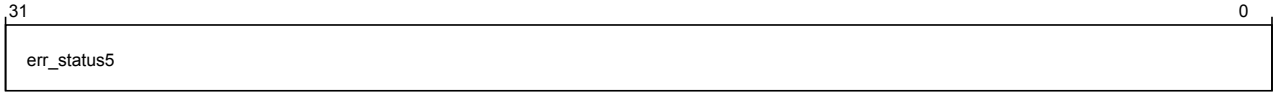

Figure 3-30 por_cfgm_errgsr5 (low)

The following table shows the por_cfgm_errgsr5 lower register bit assignments.

Table 3-44 por_cfgm_errgsr5 (low)

Bits	Field name	Description	Type	Reset
31:0	err_status5	Read-only copy of por_mxp_err<n>status	RO	64'h0

por_cfgm_errgsr6

Provides the HN-I <n> secure fault status.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h3088
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

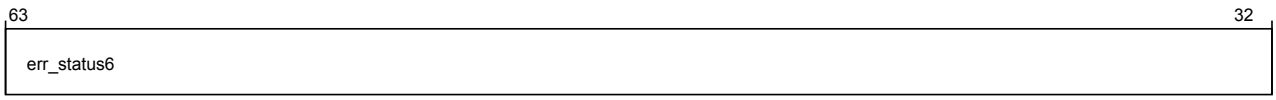

Figure 3-31 por_cfgm_errgsr6 (high)

The following table shows the por_cfgm_errgsr6 higher register bit assignments.

Table 3-45 por_cfgm_errgsr6 (high)

Bits	Field name	Description	Type	Reset
63:32	err_status6	Read-only copy of por_hni_err<n>status	RO	64'h0

The following image shows the lower register bit assignments.

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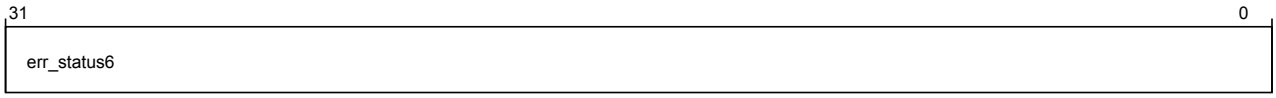

Figure 3-32 por_cfgm_errgsr6 (low)

The following table shows the por_cfgm_errgsr6 lower register bit assignments.

Table 3-46 por_cfgm_errgsr6 (low)

Bits	Field name	Description	Type	Reset
31:0	err_status6	Read-only copy of por_hni_err<n>status	RO	64'h0

por_cfgm_errgsr7

Provides the HN-F <n> secure fault status.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h3090
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

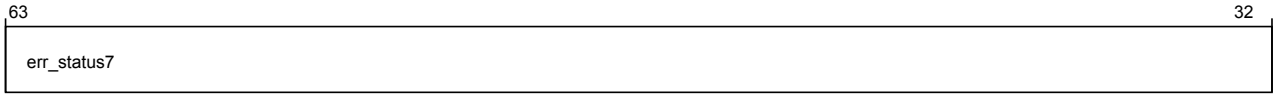

Figure 3-33 por_cfgm_errgsr7 (high)

The following table shows the por_cfgm_errgsr7 higher register bit assignments.

Table 3-47 por_cfgm_errgsr7 (high)

Bits	Field name	Description	Type	Reset
63:32	err_status7	Read-only copy of por_hnf_err<n>status	RO	64'h0

The following image shows the lower register bit assignments.

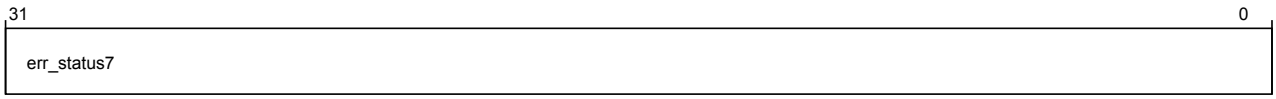

Figure 3-34 por_cfgm_errgsr7 (low)

The following table shows the por_cfgm_errgsr7 lower register bit assignments.

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Table 3-48 por_cfgm_errgsr7 (low)

Bits	Field name	Description	Type	Reset
31:0	err_status7	Read-only copy of por_hnf_err<n>status	RO	64'h0

por_cfgm_errgsr8

Provides the SBSX <n> secure fault status.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h3098
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

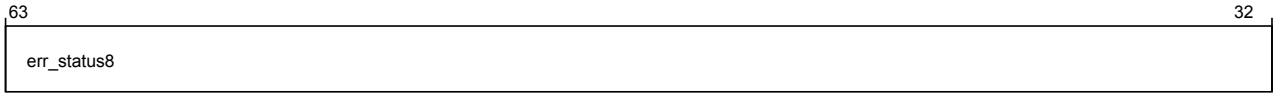

Figure 3-35 por_cfgm_errgsr8 (high)

The following table shows the por_cfgm_errgsr8 higher register bit assignments.

Table 3-49 por_cfgm_errgsr8 (high)

Bits	Field name	Description	Type	Reset
63:32	err_status8	Read-only copy of por_sbsx_err<n>status	RO	64'h0

The following image shows the lower register bit assignments.

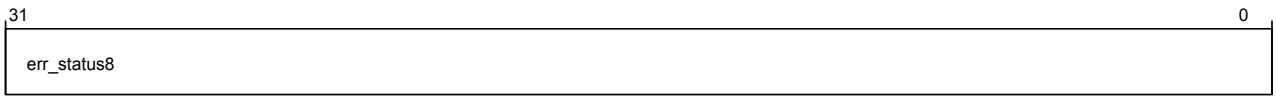

Figure 3-36 por_cfgm_errgsr8 (low)

The following table shows the por_cfgm_errgsr8 lower register bit assignments.

Table 3-50 por_cfgm_errgsr8 (low)

Bits	Field name	Description	Type	Reset
31:0	err_status8	Read-only copy of por_sbsx_err<n>status	RO	64'h0

por_cfgm_errgsr9

Provides the CXG <n> secure error status.

Its characteristics are:

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Type RO
Register width (Bits) 64
Address offset 14'h30A0
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

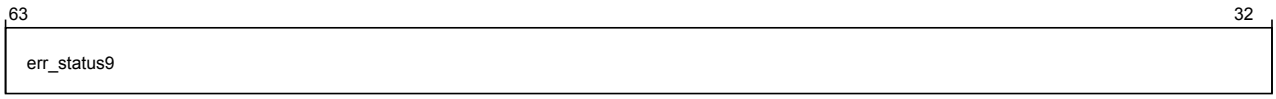

Figure 3-37 por_cfgm_errgsr9 (high)

The following table shows the por_cfgm_errgsr9 higher register bit assignments.

Table 3-51 por_cfgm_errgsr9 (high)

Bits	Field name	Description	Type	Reset
63:32	err_status9	Read-only copy of por_cxg_err<n>status	RO	64'h0

The following image shows the lower register bit assignments.

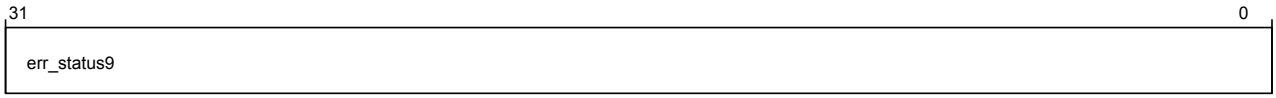

Figure 3-38 por_cfgm_errgsr9 (low)

The following table shows the por_cfgm_errgsr9 lower register bit assignments.

Table 3-52 por_cfgm_errgsr9 (low)

Bits	Field name	Description	Type	Reset
31:0	err_status9	Read-only copy of por_cxg_err<n>status	RO	64'h0

por_cfgm_errgsr0_NS

Provides the XP <n> Non-secure error status.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h3100
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

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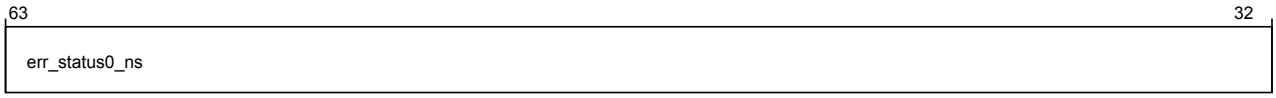

Figure 3-39 por_cfgm_errgsr0_ns (high)

The following table shows the por_cfgm_errgsr0_NS higher register bit assignments.

Table 3-53 por_cfgm_errgsr0_ns (high)

Bits	Field name	Description	Type	Reset
63:32	err_status0_ns	Read-only copy of por_mxp_err<n>status	RO	64'h0

The following image shows the lower register bit assignments.

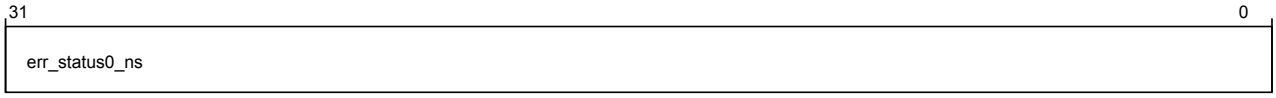

Figure 3-40 por_cfgm_errgsr0_ns (low)

The following table shows the por_cfgm_errgsr0_NS lower register bit assignments.

Table 3-54 por_cfgm_errgsr0_ns (low)

Bits	Field name	Description	Type	Reset
31:0	err_status0_ns	Read-only copy of por_mxp_err<n>status	RO	64'h0

por_cfgm_errgsr1_NS

Provides the HN-I <n> Non-secure error status.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h3108
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

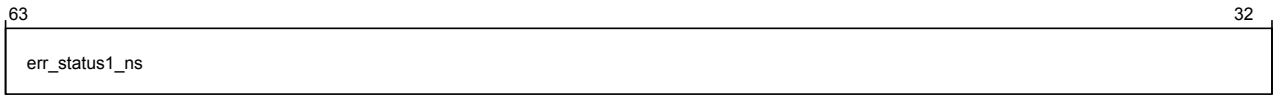

Figure 3-41 por_cfgm_errgsr1_ns (high)

The following table shows the por_cfgm_errgsr1_NS higher register bit assignments.

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Table 3-55 por_cfgm_errgsr1_ns (high)

Bits	Field name	Description	Type	Reset
63:32	err_status1_ns	Read-only copy of por_hni_err<n>status	RO	64'h0

The following image shows the lower register bit assignments.

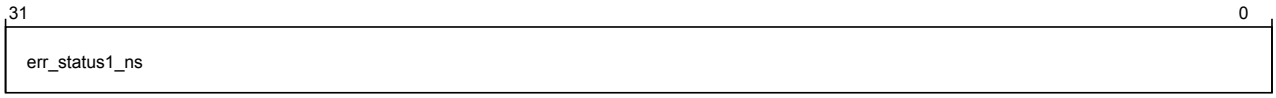

Figure 3-42 por_cfgm_errgsr1_ns (low)

The following table shows the por_cfgm_errgsr1_NS lower register bit assignments.

Table 3-56 por_cfgm_errgsr1_ns (low)

Bits	Field name	Description	Type	Reset
31:0	err_status1_ns	Read-only copy of por_hni_err<n>status	RO	64'h0

por_cfgm_errgsr2_NS

Provides the HN-F <n> Non-secure error status.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h3110
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

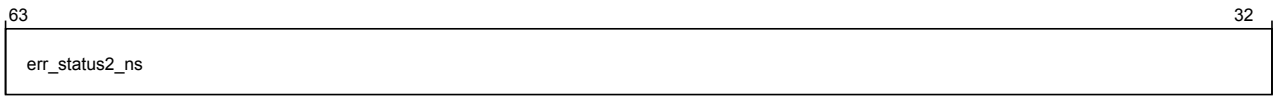

Figure 3-43 por_cfgm_errgsr2_ns (high)

The following table shows the por_cfgm_errgsr2_NS higher register bit assignments.

Table 3-57 por_cfgm_errgsr2_ns (high)

Bits	Field name	Description	Type	Reset
63:32	err_status2_ns	Read-only copy of por_hnf_err<n>status	RO	64'h0

The following image shows the lower register bit assignments.

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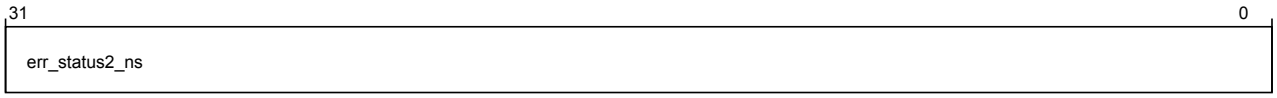

Figure 3-44 por_cfgm_errgsr2_ns (low)

The following table shows the por_cfgm_errgsr2_NS lower register bit assignments.

Table 3-58 por_cfgm_errgsr2_ns (low)

Bits	Field name	Description	Type	Reset
31:0	err_status2_ns	Read-only copy of por_hnf_err<n>status	RO	64'h0

por_cfgm_errgsr3_NS

Provides the SBSX <n> Non-secure error status.

Its characteristics are:

Type RO

Register width (Bits) 64

Address offset 14'h3118

Register reset 64'b0

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

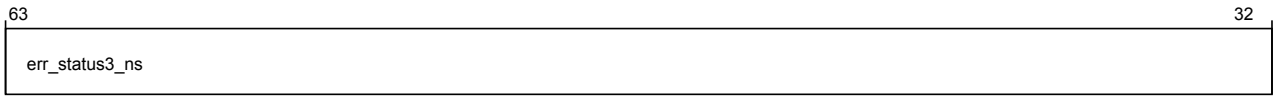

Figure 3-45 por_cfgm_errgsr3_ns (high)

The following table shows the por_cfgm_errgsr3_NS higher register bit assignments.

Table 3-59 por_cfgm_errgsr3_ns (high)

Bits	Field name	Description	Type	Reset
63:32	err_status3_ns	Read-only copy of por_sbsx_err<n>status	RO	64'h0

The following image shows the lower register bit assignments.

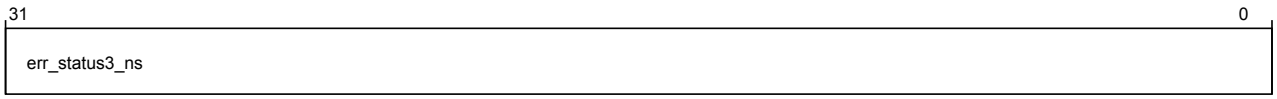

Figure 3-46 por_cfgm_errgsr3_ns (low)

The following table shows the por_cfgm_errgsr3_NS lower register bit assignments.

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Table 3-60 por_cfgm_errgsr3_ns (low)

Bits	Field name	Description	Type	Reset
31:0	err_status3_ns	Read-only copy of por_sbsx_err<n>status	RO	64'h0

por_cfgm_errgsr4_NS

Provides the CXG <n> Non-secure error status.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h3120
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

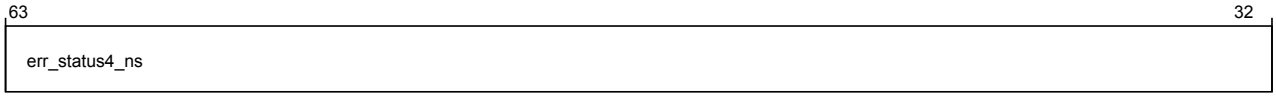

Figure 3-47 por_cfgm_errgsr4_ns (high)

The following table shows the por_cfgm_errgsr4_NS higher register bit assignments.

Table 3-61 por_cfgm_errgsr4_ns (high)

Bits	Field name	Description	Type	Reset
63:32	err_status4_ns	Read-only copy of por_cxg_err<n>status	RO	64'h0

The following image shows the lower register bit assignments.

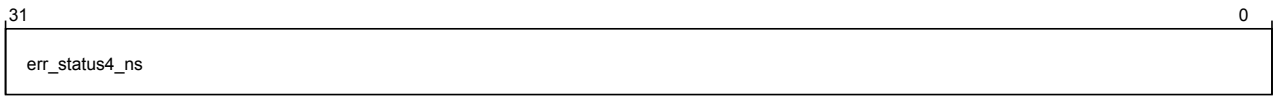

Figure 3-48 por_cfgm_errgsr4_ns (low)

The following table shows the por_cfgm_errgsr4_NS lower register bit assignments.

Table 3-62 por_cfgm_errgsr4_ns (low)

Bits	Field name	Description	Type	Reset
31:0	err_status4_ns	Read-only copy of por_cxg_err<n>status	RO	64'h0

por_cfgm_errgsr5_NS

Provides the XP <n> Non-secure fault status.

Its characteristics are:

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Type RO
Register width (Bits) 64
Address offset 14'h3180
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

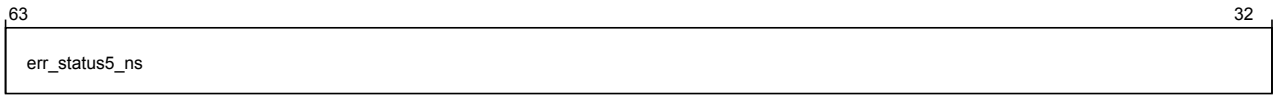

Figure 3-49 por_cfgm_errgsr5_ns (high)

The following table shows the por_cfgm_errgsr5_NS higher register bit assignments.

Table 3-63 por_cfgm_errgsr5_ns (high)

Bits	Field name	Description	Type	Reset
63:32	err_status5_ns	Read-only copy of por_mxp_err<n>status	RO	64'h0

The following image shows the lower register bit assignments.

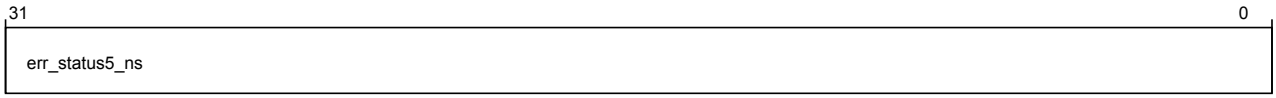

Figure 3-50 por_cfgm_errgsr5_ns (low)

The following table shows the por_cfgm_errgsr5_NS lower register bit assignments.

Table 3-64 por_cfgm_errgsr5_ns (low)

Bits	Field name	Description	Type	Reset
31:0	err_status5_ns	Read-only copy of por_mxp_err<n>status	RO	64'h0

por_cfgm_errgsr6_NS

Provides the HN-I <n> Non-secure fault status.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h3188
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

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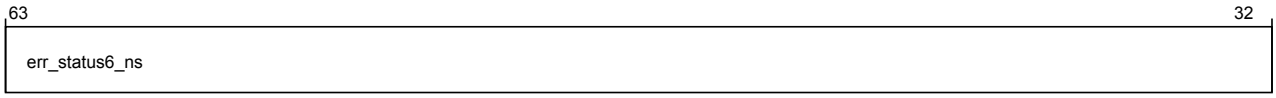

Figure 3-51 por_cfgm_errgsr6_ns (high)

The following table shows the por_cfgm_errgsr6_NS higher register bit assignments.

Table 3-65 por_cfgm_errgsr6_ns (high)

Bits	Field name	Description	Type	Reset
63:32	err_status6_ns	Read-only copy of por_hni_err<n>status	RO	64'h0

The following image shows the lower register bit assignments.

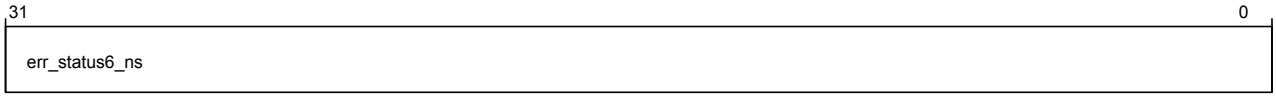

Figure 3-52 por_cfgm_errgsr6_ns (low)

The following table shows the por_cfgm_errgsr6_NS lower register bit assignments.

Table 3-66 por_cfgm_errgsr6_ns (low)

Bits	Field name	Description	Type	Reset
31:0	err_status6_ns	Read-only copy of por_hni_err<n>status	RO	64'h0

por_cfgm_errgsr7_NS

Provides the HN-F <n> Non-secure fault status.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h3190
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

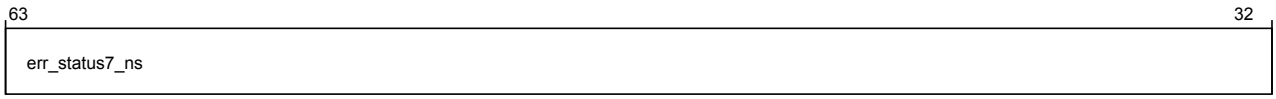

Figure 3-53 por_cfgm_errgsr7_ns (high)

The following table shows the por_cfgm_errgsr7_NS higher register bit assignments.

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Table 3-67 por_cfgm_errgsr7_ns (high)

Bits	Field name	Description	Type	Reset
63:32	err_status7_ns	Read-only copy of por_hnf_err<n>status	RO	64'h0

The following image shows the lower register bit assignments.

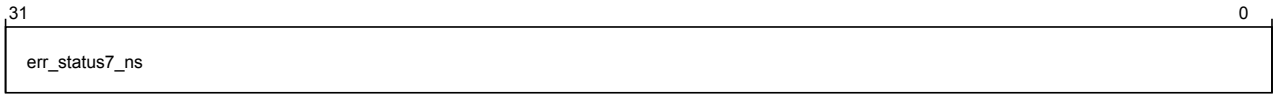

Figure 3-54 por_cfgm_errgsr7_ns (low)

The following table shows the por_cfgm_errgsr7_NS lower register bit assignments.

Table 3-68 por_cfgm_errgsr7_ns (low)

Bits	Field name	Description	Type	Reset
31:0	err_status7_ns	Read-only copy of por_hnf_err<n>status	RO	64'h0

por_cfgm_errgsr8_NS

Provides the SBSX <n> Non-secure fault status.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h3198
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

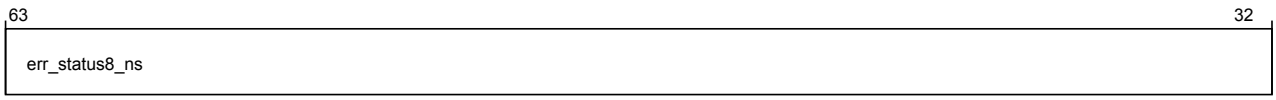

Figure 3-55 por_cfgm_errgsr8_ns (high)

The following table shows the por_cfgm_errgsr8_NS higher register bit assignments.

Table 3-69 por_cfgm_errgsr8_ns (high)

Bits	Field name	Description	Type	Reset
63:32	err_status8_ns	Read-only copy of por_sbsx_err<n>status	RO	64'h0

The following image shows the lower register bit assignments.

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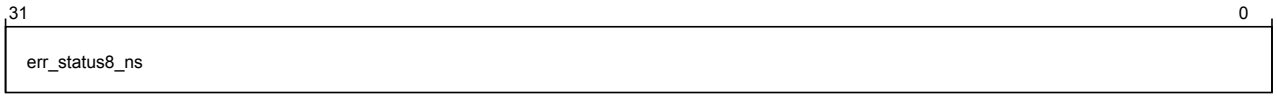

Figure 3-56 por_cfgm_errgsr8_ns (low)

The following table shows the por_cfgm_errgsr8_NS lower register bit assignments.

Table 3-70 por_cfgm_errgsr8_ns (low)

Bits	Field name	Description	Type	Reset
31:0	err_status8_ns	Read-only copy of por_sbsx_err<n>status	RO	64'h0

por_cfgm_errgsr9_NS

Provides the CXG <n> Secure error status.

Its characteristics are:

Type RO

Register width (Bits) 64

Address offset 14'h31A0

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

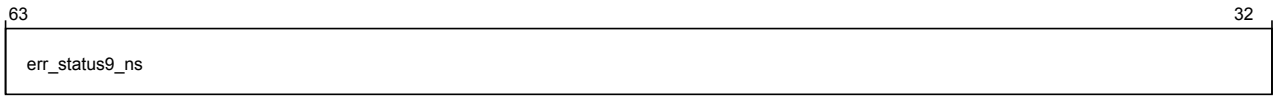

Figure 3-57 por_cfgm_errgsr9_ns (high)

The following table shows the por_cfgm_errgsr9_NS higher register bit assignments.

Table 3-71 por_cfgm_errgsr9_ns (high)

Bits	Field name	Description	Type	Reset
63:32	err_status9_ns	Read-only copy of por_cxg_err<n>status	RO	64'h0

The following image shows the lower register bit assignments.

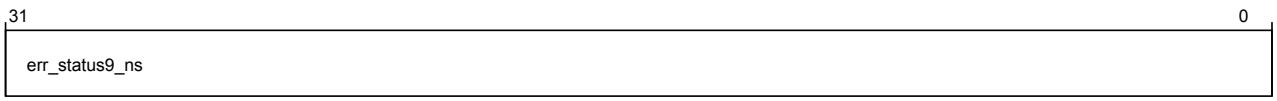

Figure 3-58 por_cfgm_errgsr9_ns (low)

The following table shows the por_cfgm_errgsr9_NS lower register bit assignments.

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Table 3-72 por_cfgm_errgsr9_ns (low)

Bits	Field name	Description	Type	Reset
31:0	err_status9_ns	Read-only copy of por_cxg_err<n>status	RO	64'h0

por_cfgm_errdevaff

Functions as the device affinity register.

Its characteristics are:

Type RO

Register width (Bits) 64

Address offset 14'h3FA8

Register reset 64'b0

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

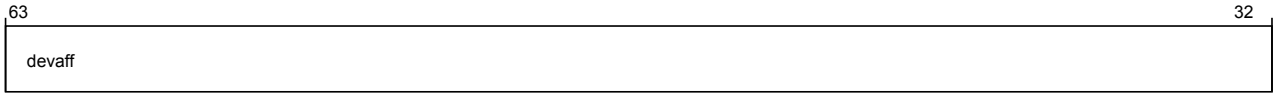

Figure 3-59 por_cfgm_errdevaff (high)

The following table shows the por_cfgm_errdevaff higher register bit assignments.

Table 3-73 por_cfgm_errdevaff (high)

Bits	Field name	Description	Type	Reset
63:32	devaff	Device affinity register	RO	64'b0

The following image shows the lower register bit assignments.

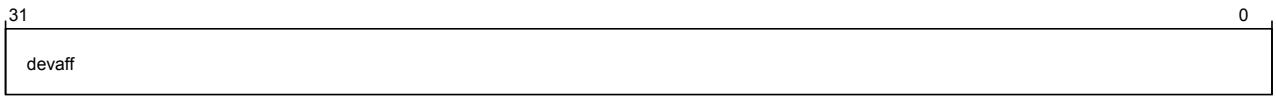

Figure 3-60 por_cfgm_errdevaff (low)

The following table shows the por_cfgm_errdevaff lower register bit assignments.

Table 3-74 por_cfgm_errdevaff (low)

Bits	Field name	Description	Type	Reset
31:0	devaff	Device affinity register	RO	64'b0

por_cfgm_errdevarch

Functions as the device architecture register.

Its characteristics are:

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Type RO

Register width (Bits) 64

Address offset 14'h3FB8

Register reset 64'b0001011101110000000000101000

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

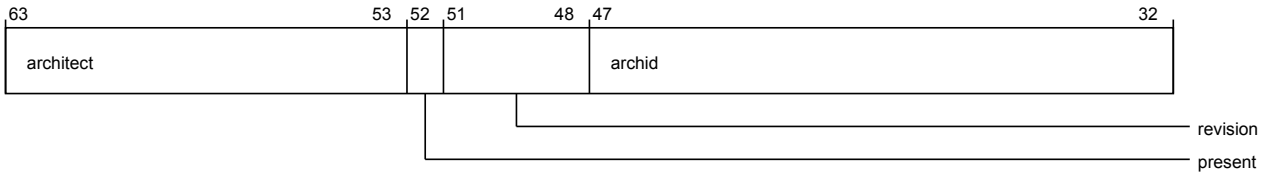

Figure 3-61 por_cfgm_errdevarch (high)

The following table shows the por_cfgm_errdevarch higher register bit assignments.

Table 3-75 por_cfgm_errdevarch (high)

Bits	Field name	Description	Type	Reset
63:53	architect	Architect	RO	11'h23B
52	present	Present	RO	1'b1
51:48	revision	Architecture revision	RO	4'b0
47:32	archid	Architecture ID	RO	16'h0A00

The following image shows the lower register bit assignments.

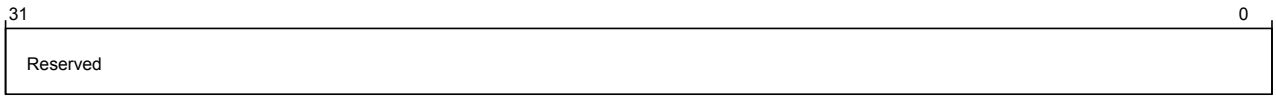

Figure 3-62 por_cfgm_errdevarch (low)

The following table shows the por_cfgm_errdevarch lower register bit assignments.

Table 3-76 por_cfgm_errdevarch (low)

Bits	Field name	Description	Type	Reset
31:0	Reserved	Reserved	RO	-

por_cfgm_erridr

Contains the number of error records.

Its characteristics are:

Type RO

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Register width (Bits) 64
Address offset 14'h3FC8
Register reset Configuration dependent
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

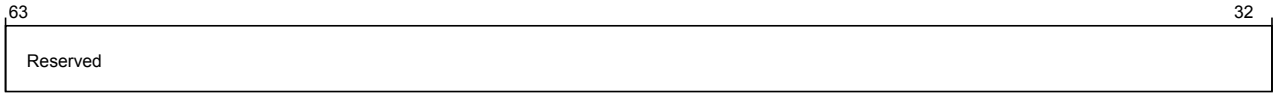

Figure 3-63 por_cfgm_erridr (high)

The following table shows the por_cfgm_erridr higher register bit assignments.

Table 3-77 por_cfgm_erridr (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

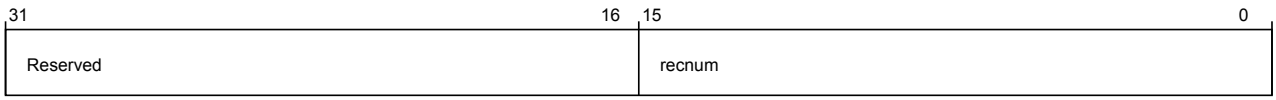

Figure 3-64 por_cfgm_erridr (low)

The following table shows the por_cfgm_erridr lower register bit assignments.

Table 3-78 por_cfgm_erridr (low)

Bits	Field name	Description	Type	Reset
31:16	Reserved	Reserved	RO	-
15:0	recnum	Number of error records; equal to 2*(number of logical devices)	RO	Configuration dependent

por_cfgm_errpidr45

Functions as the identification register for peripheral ID 4 and peripheral ID 5.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h3FD0
Register reset 64'b000000100
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

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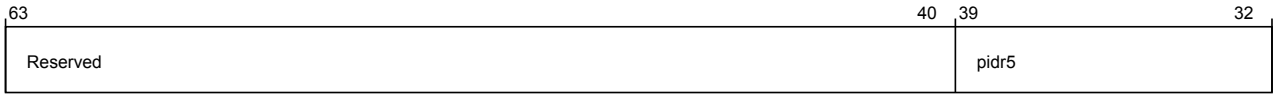

Figure 3-65 por_cfgm_errpidr45 (high)

The following table shows the por_cfgm_errpidr45 higher register bit assignments.

Table 3-79 por_cfgm_errpidr45 (high)

Bits	Field name	Description	Type	Reset
63:40	Reserved	Reserved	RO	-
39:32	pidr5	Peripheral ID 5	RO	8'b0

The following image shows the lower register bit assignments.

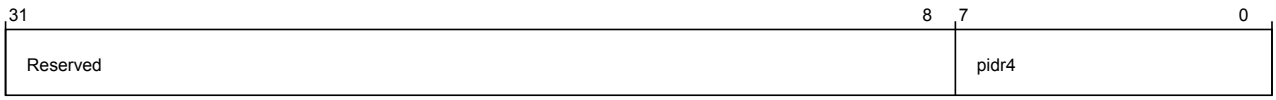

Figure 3-66 por_cfgm_errpidr45 (low)

The following table shows the por_cfgm_errpidr45 lower register bit assignments.

Table 3-80 por_cfgm_errpidr45 (low)

Bits	Field name	Description	Type	Reset
31:8	Reserved	Reserved	RO	-
7:0	pidr4	Peripheral ID 4	RO	8'h4

por_cfgm_errpidr67

Functions as the identification register for peripheral ID 6 and peripheral ID 7.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h3FD8
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

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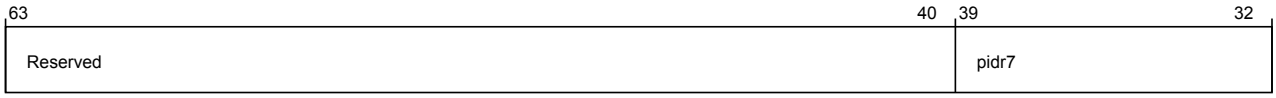

Figure 3-67 por_cfgm_errpidr67 (high)

The following table shows the por_cfgm_errpidr67 higher register bit assignments.

Table 3-81 por_cfgm_errpidr67 (high)

Bits	Field name	Description	Type	Reset
63:40	Reserved	Reserved	RO	-
39:32	pidr7	Peripheral ID 7	RO	8'b0

The following image shows the lower register bit assignments.

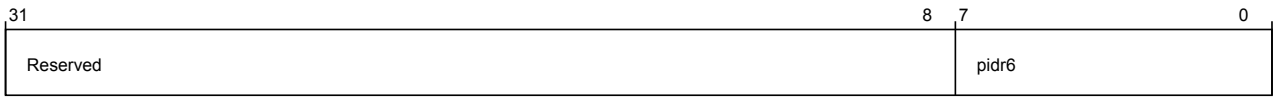

Figure 3-68 por_cfgm_errpidr67 (low)

The following table shows the por_cfgm_errpidr67 lower register bit assignments.

Table 3-82 por_cfgm_errpidr67 (low)

Bits	Field name	Description	Type	Reset
31:8	Reserved	Reserved	RO	-
7:0	pidr6	Peripheral ID 6	RO	8'b0

por_cfgm_errpidr01

Functions as the identification register for peripheral ID 0 and peripheral ID 1.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h3FE0
Register reset 64'b0101110000011100
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

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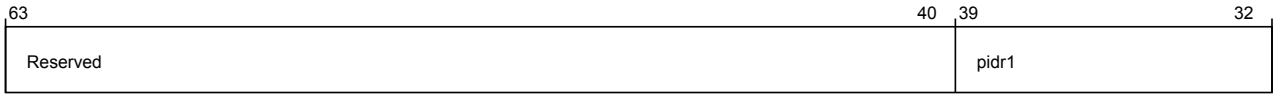

Figure 3-69 por_cfgm_errpidr01 (high)

The following table shows the por_cfgm_errpidr01 higher register bit assignments.

Table 3-83 por_cfgm_errpidr01 (high)

Bits	Field name	Description	Type	Reset
63:40	Reserved	Reserved	RO	-
39:32	pidr1	Peripheral ID 1	RO	8'hb4

The following image shows the lower register bit assignments.

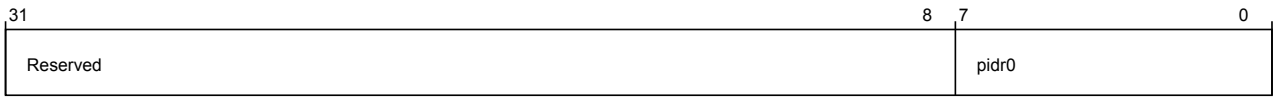

Figure 3-70 por_cfgm_errpidr01 (low)

The following table shows the por_cfgm_errpidr01 lower register bit assignments.

Table 3-84 por_cfgm_errpidr01 (low)

Bits	Field name	Description	Type	Reset
31:8	Reserved	Reserved	RO	-
7:0	pidr0	Peripheral ID 0	RO	8'h34

por_cfgm_errpidr23

Functions as the identification register for peripheral ID 2 and peripheral ID 3.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h3FE8
Register reset 64'b000000111
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

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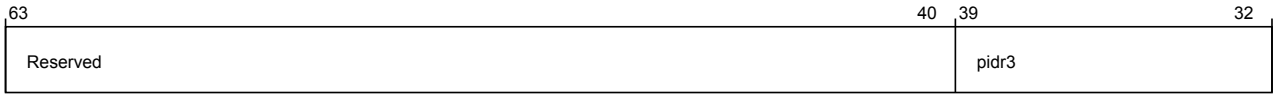

Figure 3-71 por_cfgm_errpidr23 (high)

The following table shows the por_cfgm_errpidr23 higher register bit assignments.

Table 3-85 por_cfgm_errpidr23 (high)

Bits	Field name	Description	Type	Reset
63:40	Reserved	Reserved	RO	-
39:32	pidr3	Peripheral ID 3	RO	8'b0

The following image shows the lower register bit assignments.

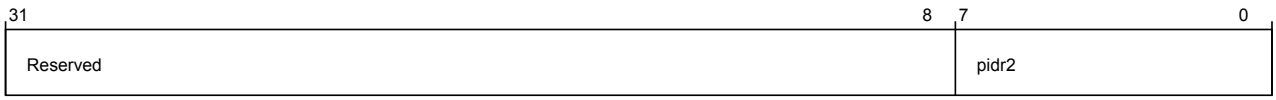

Figure 3-72 por_cfgm_errpidr23 (low)

The following table shows the por_cfgm_errpidr23 lower register bit assignments.

Table 3-86 por_cfgm_errpidr23 (low)

Bits	Field name	Description	Type	Reset
31:8	Reserved	Reserved	RO	-
7:0	pidr2	Peripheral ID 2	RO	8'h7

por_cfgm_errcidr01

Functions as the identification register for component ID 0 and component ID 1.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h3FF0
Register reset 64'b1111111100001101
Usage constraints There are no usage constraints.

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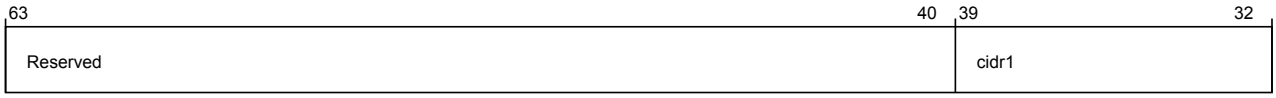

Figure 3-73 por_cfgm_errcidr01 (high)

The following table shows the por_cfgm_errcidr01 higher register bit assignments.

Table 3-87 por_cfgm_errcidr01 (high)

Bits	Field name	Description	Type	Reset
63:40	Reserved	Reserved	RO	-
39:32	cidr1	Component ID 1	RO	8'hff

The following image shows the lower register bit assignments.

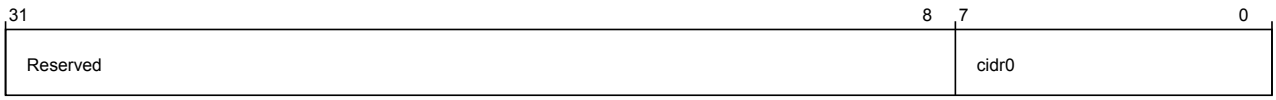

Figure 3-74 por_cfgm_errcidr01 (low)

The following table shows the por_cfgm_errcidr01 lower register bit assignments.

Table 3-88 por_cfgm_errcidr01 (low)

Bits	Field name	Description	Type	Reset
31:8	Reserved	Reserved	RO	-
7:0	cidr0	Component ID 0	RO	8'hd

por_cfgm_errcidr23

Functions as the identification register for component ID 2 and component ID 3.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h3FF8
Register reset 64'b0001011100000101
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

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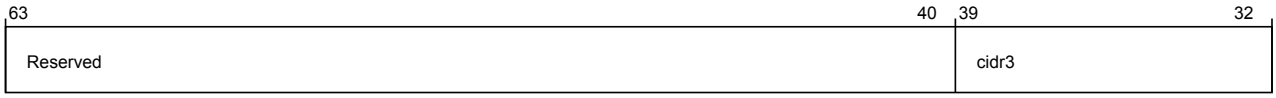

Figure 3-75 por_cfgm_errcidr23 (high)

The following table shows the por_cfgm_errcidr23 higher register bit assignments.

Table 3-89 por_cfgm_errcidr23 (high)

Bits	Field name	Description	Type	Reset
63:40	Reserved	Reserved	RO	-
39:32	cidr3	Component ID 3	RO	8'hb1

The following image shows the lower register bit assignments.

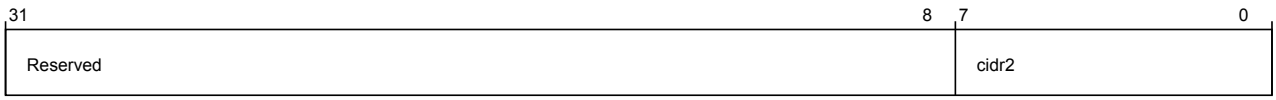

Figure 3-76 por_cfgm_errcidr23 (low)

The following table shows the por_cfgm_errcidr23 lower register bit assignments.

Table 3-90 por_cfgm_errcidr23 (low)

Bits	Field name	Description	Type	Reset
31:8	Reserved	Reserved	RO	-
7:0	cidr2	Component ID 2	RO	8'h5

por_info_global

Contains user-specified values of build-time global configuration parameters.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h900
Register reset Configuration dependent
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

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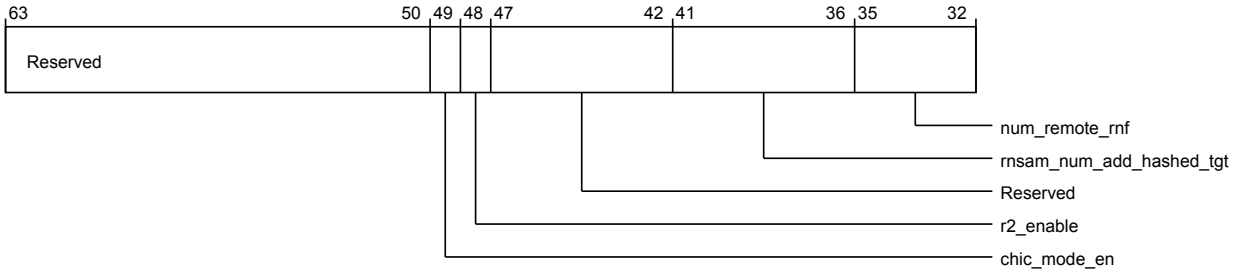

Figure 3-77 por_cfgm_por_info_global (high)

The following table shows the por_info_global higher register bit assignments.

Table 3-91 por_cfgm_por_info_global (high)

Bits	Field name	Description	Type	Reset
63:50	Reserved	Reserved	RO	-
49	chic_mode_en	CHI-C mode enable	RO	Configuration dependent
48	r2_enable	CMN R2 feature enable	RO	Configuration dependent
47:42	Reserved	Reserved	RO	-
41:36	rnsam_num_add_hashed_tgt	Number of additional hashed target ID's supported by the RN SAM, beyond the local HNF count	RO	Configuration dependent
35:32	num_remote_rnf	Number of remote RN-F devices in the system when the CML feature is enabled	RO	Configuration dependent

The following image shows the lower register bit assignments.

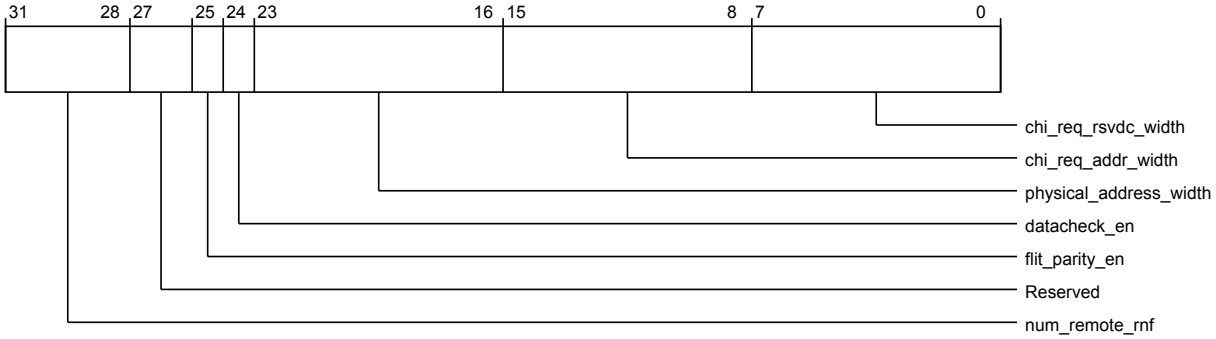

Figure 3-78 por_cfgm_por_info_global (low)

The following table shows the por_info_global lower register bit assignments.

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Table 3-92 por_cfgm_por_info_global (low)

Bits	Field name	Description	Type	Reset
31:28	num_remote_rnf	Number of remote RN-F devices in the system when the CML feature is enabled	RO	Configuration dependent
27:26	Reserved	Reserved	RO	-
25	flit_parity_en	Indicates whether parity checking is enabled in the transport layer on all flits sent on the interconnect	RO	Configuration dependent
24	datacheck_en	Indicates whether datacheck feature is enabled for CHI DAT flit	RO	Configuration dependent
23:16	physical_address_width	Physical address width	RO	Configuration dependent
15:8	chi_req_addr_width	REQ address width	RO	Configuration dependent
7:0	chi_req_rsvdc_width	RSVDC field width in CHI REQ flit	RO	Configuration dependent

por_ppu_int_enable

Configures the HN-F PPU event interrupt. Contains the interrupt mask.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h1000
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

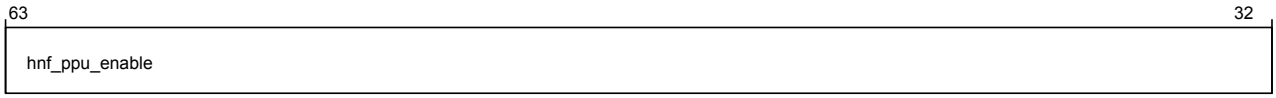

Figure 3-79 por_cfgm_por_ppu_int_enable (high)

The following table shows the por_ppu_int_enable higher register bit assignments.

Table 3-93 por_cfgm_por_ppu_int_enable (high)

Bits	Field name	Description	Type	Reset
63:32	hnf_ppu_enable	Interrupt mask	RW	64'b0

The following image shows the lower register bit assignments.

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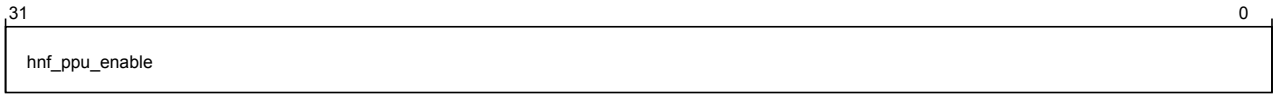

Figure 3-80 por_cfgm_por_ppu_int_enable (low)

The following table shows the por_ppu_int_enable lower register bit assignments.

Table 3-94 por_cfgm_por_ppu_int_enable (low)

Bits	Field name	Description	Type	Reset
31:0	hnf_ppu_enable	Interrupt mask	RW	64'b0

por_ppu_int_status

Provides HN-F PPU event interrupt status.

Its characteristics are:

Type W1C
Register width (Bits) 64
Address offset 14'h1008
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

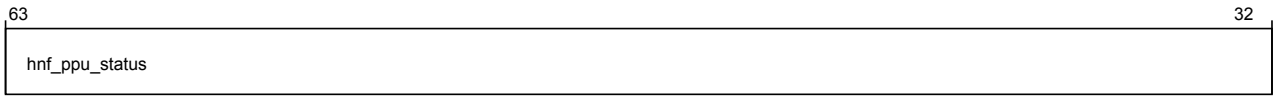

Figure 3-81 por_cfgm_por_ppu_int_status (high)

The following table shows the por_ppu_int_status higher register bit assignments.

Table 3-95 por_cfgm_por_ppu_int_status (high)

Bits	Field name	Description	Type	Reset
63:32	hnf_ppu_status	Interrupt status	W1C	64'b0

The following image shows the lower register bit assignments.

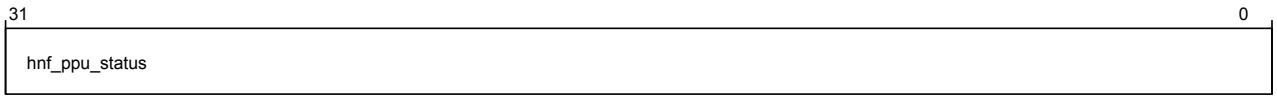

Figure 3-82 por_cfgm_por_ppu_int_status (low)

The following table shows the por_ppu_int_status lower register bit assignments.

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Table 3-96 por_cfgm_por_ppu_int_status (low)

Bits	Field name	Description	Type	Reset
31:0	hnf_ppu_status	Interrupt status	W1C	64'b0

por_ppu_qactive_hyst

Number of hysteresis clock cycles to retain QACTIVE assertion

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h1010
Register reset 64'b0000000000000010
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

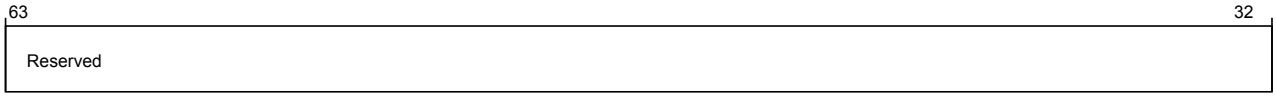

Figure 3-83 por_cfgm_por_ppu_qactive_hyst (high)

The following table shows the por_ppu_qactive_hyst higher register bit assignments.

Table 3-97 por_cfgm_por_ppu_qactive_hyst (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

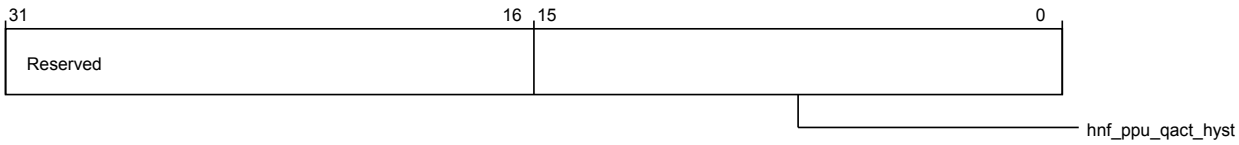

Figure 3-84 por_cfgm_por_ppu_qactive_hyst (low)

The following table shows the por_ppu_qactive_hyst lower register bit assignments.

Table 3-98 por_cfgm_por_ppu_qactive_hyst (low)

Bits	Field name	Description	Type	Reset
31:16	Reserved	Reserved	RO	-
15:0	hnf_ppu_qact_hyst	QACTIVE hysteresis	RW	16'h10

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por_cfgm_child_pointer_0

Contains base address of child configuration node.

Note

There will be as many child pointer registers in the Global Config Unit as the number of XP's on the chip. Each successive child pointer register will be at the next 8 byte address boundary. Each successive child pointer register will be named with the suffix corresponding to the register number. For example por_cfgm_child_pointer_<number>

Its characteristics are:

Type RO

Register width (Bits) 64

Address offset 14'h100

Register reset 64'b0

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

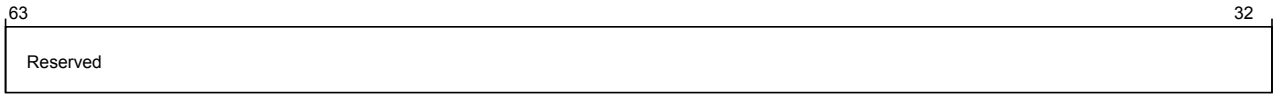

Figure 3-85 por_cfgm_child_pointer_0 (high)

The following table shows the por_cfgm_child_pointer_0 higher register bit assignments.

Table 3-99 por_cfgm_child_pointer_0 (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

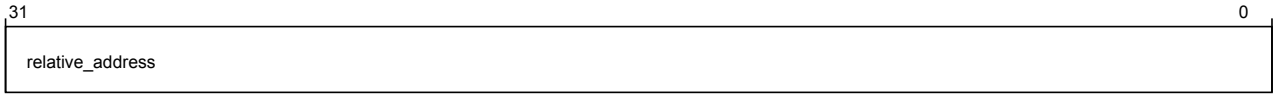

Figure 3-86 por_cfgm_child_pointer_0 (low)

The following table shows the por_cfgm_child_pointer_0 lower register bit assignments.

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Table 3-100 por_cfgm_child_pointer_0 (low)

Bits	Field name	Description	Type	Reset
31:0	relative_address	Bit 31: External or internal child node 1'b1: Indicates child pointer points to a configuration node that is external to CMN-600 1'b0: Indicates child pointer points to a configuration node that is internal to CMN-600 Bits [30:28]: Set to 3'b000 Bits [27:0]: Child node address offset relative to PERIPHBASE	RO	32'b0

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3.3.2 DN register descriptions

This section lists the DN registers.

por_dn_node_info

Provides component identification information.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h0
Register reset Configuration dependent
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

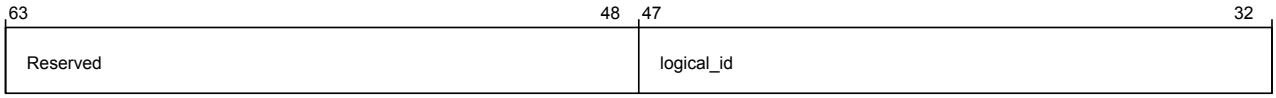

Figure 3-87 por_dn_node_info (high)

The following table shows the por_dn_node_info higher register bit assignments.

Table 3-101 por_dn_node_info (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	logical_id	Component logical ID	RO	Configuration dependent

The following image shows the lower register bit assignments.

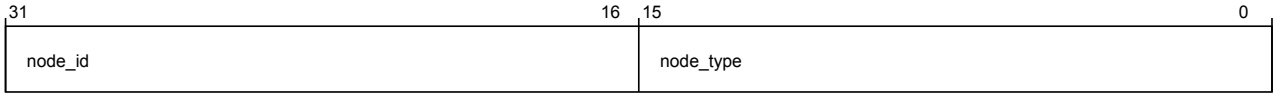

Figure 3-88 por_dn_node_info (low)

The following table shows the por_dn_node_info lower register bit assignments.

Table 3-102 por_dn_node_info (low)

Bits	Field name	Description	Type	Reset
31:16	node_id	Component CHI node ID	RO	Configuration dependent
15:0	node_type	CMN-600 node type identifier	RO	16'h0001

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por_dn_child_info

Provides component child identification information.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h80
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

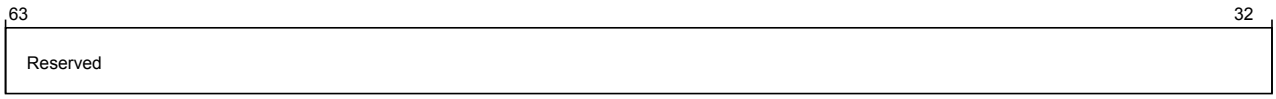

Figure 3-89 por_dn_por_dn_child_info (high)

The following table shows the por_dn_child_info higher register bit assignments.

Table 3-103 por_dn_por_dn_child_info (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

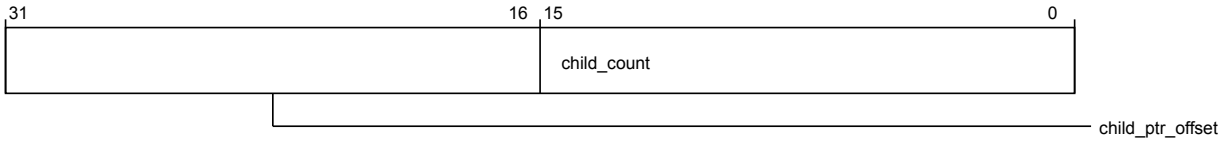

Figure 3-90 por_dn_por_dn_child_info (low)

The following table shows the por_dn_child_info lower register bit assignments.

Table 3-104 por_dn_por_dn_child_info (low)

Bits	Field name	Description	Type	Reset
31:16	child_ptr_offset	Starting register offset which contains pointers to the child nodes	RO	16'h0
15:0	child_count	Number of child nodes; used in discovery process	RO	16'h0

por_dn_build_info

Contains the configuration parameter values. Indicates the specific DN configuration.

Its characteristics are:

Type RO
Register width (Bits) 64

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Address offset 14'h900

Register reset Configuration dependent

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

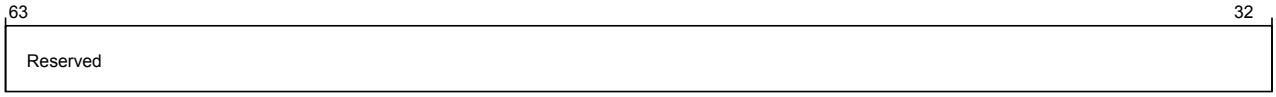

Figure 3-91 por_dn_build_info (high)

The following table shows the por_dn_build_info higher register bit assignments.

Table 3-105 por_dn_build_info (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

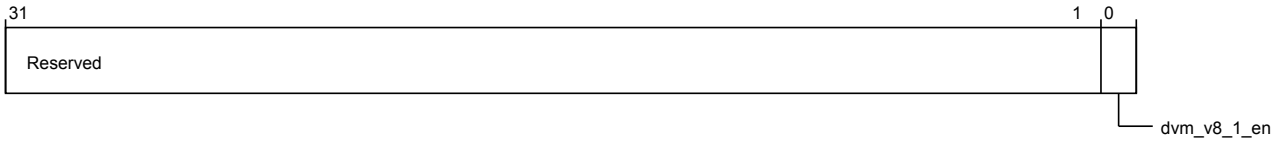

Figure 3-92 por_dn_build_info (low)

The following table shows the por_dn_build_info lower register bit assignments.

Table 3-106 por_dn_build_info (low)

Bits	Field name	Description	Type	Reset
31:1	Reserved	Reserved	RO	-
0	dvm_v8_1_en	Determines whether all nodes receiving DVM snoops support DVM v8.1 operations; must be set to 0 if not supported by all nodes, therefore allowing the node to perform demotion before sending out the DVM snoop	RO	Configuration dependent

por_dn_secure_register_groups_override

Allows Non-secure access to predefined groups of secure registers.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h980

Register reset 64'b0

Usage constraints Only accessible by Secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

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The following image shows the higher register bit assignments.

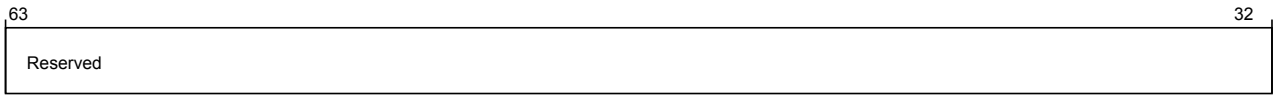

Figure 3-93 por_dn_secure_register_groups_override (high)

The following table shows the por_dn_secure_register_groups_override higher register bit assignments.

Table 3-107 por_dn_secure_register_groups_override (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

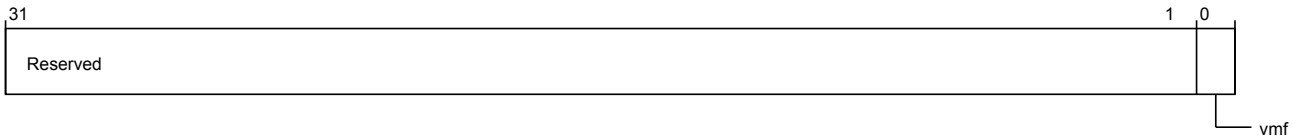

Figure 3-94 por_dn_secure_register_groups_override (low)

The following table shows the por_dn_secure_register_groups_override lower register bit assignments.

Table 3-108 por_dn_secure_register_groups_override (low)

Bits	Field name	Description	Type	Reset
31:1	Reserved	Reserved	RO	-
0	vmf	Allows Non-secure access to secure VMF registers	RW	1'b0

por_dn_aux_ctl

Functions as the auxiliary control register for DN.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hA00

Register reset Configuration dependent

Usage constraints Only accessible by Secure accesses. This register can be modified only with prior written permission from Arm.

The following image shows the higher register bit assignments.

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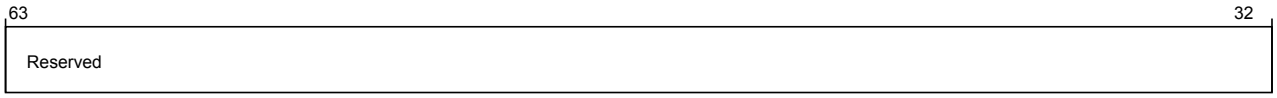

Figure 3-95 por_dn_aux_ctl (high)

The following table shows the por_dn_aux_ctl higher register bit assignments.

Table 3-109 por_dn_aux_ctl (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

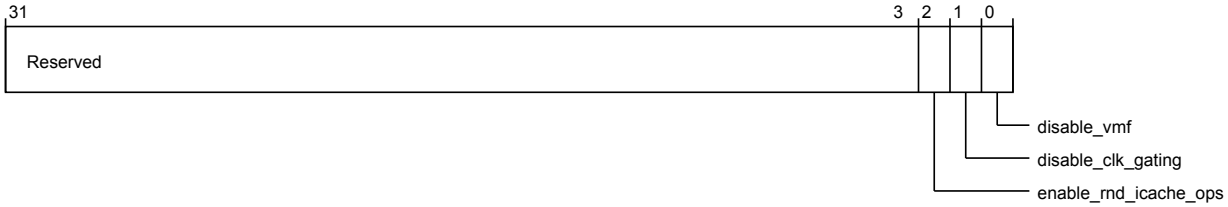

Figure 3-96 por_dn_aux_ctl (low)

The following table shows the por_dn_aux_ctl lower register bit assignments.

Table 3-110 por_dn_aux_ctl (low)

Bits	Field name	Description	Type	Reset
31:3	Reserved	Reserved	RO	-
2	enable_rnd_icache_ops	Filters out BPI and VICI/PICI Snps to RNDs when set	RW	Configuration dependent
1	disable_clk_gating	Disables autonomous clock gating when set	RW	1'b0
0	disable_vmf	This bit is currently not supported. Software must not program this bit.	RW	Configuration dependent

por_dn_vmf0_ctrl

Functions as the control register for VMID-based DVM snoop filtering.

Note

This register has no effect when por_dn_aux_ctl.disable_vmf is set to 1.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC00

Register reset 64'b1111111111111111000000000000000000

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Usage constraints Only accessible by Secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

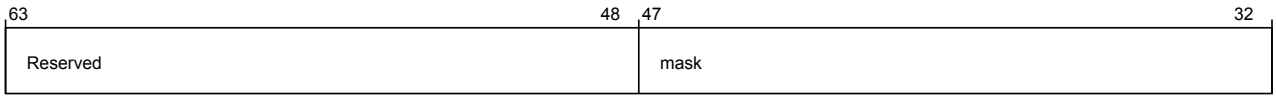

Figure 3-97 por_dn_vmf0_ctrl (high)

The following table shows the por_dn_vmf0_ctrl higher register bit assignments.

Table 3-111 por_dn_vmf0_ctrl (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	mask	VMID mask; enables mapping of multiple VMID values to a single register **Note** Logically, the AND operator is performed on the mask and por_dn_vmf0_ctrl.vmid. Then, the AND operator is performed on the mask and the incoming request's VMID. The two results are then compared, and filtering is applied to the incoming request if the masked VMIDs match.	RW	16'hffff

The following image shows the lower register bit assignments.

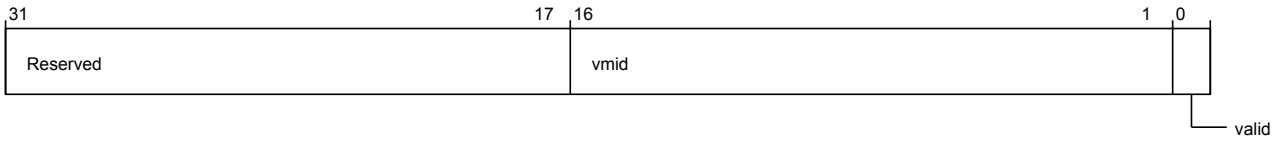

Figure 3-98 por_dn_vmf0_ctrl (low)

The following table shows the por_dn_vmf0_ctrl lower register bit assignments.

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Table 3-112 por_dn_vmf0_ctrl (low)

Bits	Field name	Description	Type	Reset
31:17	Reserved	Reserved	RO	-
16:1	vmid	VMID value **Note** The incoming request's VMID is only compared with this VMID value if the request's VMID valid bit is set. If the request's VMID is valid and the two VMIDs match, filtering is applied to the incoming request.	RW	16'h0000
0	valid	Register valid 1'b1: Register is enabled 1'b0: Register is not enabled	RW	1'b0

por_dn_vmf0_rnf0

Contains the logical RN-F bit vector 63:0 corresponding to por_dn_vmf0_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC08

Register reset 64'b0

Usage constraints Only accessible by Secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

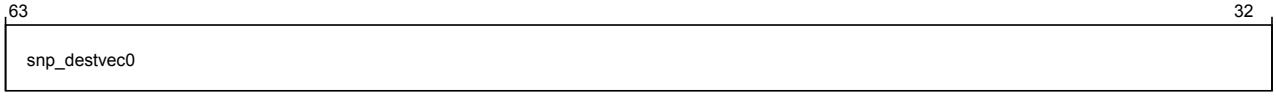

Figure 3-99 por_dn_vmf0_rnf0 (high)

The following table shows the por_dn_vmf0_rnf0 higher register bit assignments.

Table 3-113 por_dn_vmf0_rnf0 (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf0_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

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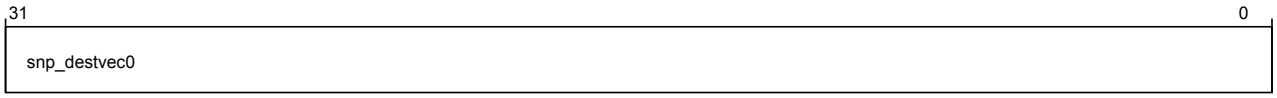

Figure 3-100 por_dn_vmf0_rnf0 (low)

The following table shows the por_dn_vmf0_rnf0 lower register bit assignments.

Table 3-114 por_dn_vmf0_rnf0 (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf0_ctrl.vmid	RW	64'b0

por_dn_vmf0_rnd

Contains the logical RN-D bit vector 63:0 corresponding to por_dn_vmf0_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC10

Register reset 64'b0

Usage constraints Only accessible by Secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

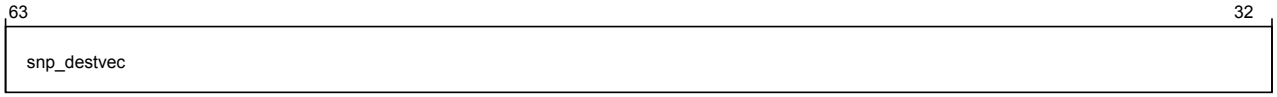

Figure 3-101 por_dn_vmf0_rnd (high)

The following table shows the por_dn_vmf0_rnd higher register bit assignments.

Table 3-115 por_dn_vmf0_rnd (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf0_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

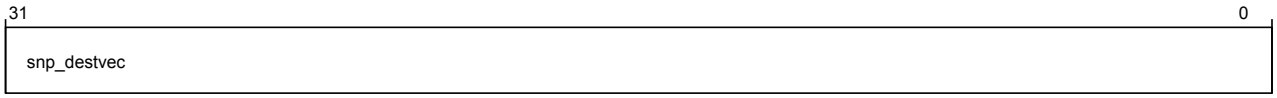

Figure 3-102 por_dn_vmf0_rnd (low)

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The following table shows the por_dn_vmf0_rnd lower register bit assignments.

Table 3-116 por_dn_vmf0_rnd (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf0_ctrl.vmid	RW	64'b0

por_dn_vmf0_cxra

Contains the logical CXRA bit vector 63:0 corresponding to por_dn_vmf0_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Note

Not applicable in a single-chip CMN-600 system. Does not have any effect.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC18

Register reset 64'b0

Usage constraints Only accessible by Secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

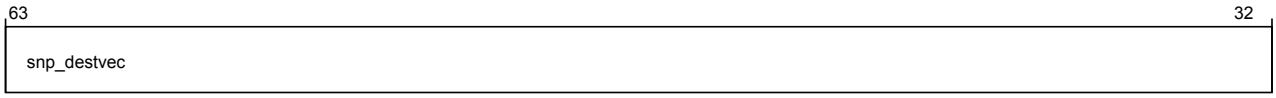

Figure 3-103 por_dn_vmf0_cxra (high)

The following table shows the por_dn_vmf0_cxra higher register bit assignments.

Table 3-117 por_dn_vmf0_cxra (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf0_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

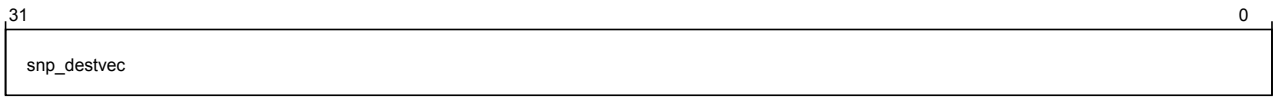

Figure 3-104 por_dn_vmf0_cxra (low)

The following table shows the por_dn_vmf0_cxra lower register bit assignments.

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Table 3-118 por_dn_vmf0_cxra (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf0_ctrl.vmid	RW	64'b0

por_dn_vmf1_ctrl

Functions as the control register for VMID-based DVM snoop filtering.

Note

This register has no effect when por_dn_aux_ctl.disable_vmf is set to 1.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC20

Register reset 64'b1111111111111111000000000000000000

Usage constraints Only accessible by Secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

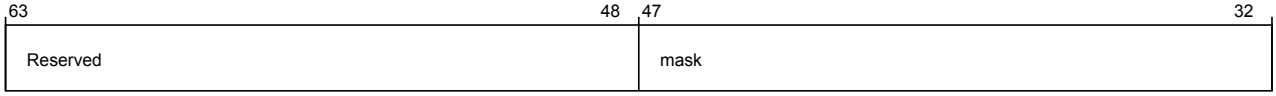

Figure 3-105 por_dn_vmf1_ctrl (high)

The following table shows the por_dn_vmf1_ctrl higher register bit assignments.

Table 3-119 por_dn_vmf1_ctrl (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	mask	VMID mask; enables mapping of multiple VMID values to a single register **Note** Logically, the AND operator is performed on the mask and por_dn_vmf1_ctrl.vmid. Then, the AND operator is performed on the mask and the incoming request's VMID. The two results are then compared, and filtering is applied to the incoming request if the masked VMIDs match.	RW	16'hffff

The following image shows the lower register bit assignments.

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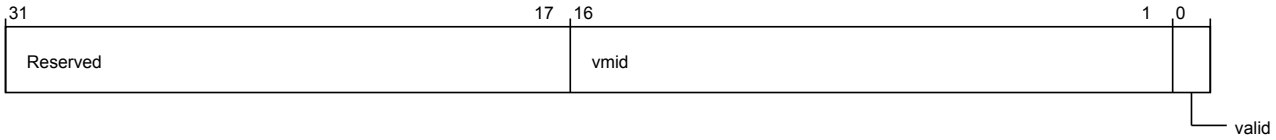

Figure 3-106 por_dn_vmf1_ctrl (low)

The following table shows the por_dn_vmf1_ctrl lower register bit assignments.

Table 3-120 por_dn_vmf1_ctrl (low)

Bits	Field name	Description	Type	Reset
31:17	Reserved	Reserved	RO	-
16:1	vmid	VMID value **Note** The incoming request's VMID is only compared with this VMID value if the request's VMID valid bit is set. If the request's VMID is valid and the two VMIDs match, filtering is applied to the incoming request.	RW	16'h0000
0	valid	Register valid 1'b1: Register is enabled 1'b0: Register is not enabled	RW	1'b0

por_dn_vmf1_rnf0

Contains the logical RN-F bit vector 63:0 corresponding to por_dn_vmf1_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC28

Register reset 64'b0

Usage constraints Only accessible by Secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

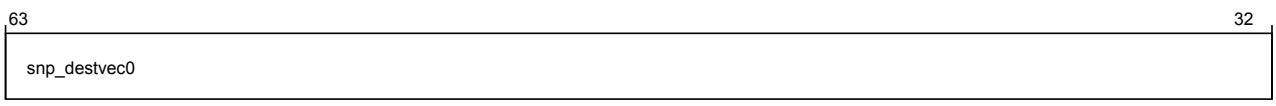

Figure 3-107 por_dn_vmf1_rnf0 (high)

The following table shows the por_dn_vmf1_rnf0 higher register bit assignments.

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Table 3-121 por_dn_vmf1_rnf0 (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf1_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

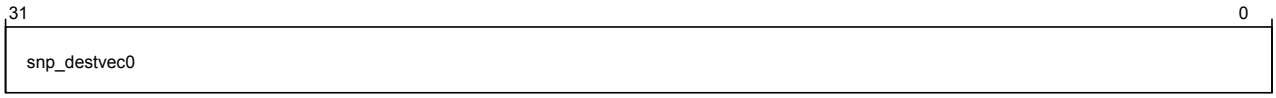

Figure 3-108 por_dn_vmf1_rnf0 (low)

The following table shows the por_dn_vmf1_rnf0 lower register bit assignments.

Table 3-122 por_dn_vmf1_rnf0 (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf1_ctrl.vmid	RW	64'b0

por_dn_vmf1_rnd

Contains the logical RN-D bit vector 63:0 corresponding to por_dn_vmf1_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC30

Register reset 64'b0

Usage constraints Only accessible by Secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

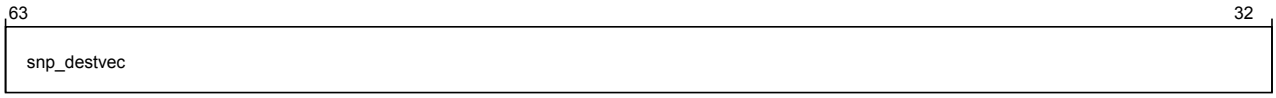

Figure 3-109 por_dn_vmf1_rnd (high)

The following table shows the por_dn_vmf1_rnd higher register bit assignments.

Table 3-123 por_dn_vmf1_rnd (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf1_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

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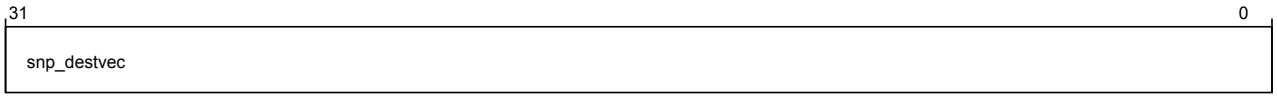

Figure 3-110 por_dn_vmf1_rnd (low)

The following table shows the por_dn_vmf1_rnd lower register bit assignments.

Table 3-124 por_dn_vmf1_rnd (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf1_ctrl.vmid	RW	64'b0

por_dn_vmf1_cxra

Contains the logical CXRA bit vector 63:0 corresponding to por_dn_vmf1_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Note

Not applicable in a single-chip CMN-600 system. Does not have any effect.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC38

Register reset 64'b0

Usage constraints Only accessible by Secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

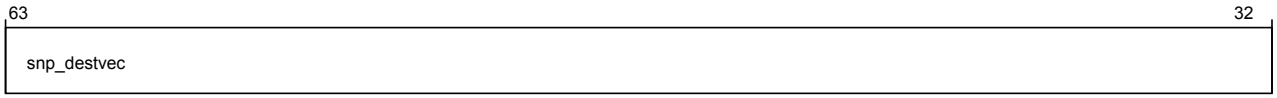

Figure 3-111 por_dn_vmf1_cxra (high)

The following table shows the por_dn_vmf1_cxra higher register bit assignments.

Table 3-125 por_dn_vmf1_cxra (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf1_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

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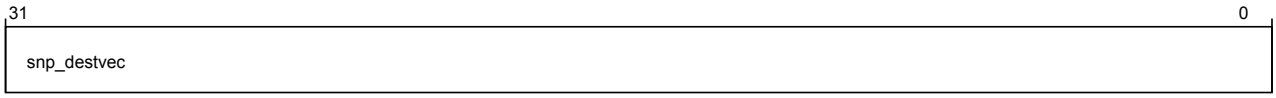

Figure 3-112 por_dn_vmf1_cxra (low)

The following table shows the por_dn_vmf1_cxra lower register bit assignments.

Table 3-126 por_dn_vmf1_cxra (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf1_ctrl.vmid	RW	64'b0

por_dn_vmf2_ctrl

Functions as the control register for VMID-based DVM snoop filtering.

Note

This register has no effect when por_dn_aux_ctl.disable_vmf is set to 1.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC40

Register reset 64'b1111111111111111000000000000000000

Usage constraints Only accessible by Secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

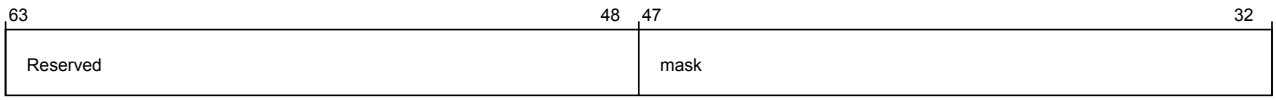

Figure 3-113 por_dn_vmf2_ctrl (high)

The following table shows the por_dn_vmf2_ctrl higher register bit assignments.

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Table 3-127 por_dn_vmf2_ctrl (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	mask	VMID mask; enables mapping of multiple VMID values to a single register **Note** Logically, the AND operator is performed on the mask and por_dn_vmf2_ctrl.vmid. Then, the AND operator is performed on the mask and the incoming request's VMID. The two results are then compared, and filtering is applied to the incoming request if the masked VMIDs match.	RW	16'hffff

The following image shows the lower register bit assignments.

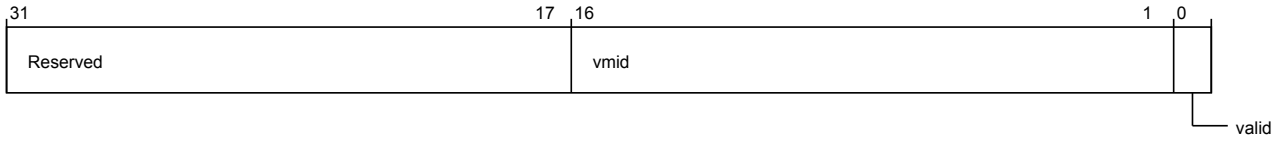

Figure 3-114 por_dn_vmf2_ctrl (low)

The following table shows the por_dn_vmf2_ctrl lower register bit assignments.

Table 3-128 por_dn_vmf2_ctrl (low)

Bits	Field name	Description	Type	Reset
31:17	Reserved	Reserved	RO	-
16:1	vmid	VMID value **Note** The incoming request's VMID is only compared with this VMID value if the request's VMID valid bit is set. If the request's VMID is valid and the two VMIDs match, filtering is applied to the incoming request.	RW	16'h0000
0	valid	Register valid 1'b1: Register is enabled 1'b0: Register is not enabled	RW	1'b0

por_dn_vmf2_rnf0

Contains the logical RN-F bit vector 63:0 corresponding to por_dn_vmf2_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hC48
Register reset 64'b0

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Usage constraints Only accessible by Secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

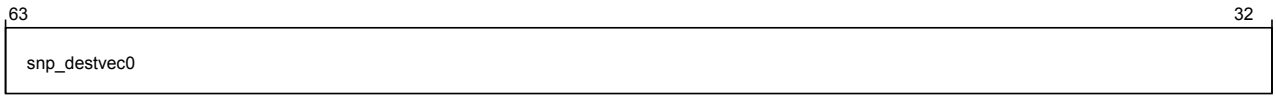

Figure 3-115 por_dn_vmf2_rnf0 (high)

The following table shows the por_dn_vmf2_rnf0 higher register bit assignments.

Table 3-129 por_dn_vmf2_rnf0 (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf2_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

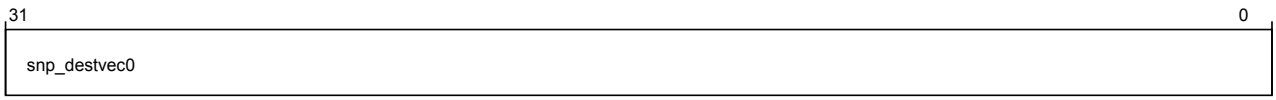

Figure 3-116 por_dn_vmf2_rnf0 (low)

The following table shows the por_dn_vmf2_rnf0 lower register bit assignments.

Table 3-130 por_dn_vmf2_rnf0 (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf2_ctrl.vmid	RW	64'b0

por_dn_vmf2_rnd

Contains the logical RN-D bit vector 63:0 corresponding to por_dn_vmf2_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC50

Register reset 64'b0

Usage constraints Only accessible by Secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

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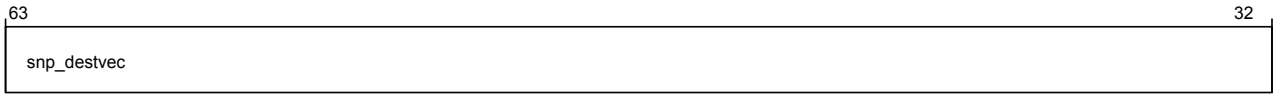

Figure 3-117 por_dn_vmf2_rnd (high)

The following table shows the por_dn_vmf2_rnd higher register bit assignments.

Table 3-131 por_dn_vmf2_rnd (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf2_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

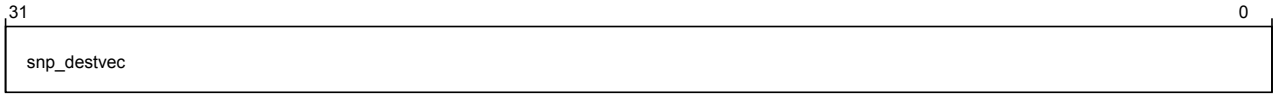

Figure 3-118 por_dn_vmf2_rnd (low)

The following table shows the por_dn_vmf2_rnd lower register bit assignments.

Table 3-132 por_dn_vmf2_rnd (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf2_ctrl.vmid	RW	64'b0

por_dn_vmf2_cxra

Contains the logical CXRA bit vector 63:0 corresponding to por_dn_vmf2_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Note

Not applicable in a single-chip CMN-600 system. Does not have any effect.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC58

Register reset 64'b0

Usage constraints Only accessible by Secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

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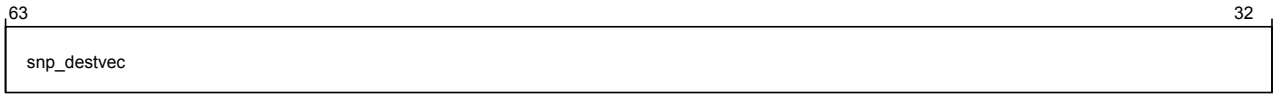

Figure 3-119 por_dn_vmf2_cxra (high)

The following table shows the por_dn_vmf2_cxra higher register bit assignments.

Table 3-133 por_dn_vmf2_cxra (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf2_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

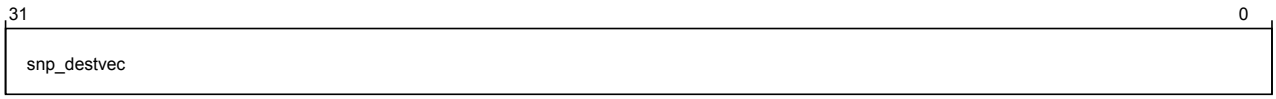

Figure 3-120 por_dn_vmf2_cxra (low)

The following table shows the por_dn_vmf2_cxra lower register bit assignments.

Table 3-134 por_dn_vmf2_cxra (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf2_ctrl.vmid	RW	64'b0

por_dn_vmf3_ctrl

Functions as the control register for VMID-based DVM snoop filtering.

Note

This register has no effect when por_dn_aux_ctl.disable_vmf is set to 1.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC60

Register reset 64'b1111111111111111000000000000000000

Usage constraints Only accessible by Secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

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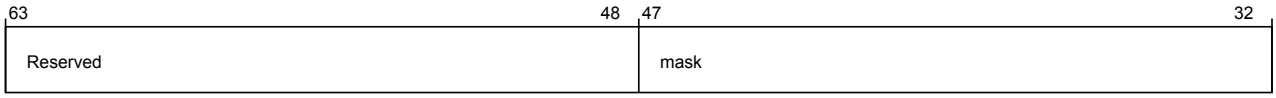

Figure 3-121 por_dn_vmf3_ctrl (high)

The following table shows the por_dn_vmf3_ctrl higher register bit assignments.

Table 3-135 por_dn_vmf3_ctrl (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	mask	VMID mask; enables mapping of multiple VMID values to a single register **Note** Logically, the AND operator is performed on the mask and por_dn_vmf3_ctrl.vmid. Then, the AND operator is performed on the mask and the incoming request's VMID. The two results are then compared, and filtering is applied to the incoming request if the masked VMIDs match.	RW	16'hffff

The following image shows the lower register bit assignments.

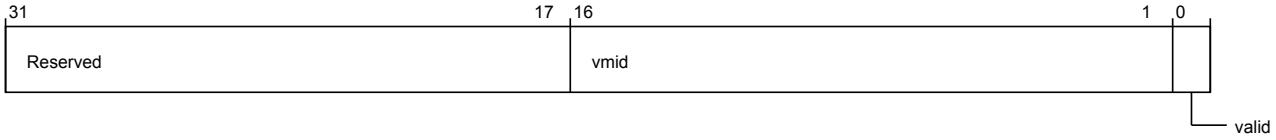

Figure 3-122 por_dn_vmf3_ctrl (low)

The following table shows the por_dn_vmf3_ctrl lower register bit assignments.

Table 3-136 por_dn_vmf3_ctrl (low)

Bits	Field name	Description	Type	Reset
31:17	Reserved	Reserved	RO	-
16:1	vmid	VMID value **Note** The incoming request's VMID is only compared with this VMID value if the request's VMID valid bit is set. If the request's VMID is valid and the two VMIDs match, filtering is applied to the incoming request.	RW	16'h0000
0	valid	Register valid 1'b1: Register is enabled 1'b0: Register is not enabled	RW	1'b0

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por_dn_vmf3_rnf0

Contains the logical RN-F bit vector 63:0 corresponding to por_dn_vmf3_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC68

Register reset 64'b0

Usage constraints Only accessible by Secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

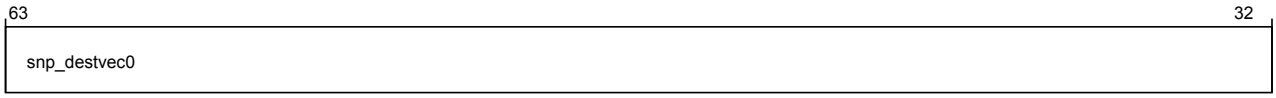

Figure 3-123 por_dn_vmf3_rnf0 (high)

The following table shows the por_dn_vmf3_rnf0 higher register bit assignments.

Table 3-137 por_dn_vmf3_rnf0 (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf3_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

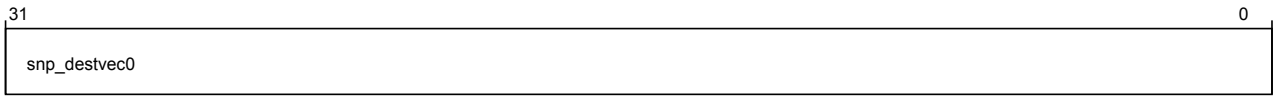

Figure 3-124 por_dn_vmf3_rnf0 (low)

The following table shows the por_dn_vmf3_rnf0 lower register bit assignments.

Table 3-138 por_dn_vmf3_rnf0 (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf3_ctrl.vmid	RW	64'b0

por_dn_vmf3_rnd

Contains the logical RN-D bit vector 63:0 corresponding to por_dn_vmf3_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW

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Register width (Bits) 64

Address offset 14'hC70

Register reset 64'b0

Usage constraints Only accessible by Secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

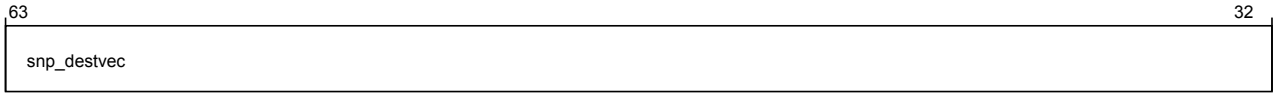

Figure 3-125 por_dn_vmf3_rnd (high)

The following table shows the por_dn_vmf3_rnd higher register bit assignments.

Table 3-139 por_dn_vmf3_rnd (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf3_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

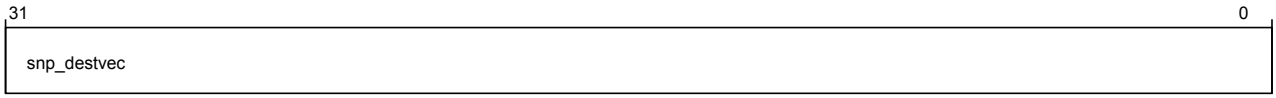

Figure 3-126 por_dn_vmf3_rnd (low)

The following table shows the por_dn_vmf3_rnd lower register bit assignments.

Table 3-140 por_dn_vmf3_rnd (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf3_ctrl.vmid	RW	64'b0

por_dn_vmf3_cxra

Contains the logical CXRA bit vector 63:0 corresponding to por_dn_vmf3_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Note

Not applicable in a single-chip CMN-600 system. Does not have any effect.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC78

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Register reset 64'b0

Usage constraints Only accessible by Secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

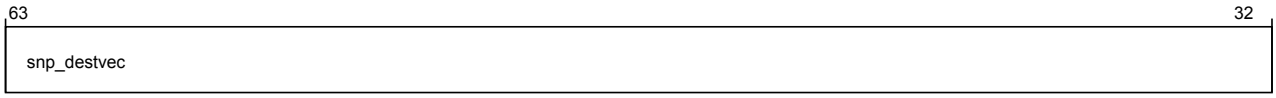

Figure 3-127 por_dn_vmf3_cxra (high)

The following table shows the por_dn_vmf3_cxra higher register bit assignments.

Table 3-141 por_dn_vmf3_cxra (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf3_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

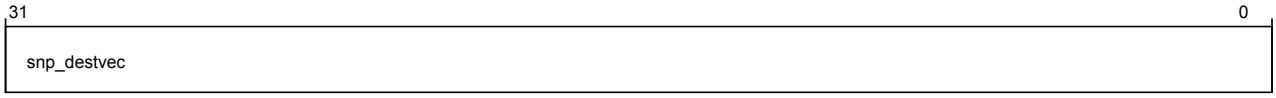

Figure 3-128 por_dn_vmf3_cxra (low)

The following table shows the por_dn_vmf3_cxra lower register bit assignments.

Table 3-142 por_dn_vmf3_cxra (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf3_ctrl.vmid	RW	64'b0

por_dn_vmf4_ctrl

Functions as the control register for VMID-based DVM snoop filtering.

——— **Note** ———

This register has no effect when por_dn_aux_ctl.disable_vmf is set to 1.

———————————

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC80

Register reset 64'b1111111111111111000000000000000000

Usage constraints Only accessible by Secure accesses.

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Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

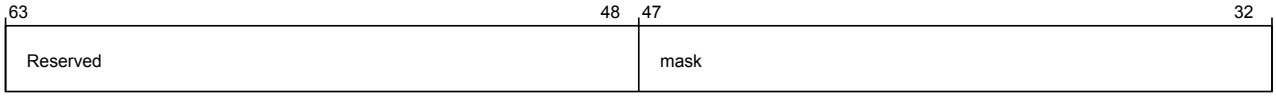

Figure 3-129 por_dn_vmf4_ctrl (high)

The following table shows the por_dn_vmf4_ctrl higher register bit assignments.

Table 3-143 por_dn_vmf4_ctrl (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	mask	VMID mask; enables mapping of multiple VMID values to a single register **Note** Logically, the AND operator is performed on the mask and por_dn_vmf4_ctrl.vmid. Then, the AND operator is performed on the mask and the incoming request's VMID. The two results are then compared, and filtering is applied to the incoming request if the masked VMIDs match.	RW	16'hffff

The following image shows the lower register bit assignments.

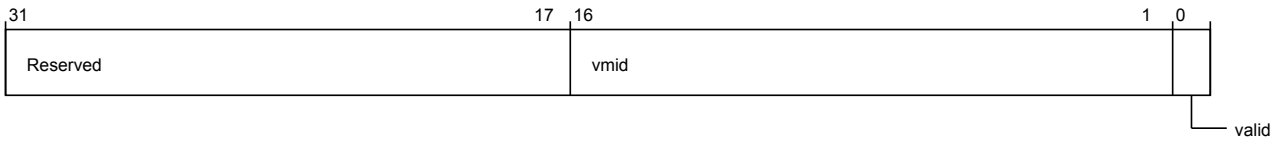

Figure 3-130 por_dn_vmf4_ctrl (low)

The following table shows the por_dn_vmf4_ctrl lower register bit assignments.

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Table 3-144 por_dn_vmf4_ctrl (low)

Bits	Field name	Description	Type	Reset
31:17	Reserved	Reserved	RO	-
16:1	vmid	VMID value **Note** The incoming request's VMID is only compared with this VMID value if the request's VMID valid bit is set. If the request's VMID is valid and the two VMIDs match, filtering is applied to the incoming request.	RW	16'h0000
0	valid	Register valid 1'b1: Register is enabled 1'b0: Register is not enabled	RW	1'b0

por_dn_vmf4_rnf0

Contains the logical RN-F bit vector 63:0 corresponding to por_dn_vmf4_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC88

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

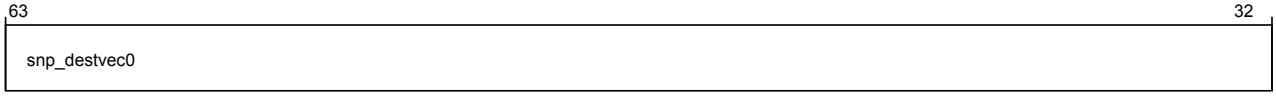

Figure 3-131 por_dn_vmf4_rnf0 (high)

The following table shows the por_dn_vmf4_rnf0 higher register bit assignments.

Table 3-145 por_dn_vmf4_rnf0 (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf4_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

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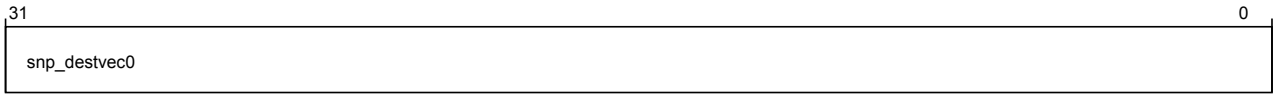

Figure 3-132 por_dn_vmf4_rnf0 (low)

The following table shows the por_dn_vmf4_rnf0 lower register bit assignments.

Table 3-146 por_dn_vmf4_rnf0 (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf4_ctrl.vmid	RW	64'b0

por_dn_vmf4_rnd

Contains the logical RN-D bit vector 63:0 corresponding to por_dn_vmf4_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC90

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

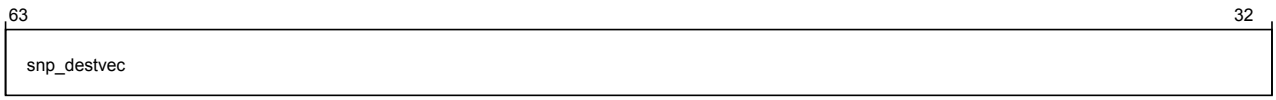

Figure 3-133 por_dn_vmf4_rnd (high)

The following table shows the por_dn_vmf4_rnd higher register bit assignments.

Table 3-147 por_dn_vmf4_rnd (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf4_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

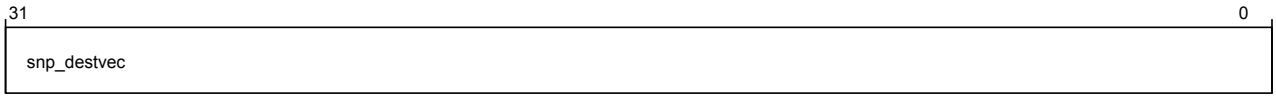

Figure 3-134 por_dn_vmf4_rnd (low)

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The following table shows the por_dn_vmf4_rnd lower register bit assignments.

Table 3-148 por_dn_vmf4_rnd (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf4_ctrl.vmid	RW	64'b0

por_dn_vmf4_cxra

Contains the logical CXRA bit vector 63:0 corresponding to por_dn_vmf4_ctrl.vmid. Used for VMID-based DVM snoop filtering. NOTE: Not applicable in a single-chip CMN-600 system. Does not have any effect.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC98

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

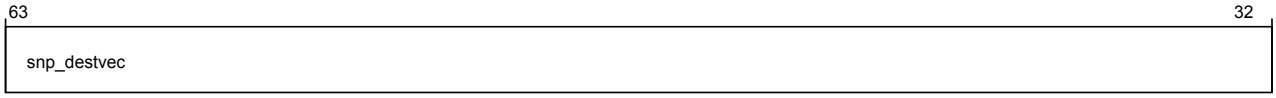

Figure 3-135 por_dn_vmf4_cxra (high)

The following table shows the por_dn_vmf4_cxra higher register bit assignments.

Table 3-149 por_dn_vmf4_cxra (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf4_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

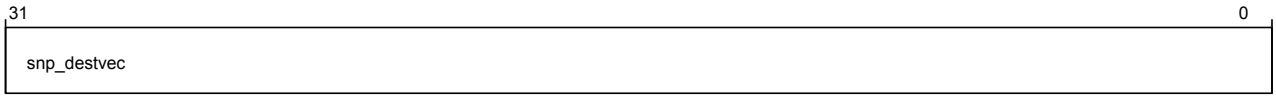

Figure 3-136 por_dn_vmf4_cxra (low)

The following table shows the por_dn_vmf4_cxra lower register bit assignments.

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Table 3-150 por_dn_vmf4_cxra (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf4_ctrl.vmid	RW	64'b0

por_dn_vmf5_ctrl

Functions as the control register for VMID-based DVM snoop filtering. NOTE: This register has no effect when por_dn_aux_ctl.disable_vmf is set to 1.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hCA0

Register reset 64'b1111111111111111000000000000000000

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

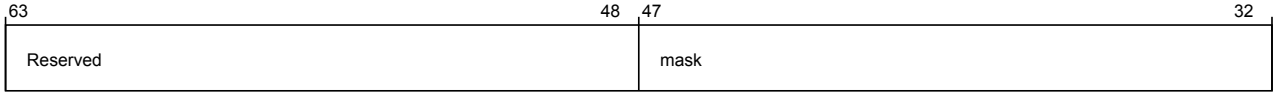

Figure 3-137 por_dn_vmf5_ctrl (high)

The following table shows the por_dn_vmf5_ctrl higher register bit assignments.

Table 3-151 por_dn_vmf5_ctrl (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	mask	VMID mask; enables mapping of multiple VMID values to a single register ——— **Note** ——— Logically, the AND operator is performed on the mask and por_dn_vmf5_ctrl.vmid. Then, the AND operator is performed on the mask and the incoming request's VMID. The two results are then compared, and filtering is applied to the incoming request if the masked VMIDs match. ———	RW	16'hffff

The following image shows the lower register bit assignments.

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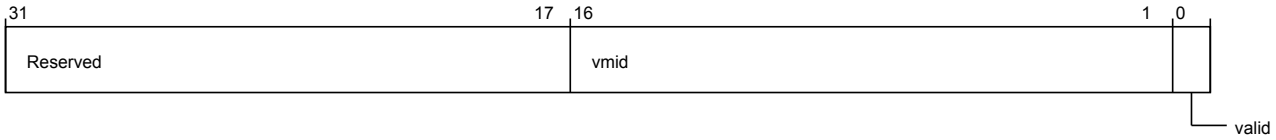

Figure 3-138 por_dn_vmf5_ctrl (low)

The following table shows the por_dn_vmf5_ctrl lower register bit assignments.

Table 3-152 por_dn_vmf5_ctrl (low)

Bits	Field name	Description	Type	Reset
31:17	Reserved	Reserved	RO	-
16:1	vmid	VMID value **Note** The incoming request's VMID is only compared with this VMID value if the request's VMID valid bit is set. If the request's VMID is valid and the two VMIDs match, filtering is applied to the incoming request.	RW	16'h0000
0	valid	Register valid 1'b1: Register is enabled 1'b0: Register is not enabled	RW	1'b0

por_dn_vmf5_rnf0

Contains the logical RN-F bit vector 63:0 corresponding to por_dn_vmf5_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hCA8

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

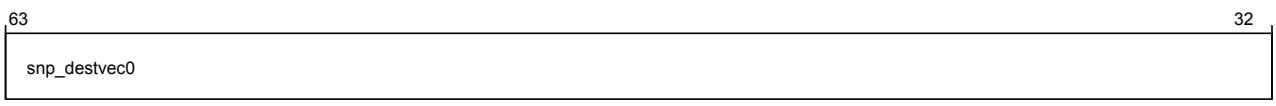

Figure 3-139 por_dn_vmf5_rnf0 (high)

The following table shows the por_dn_vmf5_rnf0 higher register bit assignments.

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Table 3-153 por_dn_vmf5_rnf0 (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf5_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

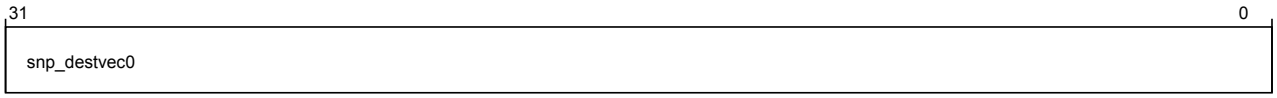

Figure 3-140 por_dn_vmf5_rnf0 (low)

The following table shows the por_dn_vmf5_rnf0 lower register bit assignments.

Table 3-154 por_dn_vmf5_rnf0 (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf5_ctrl.vmid	RW	64'b0

por_dn_vmf5_rnd

Contains the logical RN-D bit vector 63:0 corresponding to por_dn_vmf5_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hCB0

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

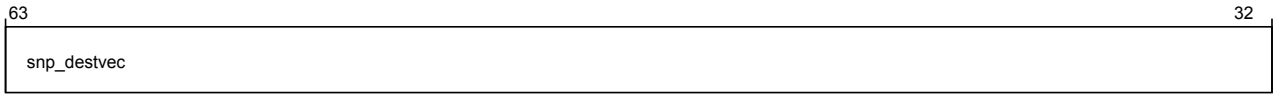

Figure 3-141 por_dn_vmf5_rnd (high)

The following table shows the por_dn_vmf5_rnd higher register bit assignments.

Table 3-155 por_dn_vmf5_rnd (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf5_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

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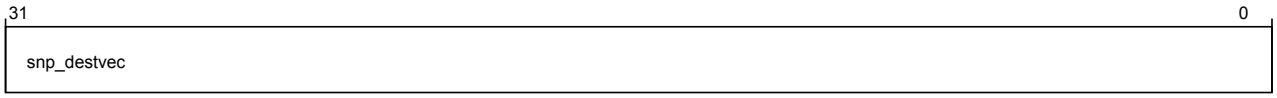

Figure 3-142 por_dn_vmf5_rnd (low)

The following table shows the por_dn_vmf5_rnd lower register bit assignments.

Table 3-156 por_dn_vmf5_rnd (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf5_ctrl.vmid	RW	64'b0

por_dn_vmf5_cxra

Contains the logical CXRA bit vector 63:0 corresponding to por_dn_vmf5_ctrl.vmid. Used for VMID-based DVM snoop filtering. NOTE: Not applicable in a single-chip CMN-600 system. Does not have any effect.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hCB8

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

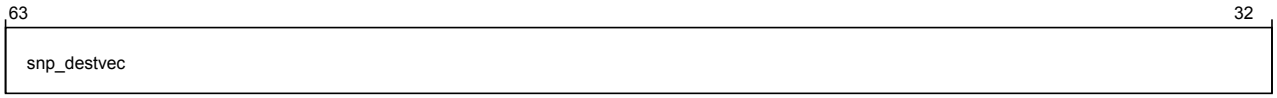

Figure 3-143 por_dn_vmf5_cxra (high)

The following table shows the por_dn_vmf5_cxra higher register bit assignments.

Table 3-157 por_dn_vmf5_cxra (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf5_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

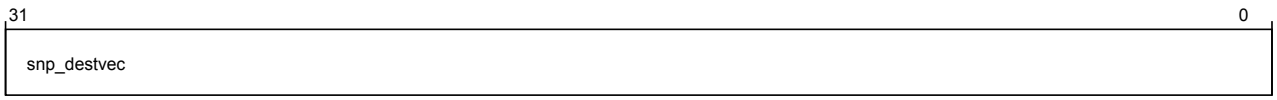

Figure 3-144 por_dn_vmf5_cxra (low)

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The following table shows the por_dn_vmf5_cxra lower register bit assignments.

Table 3-158 por_dn_vmf5_cxra (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf5_ctrl.vmid	RW	64'b0

por_dn_vmf6_ctrl

Functions as the control register for VMID-based DVM snoop filtering. NOTE: This register has no effect when por_dn_aux_ctl.disable_vmf is set to 1.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hCC0

Register reset 64'b1111111111111111000000000000000000

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

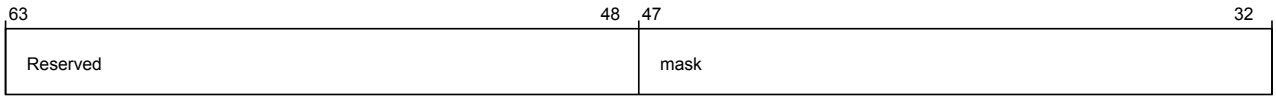

Figure 3-145 por_dn_vmf6_ctrl (high)

The following table shows the por_dn_vmf6_ctrl higher register bit assignments.

Table 3-159 por_dn_vmf6_ctrl (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	mask	VMID mask; enables mapping of multiple VMID values to a single register ——— **Note** ——— Logically, the AND operator is performed on the mask and por_dn_vmf6_ctrl.vmid. Then, the AND operator is performed on the mask and the incoming request's VMID. The two results are then compared, and filtering is applied to the incoming request if the masked VMIDs match. ———	RW	16'hffff

The following image shows the lower register bit assignments.

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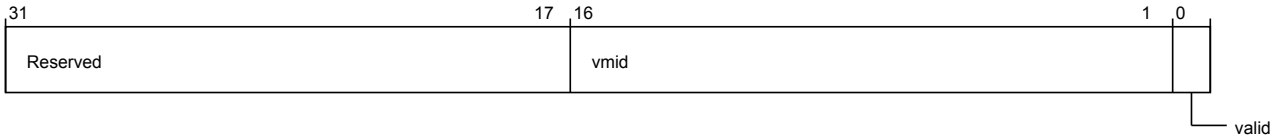

Figure 3-146 por_dn_vmf6_ctrl (low)

The following table shows the por_dn_vmf6_ctrl lower register bit assignments.

Table 3-160 por_dn_vmf6_ctrl (low)

Bits	Field name	Description	Type	Reset
31:17	Reserved	Reserved	RO	-
16:1	vmid	VMID value **Note** The incoming request's VMID is only compared with this VMID value if the request's VMID valid bit is set. If the request's VMID is valid and the two VMIDs match, filtering is applied to the incoming request.	RW	16'h0000
0	valid	Register valid 1'b1: Register is enabled 1'b0: Register is not enabled	RW	1'b0

por_dn_vmf6_rnf0

Contains the logical RN-F bit vector 63:0 corresponding to por_dn_vmf6_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hCC8

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

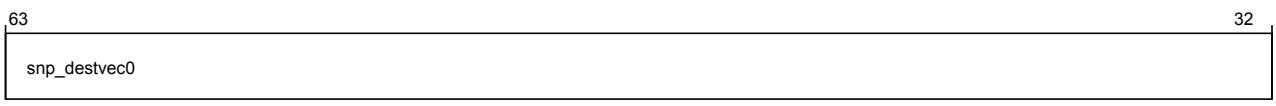

Figure 3-147 por_dn_vmf6_rnf0 (high)

The following table shows the por_dn_vmf6_rnf0 higher register bit assignments.

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Table 3-161 por_dn_vmf6_rnf0 (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf6_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

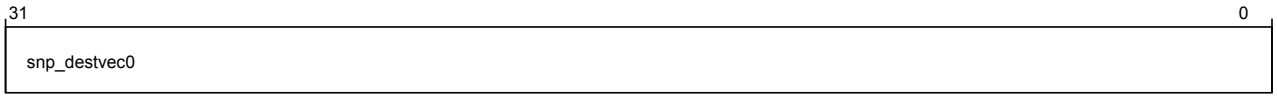

Figure 3-148 por_dn_vmf6_rnf0 (low)

The following table shows the por_dn_vmf6_rnf0 lower register bit assignments.

Table 3-162 por_dn_vmf6_rnf0 (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf6_ctrl.vmid	RW	64'b0

por_dn_vmf6_rnd

Contains the logical RN-D bit vector 63:0 corresponding to por_dn_vmf6_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hCD0

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

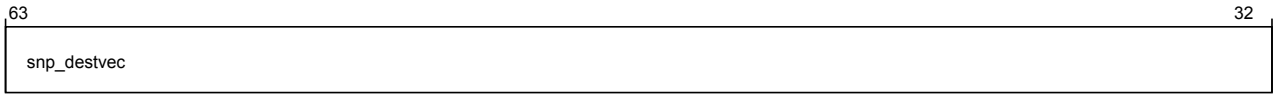

Figure 3-149 por_dn_vmf6_rnd (high)

The following table shows the por_dn_vmf6_rnd higher register bit assignments.

Table 3-163 por_dn_vmf6_rnd (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf6_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

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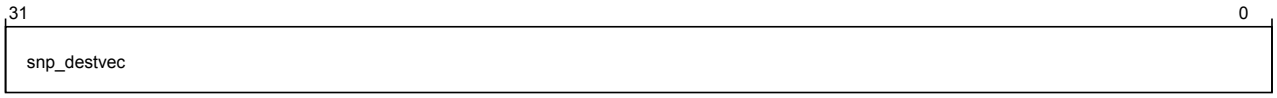

Figure 3-150 por_dn_vmf6_rnd (low)

The following table shows the por_dn_vmf6_rnd lower register bit assignments.

Table 3-164 por_dn_vmf6_rnd (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf6_ctrl.vmid	RW	64'b0

por_dn_vmf6_cxra

Contains the logical CXRA bit vector 63:0 corresponding to por_dn_vmf6_ctrl.vmid. Used for VMID-based DVM snoop filtering. NOTE: Not applicable in a single-chip CMN-600 system. Does not have any effect.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hCD8

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

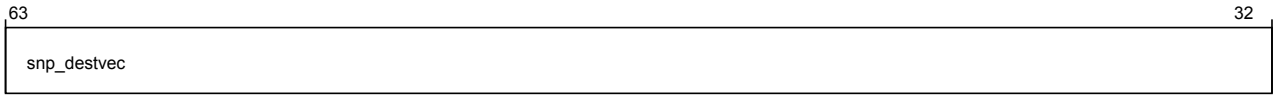

Figure 3-151 por_dn_vmf6_cxra (high)

The following table shows the por_dn_vmf6_cxra higher register bit assignments.

Table 3-165 por_dn_vmf6_cxra (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf6_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

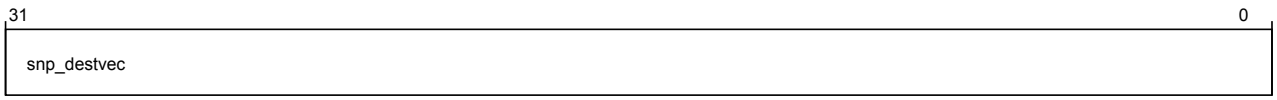

Figure 3-152 por_dn_vmf6_cxra (low)

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The following table shows the por_dn_vmf6_cxra lower register bit assignments.

Table 3-166 por_dn_vmf6_cxra (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf6_ctrl.vmid	RW	64'b0

por_dn_vmf7_ctrl

Functions as the control register for VMID-based DVM snoop filtering. NOTE: This register has no effect when por_dn_aux_ctl.disable_vmf is set to 1.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hCE0

Register reset 64'b1111111111111111000000000000000000

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

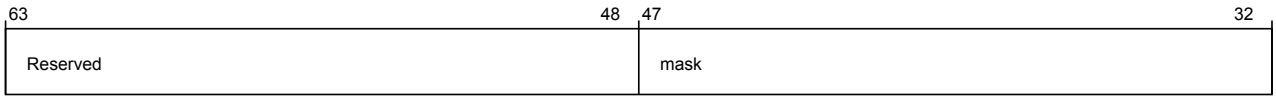

Figure 3-153 por_dn_vmf7_ctrl (high)

The following table shows the por_dn_vmf7_ctrl higher register bit assignments.

Table 3-167 por_dn_vmf7_ctrl (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	mask	VMID mask; enables mapping of multiple VMID values to a single register ——— **Note** ——— Logically, the AND operator is performed on the mask and por_dn_vmf7_ctrl.vmid. Then, the AND operator is performed on the mask and the incoming request's VMID. The two results are then compared, and filtering is applied to the incoming request if the masked VMIDs match. ———	RW	16'hffff

The following image shows the lower register bit assignments.

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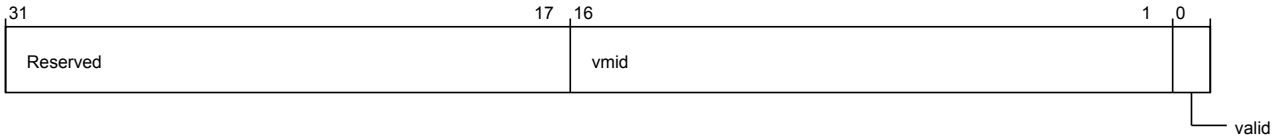

Figure 3-154 por_dn_vmf7_ctrl (low)

The following table shows the por_dn_vmf7_ctrl lower register bit assignments.

Table 3-168 por_dn_vmf7_ctrl (low)

Bits	Field name	Description	Type	Reset
31:17	Reserved	Reserved	RO	-
16:1	vmid	VMID value **Note** The incoming request's VMID is only compared with this VMID value if the request's VMID valid bit is set. If the request's VMID is valid and the two VMIDs match, filtering is applied to the incoming request.	RW	16'h0000
0	valid	Register valid 1'b1: Register is enabled 1'b0: Register is not enabled	RW	1'b0

por_dn_vmf7_rnf0

Contains the logical RN-F bit vector 63:0 corresponding to por_dn_vmf7_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hCE8

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

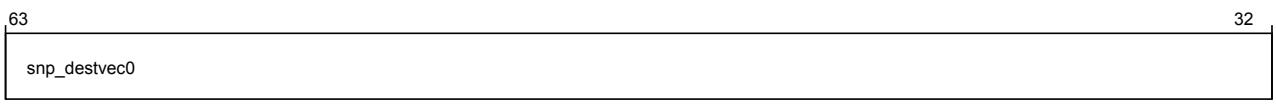

Figure 3-155 por_dn_vmf7_rnf0 (high)

The following table shows the por_dn_vmf7_rnf0 higher register bit assignments.

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Table 3-169 por_dn_vmf7_rnf0 (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf7_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

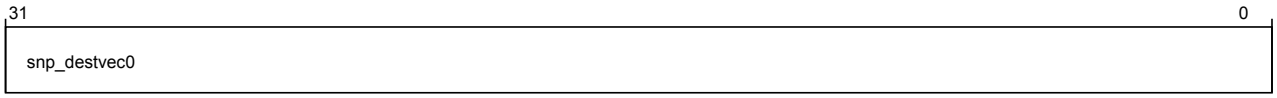

Figure 3-156 por_dn_vmf7_rnf0 (low)

The following table shows the por_dn_vmf7_rnf0 lower register bit assignments.

Table 3-170 por_dn_vmf7_rnf0 (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf7_ctrl.vmid	RW	64'b0

por_dn_vmf7_rnd

Contains the logical RN-D bit vector 63:0 corresponding to por_dn_vmf7_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hCF0

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

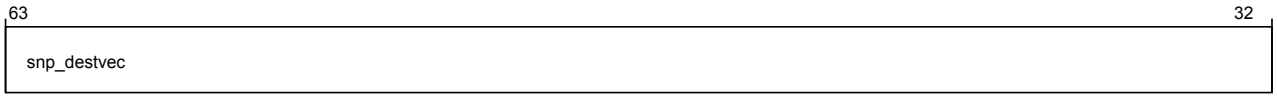

Figure 3-157 por_dn_vmf7_rnd (high)

The following table shows the por_dn_vmf7_rnd higher register bit assignments.

Table 3-171 por_dn_vmf7_rnd (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf7_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

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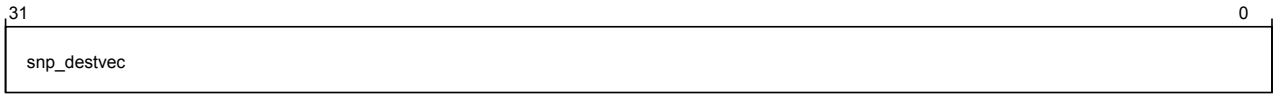

Figure 3-158 por_dn_vmf7_rnd (low)

The following table shows the por_dn_vmf7_rnd lower register bit assignments.

Table 3-172 por_dn_vmf7_rnd (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf7_ctrl.vmid	RW	64'b0

por_dn_vmf7_cxra

Contains the logical CXRA bit vector 63:0 corresponding to por_dn_vmf7_ctrl.vmid. Used for VMID-based DVM snoop filtering. NOTE: Not applicable in a single-chip CMN-600 system. Does not have any effect.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hCF8

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

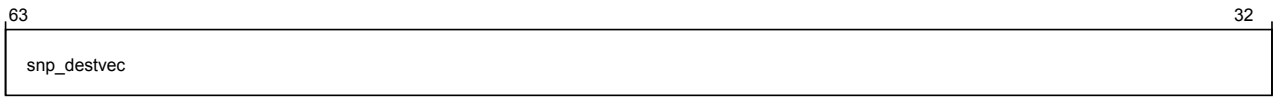

Figure 3-159 por_dn_vmf7_cxra (high)

The following table shows the por_dn_vmf7_cxra higher register bit assignments.

Table 3-173 por_dn_vmf7_cxra (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf7_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

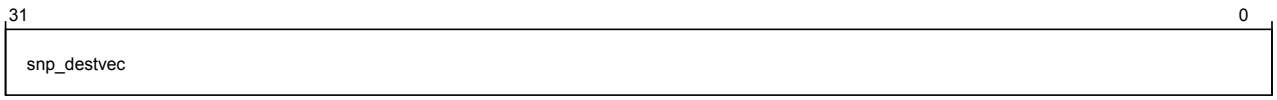

Figure 3-160 por_dn_vmf7_cxra (low)

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The following table shows the por_dn_vmf7_cxra lower register bit assignments.

Table 3-174 por_dn_vmf7_cxra (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf7_ctrl.vmid	RW	64'b0

por_dn_vmf8_ctrl

Functions as the control register for VMID-based DVM snoop filtering. NOTE: This register has no effect when por_dn_aux_ctl.disable_vmf is set to 1.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD00

Register reset 64'b1111111111111111000000000000000000

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

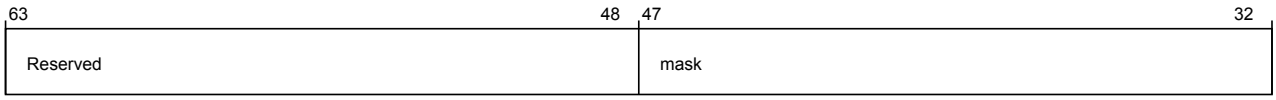

Figure 3-161 por_dn_vmf8_ctrl (high)

The following table shows the por_dn_vmf8_ctrl higher register bit assignments.

Table 3-175 por_dn_vmf8_ctrl (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	mask	VMID mask; enables mapping of multiple VMID values to a single register ——— **Note** ——— Logically, the AND operator is performed on the mask and por_dn_vmf8_ctrl.vmid. Then, the AND operator is performed on the mask and the incoming request's VMID. The two results are then compared, and filtering is applied to the incoming request if the masked VMIDs match. ———	RW	16'hffff

The following image shows the lower register bit assignments.

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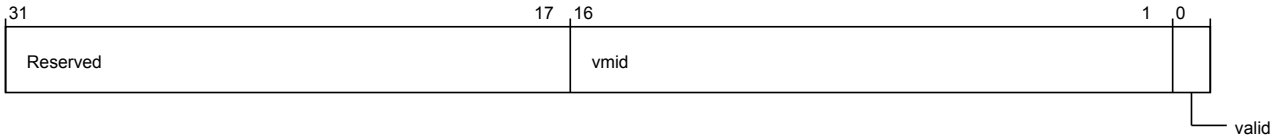

Figure 3-162 por_dn_vmf8_ctrl (low)

The following table shows the por_dn_vmf8_ctrl lower register bit assignments.

Table 3-176 por_dn_vmf8_ctrl (low)

Bits	Field name	Description	Type	Reset
31:17	Reserved	Reserved	RO	-
16:1	vmid	VMID value **Note** The incoming request's VMID is only compared with this VMID value if the request's VMID valid bit is set. If the request's VMID is valid and the two VMIDs match, filtering is applied to the incoming request.	RW	16'h0000
0	valid	Register valid 1'b1: Register is enabled 1'b0: Register is not enabled	RW	1'b0

por_dn_vmf8_rnf0

Contains the logical RN-F bit vector 63:0 corresponding to por_dn_vmf8_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD08

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

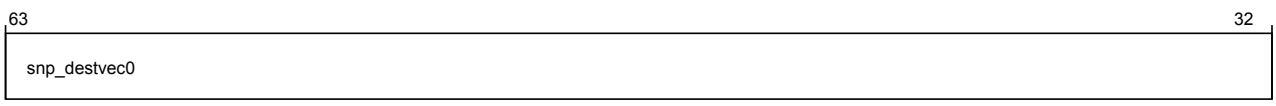

Figure 3-163 por_dn_vmf8_rnf0 (high)

The following table shows the por_dn_vmf8_rnf0 higher register bit assignments.

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Table 3-177 por_dn_vmf8_rnf0 (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf8_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

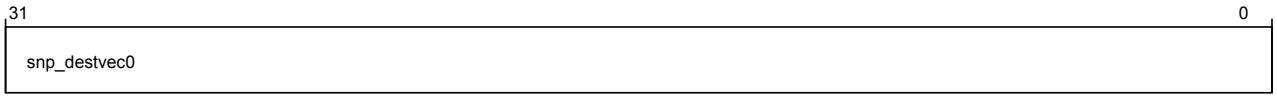

Figure 3-164 por_dn_vmf8_rnf0 (low)

The following table shows the por_dn_vmf8_rnf0 lower register bit assignments.

Table 3-178 por_dn_vmf8_rnf0 (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf8_ctrl.vmid	RW	64'b0

por_dn_vmf8_rnd

Contains the logical RN-D bit vector 63:0 corresponding to por_dn_vmf8_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD10

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

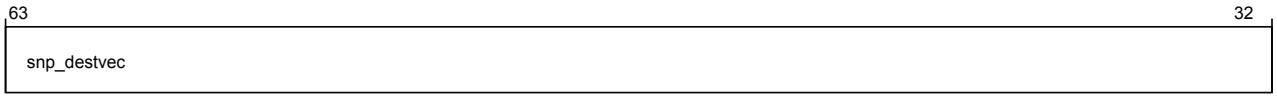

Figure 3-165 por_dn_vmf8_rnd (high)

The following table shows the por_dn_vmf8_rnd higher register bit assignments.

Table 3-179 por_dn_vmf8_rnd (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf8_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

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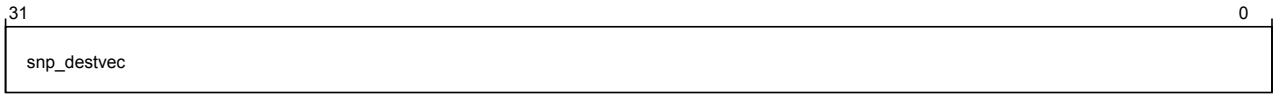

Figure 3-166 por_dn_vmf8_rnd (low)

The following table shows the por_dn_vmf8_rnd lower register bit assignments.

Table 3-180 por_dn_vmf8_rnd (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf8_ctrl.vmid	RW	64'b0

por_dn_vmf8_cxra

Contains the logical CXRA bit vector 63:0 corresponding to por_dn_vmf8_ctrl.vmid. Used for VMID-based DVM snoop filtering. NOTE: Not applicable in a single-chip CMN-600 system. Does not have any effect.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD18

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

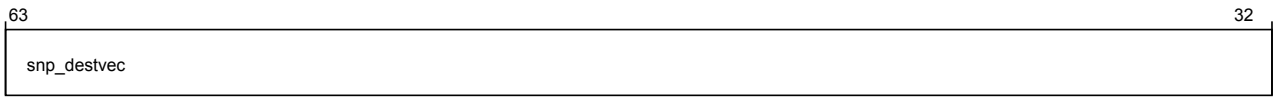

Figure 3-167 por_dn_vmf8_cxra (high)

The following table shows the por_dn_vmf8_cxra higher register bit assignments.

Table 3-181 por_dn_vmf8_cxra (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf8_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

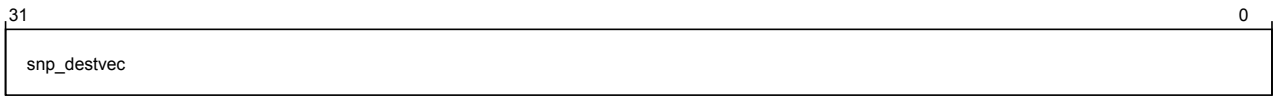

Figure 3-168 por_dn_vmf8_cxra (low)

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The following table shows the por_dn_vmf8_cxra lower register bit assignments.

Table 3-182 por_dn_vmf8_cxra (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf8_ctrl.vmid	RW	64'b0

por_dn_vmf9_ctrl

Functions as the control register for VMID-based DVM snoop filtering. NOTE: This register has no effect when por_dn_aux_ctl.disable_vmf is set to 1.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD20

Register reset 64'b1111111111111111000000000000000000

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

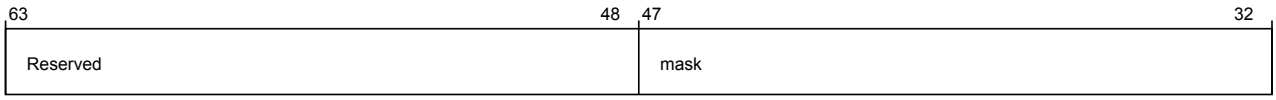

Figure 3-169 por_dn_vmf9_ctrl (high)

The following table shows the por_dn_vmf9_ctrl higher register bit assignments.

Table 3-183 por_dn_vmf9_ctrl (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	mask	VMID mask; enables mapping of multiple VMID values to a single register ——— **Note** ——— Logically, the AND operator is performed on the mask and por_dn_vmf9_ctrl.vmid. Then, the AND operator is performed on the mask and the incoming request's VMID. The two results are then compared, and filtering is applied to the incoming request if the masked VMIDs match. ———	RW	16'hffff

The following image shows the lower register bit assignments.

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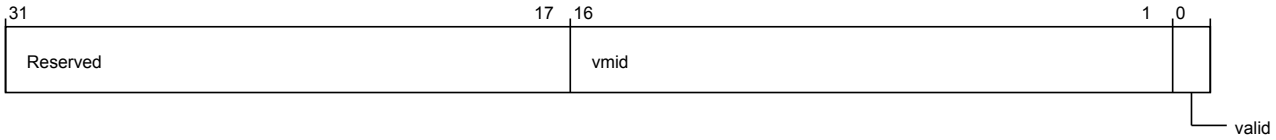

Figure 3-170 por_dn_vmf9_ctrl (low)

The following table shows the por_dn_vmf9_ctrl lower register bit assignments.

Table 3-184 por_dn_vmf9_ctrl (low)

Bits	Field name	Description	Type	Reset
31:17	Reserved	Reserved	RO	-
16:1	vmid	VMID value **Note** The incoming request's VMID is only compared with this VMID value if the request's VMID valid bit is set. If the request's VMID is valid and the two VMIDs match, filtering is applied to the incoming request.	RW	16'h0000
0	valid	Register valid 1'b1: Register is enabled 1'b0: Register is not enabled	RW	1'b0

por_dn_vmf9_rnf0

Contains the logical RN-F bit vector 63:0 corresponding to por_dn_vmf9_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD28

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

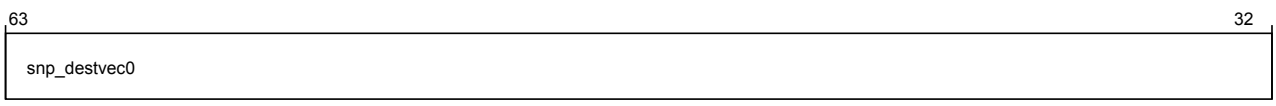

Figure 3-171 por_dn_vmf9_rnf0 (high)

The following table shows the por_dn_vmf9_rnf0 higher register bit assignments.

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Table 3-185 por_dn_vmf9_rnf0 (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf9_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

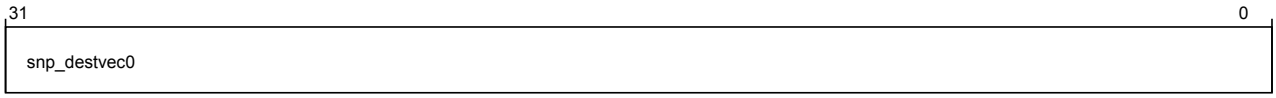

Figure 3-172 por_dn_vmf9_rnf0 (low)

The following table shows the por_dn_vmf9_rnf0 lower register bit assignments.

Table 3-186 por_dn_vmf9_rnf0 (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf9_ctrl.vmid	RW	64'b0

por_dn_vmf9_rnd

Contains the logical RN-D bit vector 63:0 corresponding to por_dn_vmf9_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD30

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

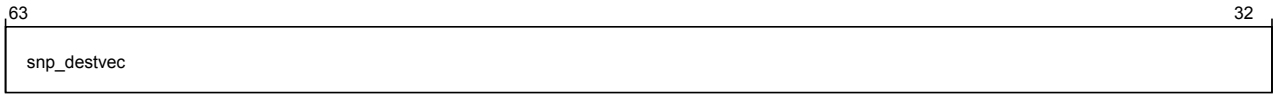

Figure 3-173 por_dn_vmf9_rnd (high)

The following table shows the por_dn_vmf9_rnd higher register bit assignments.

Table 3-187 por_dn_vmf9_rnd (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf9_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

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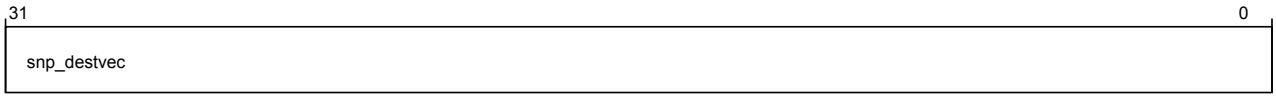

Figure 3-174 por_dn_vmf9_rnd (low)

The following table shows the por_dn_vmf9_rnd lower register bit assignments.

Table 3-188 por_dn_vmf9_rnd (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf9_ctrl.vmid	RW	64'b0

por_dn_vmf9_cxra

Contains the logical CXRA bit vector 63:0 corresponding to por_dn_vmf9_ctrl.vmid. Used for VMID-based DVM snoop filtering. NOTE: Not applicable in a single-chip CMN-600 system. Does not have any effect.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD38

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

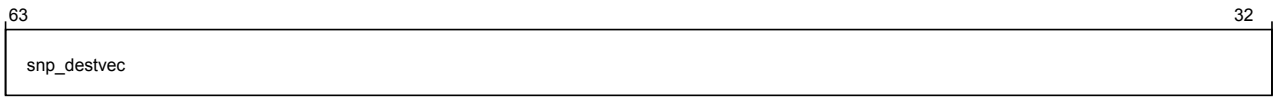

Figure 3-175 por_dn_vmf9_cxra (high)

The following table shows the por_dn_vmf9_cxra higher register bit assignments.

Table 3-189 por_dn_vmf9_cxra (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf9_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

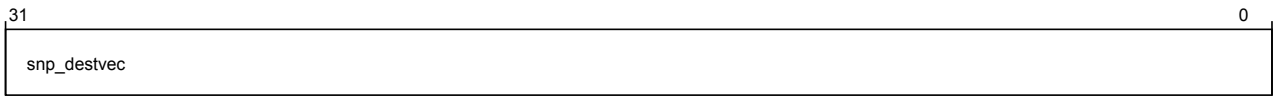

Figure 3-176 por_dn_vmf9_cxra (low)

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The following table shows the por_dn_vmf9_cxra lower register bit assignments.

Table 3-190 por_dn_vmf9_cxra (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf9_ctrl.vmid	RW	64'b0

por_dn_vmf10_ctrl

Functions as the control register for VMID-based DVM snoop filtering. NOTE: This register has no effect when por_dn_aux_ctl.disable_vmf is set to 1.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD40

Register reset 64'b1111111111111111000000000000000000

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

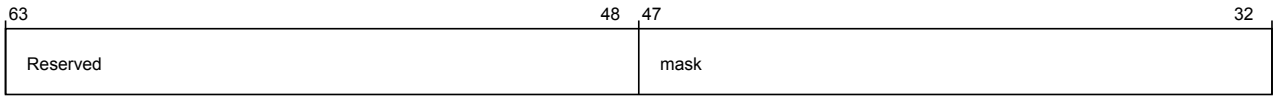

Figure 3-177 por_dn_vmf10_ctrl (high)

The following table shows the por_dn_vmf10_ctrl higher register bit assignments.

Table 3-191 por_dn_vmf10_ctrl (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	mask	VMID mask; enables mapping of multiple VMID values to a single register ——— **Note** ——— Logically, the AND operator is performed on the mask and por_dn_vmf10_ctrl.vmid. Then, the AND operator is performed on the mask and the incoming request's VMID. The two results are then compared, and filtering is applied to the incoming request if the masked VMIDs match. ———	RW	16'hffff

The following image shows the lower register bit assignments.

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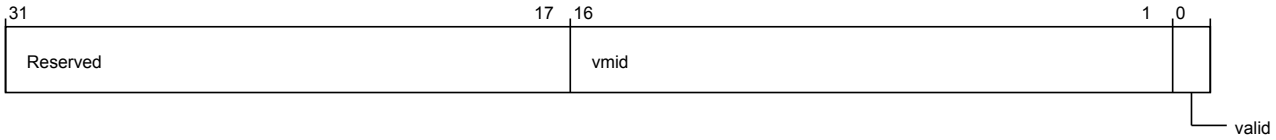

Figure 3-178 por_dn_vmf10_ctrl (low)

The following table shows the por_dn_vmf10_ctrl lower register bit assignments.

Table 3-192 por_dn_vmf10_ctrl (low)

Bits	Field name	Description	Type	Reset
31:17	Reserved	Reserved	RO	-
16:1	vmid	VMID value **Note** The incoming request's VMID is only compared with this VMID value if the request's VMID valid bit is set. If the request's VMID is valid and the two VMIDs match, filtering is applied to the incoming request.	RW	16'h0000
0	valid	Register valid 1'b1: Register is enabled 1'b0: Register is not enabled	RW	1'b0

por_dn_vmf10_rnf0

Contains the logical RN-F bit vector 63:0 corresponding to por_dn_vmf10_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD48

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

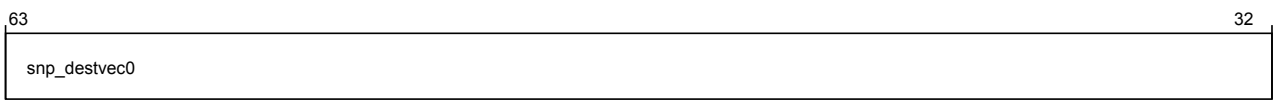

Figure 3-179 por_dn_vmf10_rnf0 (high)

The following table shows the por_dn_vmf10_rnf0 higher register bit assignments.

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Table 3-193 por_dn_vmf10_rnf0 (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf10_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

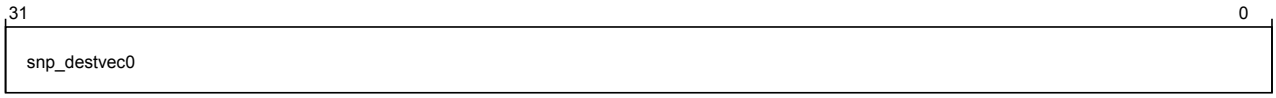

Figure 3-180 por_dn_vmf10_rnf0 (low)

The following table shows the por_dn_vmf10_rnf0 lower register bit assignments.

Table 3-194 por_dn_vmf10_rnf0 (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf10_ctrl.vmid	RW	64'b0

por_dn_vmf10_rnd

Contains the logical RN-D bit vector 63:0 corresponding to por_dn_vmf10_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD50

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

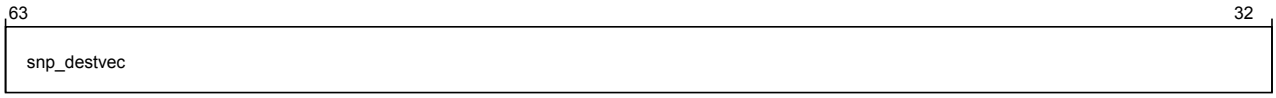

Figure 3-181 por_dn_vmf10_rnd (high)

The following table shows the por_dn_vmf10_rnd higher register bit assignments.

Table 3-195 por_dn_vmf10_rnd (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf10_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

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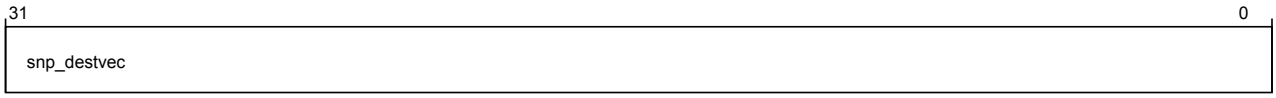

Figure 3-182 por_dn_vmf10_rnd (low)

The following table shows the por_dn_vmf10_rnd lower register bit assignments.

Table 3-196 por_dn_vmf10_rnd (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf10_ctrl.vmid	RW	64'b0

por_dn_vmf10_cxra

Contains the logical CXRA bit vector 63:0 corresponding to por_dn_vmf10_ctrl.vmid. Used for VMID-based DVM snoop filtering. NOTE: Not applicable in a single-chip CMN-600 system. Does not have any effect.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD58

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

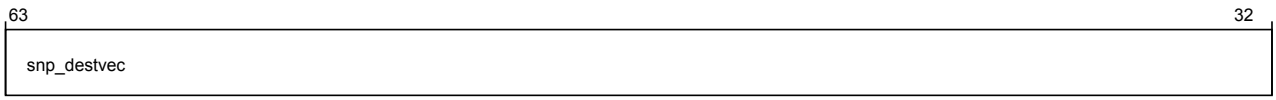

Figure 3-183 por_dn_vmf10_cxra (high)

The following table shows the por_dn_vmf10_cxra higher register bit assignments.

Table 3-197 por_dn_vmf10_cxra (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf10_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

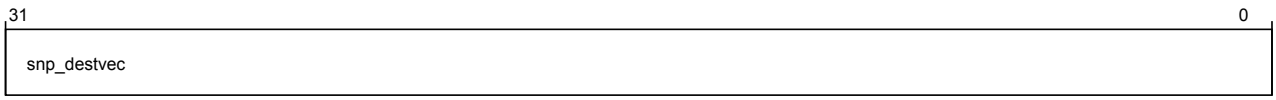

Figure 3-184 por_dn_vmf10_cxra (low)

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The following table shows the por_dn_vmf10_cxra lower register bit assignments.

Table 3-198 por_dn_vmf10_cxra (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf10_ctrl.vmid	RW	64'b0

por_dn_vmf11_ctrl

Functions as the control register for VMID-based DVM snoop filtering. NOTE: This register has no effect when por_dn_aux_ctl.disable_vmf is set to 1.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD60

Register reset 64'b1111111111111111000000000000000000

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

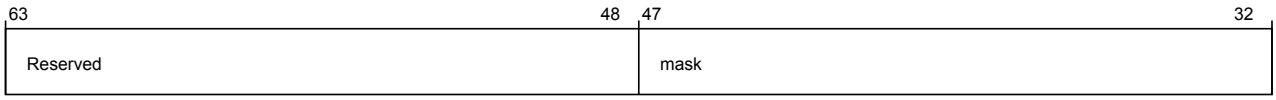

Figure 3-185 por_dn_vmf11_ctrl (high)

The following table shows the por_dn_vmf11_ctrl higher register bit assignments.

Table 3-199 por_dn_vmf11_ctrl (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	mask	VMID mask; enables mapping of multiple VMID values to a single register ——— **Note** ——— Logically, the AND operator is performed on the mask and por_dn_vmf11_ctrl.vmid. Then, the AND operator is performed on the mask and the incoming request's VMID. The two results are then compared, and filtering is applied to the incoming request if the masked VMIDs match. ———	RW	16'hffff

The following image shows the lower register bit assignments.

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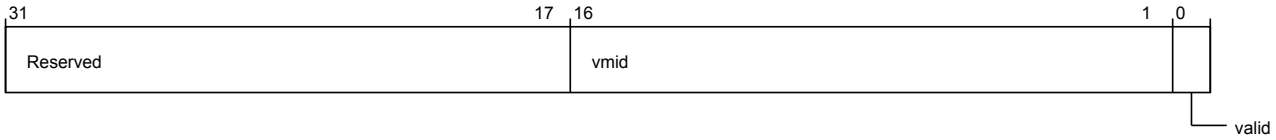

Figure 3-186 por_dn_vmf11_ctrl (low)

The following table shows the por_dn_vmf11_ctrl lower register bit assignments.

Table 3-200 por_dn_vmf11_ctrl (low)

Bits	Field name	Description	Type	Reset
31:17	Reserved	Reserved	RO	-
16:1	vmid	VMID value **Note** The incoming request's VMID is only compared with this VMID value if the request's VMID valid bit is set. If the request's VMID is valid and the two VMIDs match, filtering is applied to the incoming request.	RW	16'h0000
0	valid	Register valid 1'b1: Register is enabled 1'b0: Register is not enabled	RW	1'b0

por_dn_vmf11_rnf0

Contains the logical RN-F bit vector 63:0 corresponding to por_dn_vmf11_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD68

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

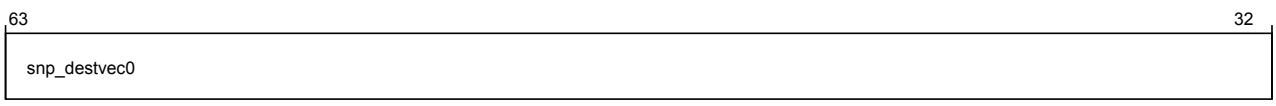

Figure 3-187 por_dn_vmf11_rnf0 (high)

The following table shows the por_dn_vmf11_rnf0 higher register bit assignments.

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Table 3-201 por_dn_vmf11_rnf0 (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf11_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

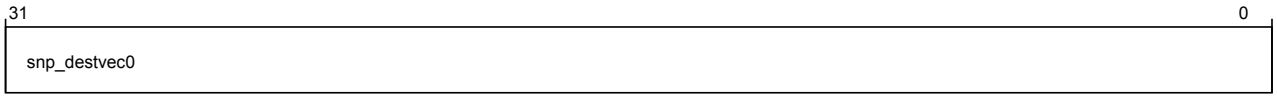

Figure 3-188 por_dn_vmf11_rnf0 (low)

The following table shows the por_dn_vmf11_rnf0 lower register bit assignments.

Table 3-202 por_dn_vmf11_rnf0 (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf11_ctrl.vmid	RW	64'b0

por_dn_vmf11_rnd

Contains the logical RN-D bit vector 63:0 corresponding to por_dn_vmf11_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD70

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

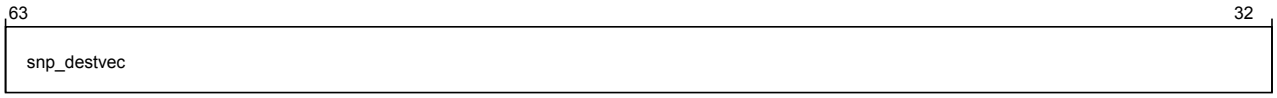

Figure 3-189 por_dn_vmf11_rnd (high)

The following table shows the por_dn_vmf11_rnd higher register bit assignments.

Table 3-203 por_dn_vmf11_rnd (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf11_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

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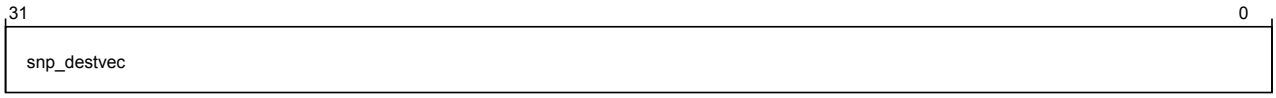

Figure 3-190 por_dn_vmf11_rnd (low)

The following table shows the por_dn_vmf11_rnd lower register bit assignments.

Table 3-204 por_dn_vmf11_rnd (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf11_ctrl.vmid	RW	64'b0

por_dn_vmf11_cxra

Contains the logical CXRA bit vector 63:0 corresponding to por_dn_vmf11_ctrl.vmid. Used for VMID-based DVM snoop filtering. NOTE: Not applicable in a single-chip CMN-600 system. Does not have any effect.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD78

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

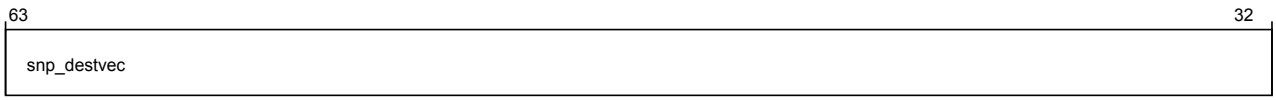

Figure 3-191 por_dn_vmf11_cxra (high)

The following table shows the por_dn_vmf11_cxra higher register bit assignments.

Table 3-205 por_dn_vmf11_cxra (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf11_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

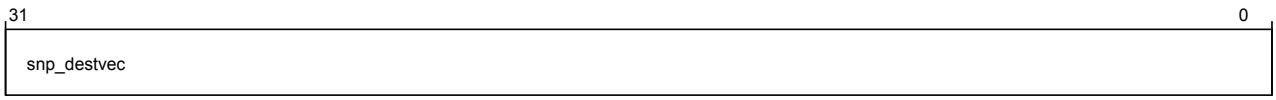

Figure 3-192 por_dn_vmf11_cxra (low)

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The following table shows the por_dn_vmf11_cxra lower register bit assignments.

Table 3-206 por_dn_vmf11_cxra (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf11_ctrl.vmid	RW	64'b0

por_dn_vmf12_ctrl

Functions as the control register for VMID-based DVM snoop filtering. NOTE: This register has no effect when por_dn_aux_ctl.disable_vmf is set to 1.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD80

Register reset 64'b1111111111111111000000000000000000

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

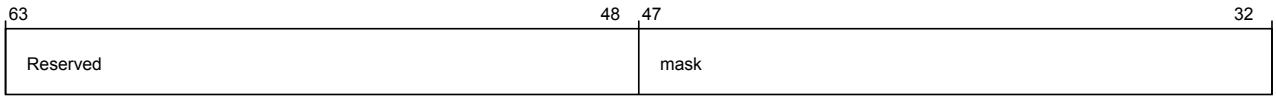

Figure 3-193 por_dn_vmf12_ctrl (high)

The following table shows the por_dn_vmf12_ctrl higher register bit assignments.

Table 3-207 por_dn_vmf12_ctrl (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	mask	VMID mask; enables mapping of multiple VMID values to a single register ——— **Note** ——— Logically, the AND operator is performed on the mask and por_dn_vmf12_ctrl.vmid. Then, the AND operator is performed on the mask and the incoming request's VMID. The two results are then compared, and filtering is applied to the incoming request if the masked VMIDs match. ———	RW	16'hffff

The following image shows the lower register bit assignments.

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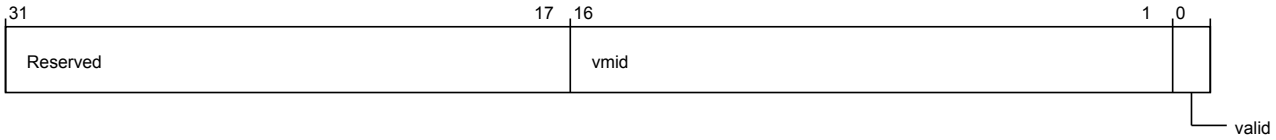

Figure 3-194 por_dn_vmf12_ctrl (low)

The following table shows the por_dn_vmf12_ctrl lower register bit assignments.

Table 3-208 por_dn_vmf12_ctrl (low)

Bits	Field name	Description	Type	Reset
31:17	Reserved	Reserved	RO	-
16:1	vmid	VMID value **Note** The incoming request's VMID is only compared with this VMID value if the request's VMID valid bit is set. If the request's VMID is valid and the two VMIDs match, filtering is applied to the incoming request.	RW	16'h0000
0	valid	Register valid 1'b1: Register is enabled 1'b0: Register is not enabled	RW	1'b0

por_dn_vmf12_rnf0

Contains the logical RN-F bit vector 63:0 corresponding to por_dn_vmf12_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD88

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

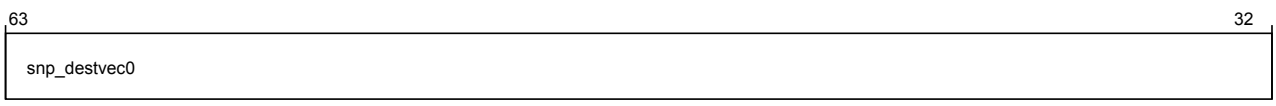

Figure 3-195 por_dn_vmf12_rnf0 (high)

The following table shows the por_dn_vmf12_rnf0 higher register bit assignments.

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Table 3-209 por_dn_vmf12_rnf0 (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf12_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

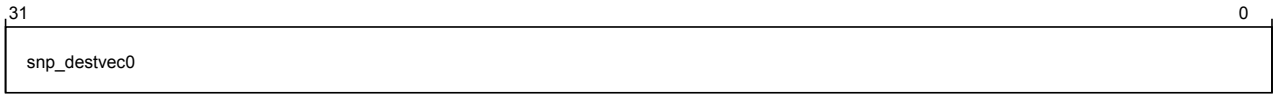

Figure 3-196 por_dn_vmf12_rnf0 (low)

The following table shows the por_dn_vmf12_rnf0 lower register bit assignments.

Table 3-210 por_dn_vmf12_rnf0 (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf12_ctrl.vmid	RW	64'b0

por_dn_vmf12_rnd

Contains the logical RN-D bit vector 63:0 corresponding to por_dn_vmf12_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD90

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

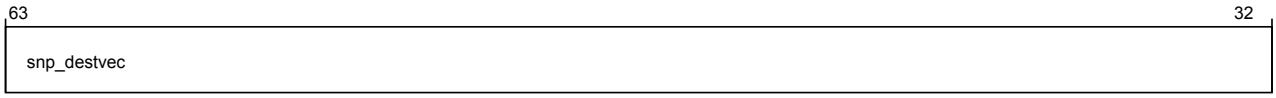

Figure 3-197 por_dn_vmf12_rnd (high)

The following table shows the por_dn_vmf12_rnd higher register bit assignments.

Table 3-211 por_dn_vmf12_rnd (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf12_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

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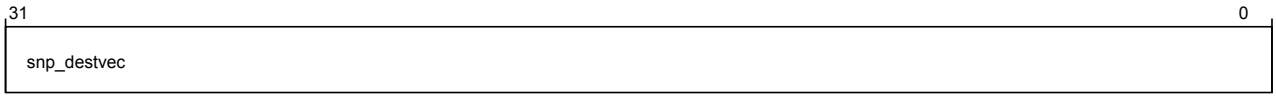

Figure 3-198 por_dn_vmf12_rnd (low)

The following table shows the por_dn_vmf12_rnd lower register bit assignments.

Table 3-212 por_dn_vmf12_rnd (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf12_ctrl.vmid	RW	64'b0

por_dn_vmf12_cxra

Contains the logical CXRA bit vector 63:0 corresponding to por_dn_vmf12_ctrl.vmid. Used for VMID-based DVM snoop filtering. NOTE: Not applicable in a single-chip CMN-600 system. Does not have any effect.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD98

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

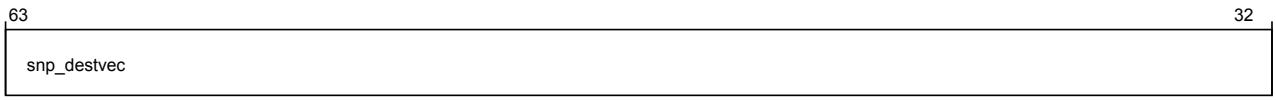

Figure 3-199 por_dn_vmf12_cxra (high)

The following table shows the por_dn_vmf12_cxra higher register bit assignments.

Table 3-213 por_dn_vmf12_cxra (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf12_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

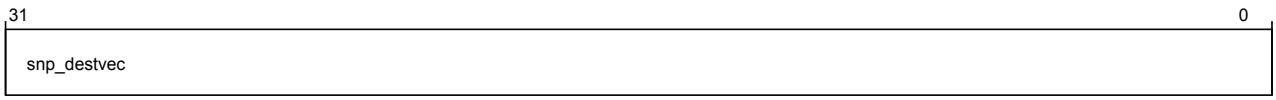

Figure 3-200 por_dn_vmf12_cxra (low)

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The following table shows the por_dn_vmf12_cxra lower register bit assignments.

Table 3-214 por_dn_vmf12_cxra (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf12_ctrl.vmid	RW	64'b0

por_dn_vmf13_ctrl

Functions as the control register for VMID-based DVM snoop filtering. NOTE: This register has no effect when por_dn_aux_ctl.disable_vmf is set to 1.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hDA0

Register reset 64'b1111111111111111000000000000000000

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

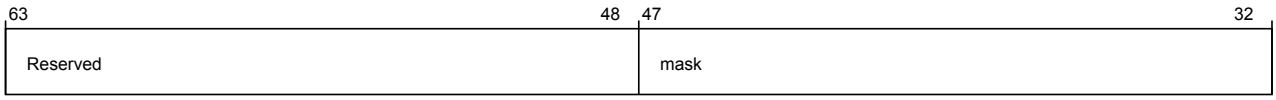

Figure 3-201 por_dn_vmf13_ctrl (high)

The following table shows the por_dn_vmf13_ctrl higher register bit assignments.

Table 3-215 por_dn_vmf13_ctrl (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	mask	VMID mask; enables mapping of multiple VMID values to a single register ——— **Note** ——— Logically, the AND operator is performed on the mask and por_dn_vmf13_ctrl.vmid. Then, the AND operator is performed on the mask and the incoming request's VMID. The two results are then compared, and filtering is applied to the incoming request if the masked VMIDs match. ———	RW	16'hffff

The following image shows the lower register bit assignments.

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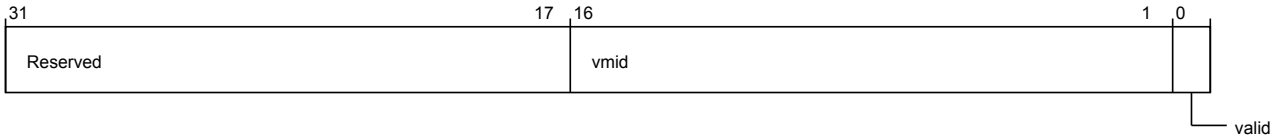

Figure 3-202 por_dn_vmf13_ctrl (low)

The following table shows the por_dn_vmf13_ctrl lower register bit assignments.

Table 3-216 por_dn_vmf13_ctrl (low)

Bits	Field name	Description	Type	Reset
31:17	Reserved	Reserved	RO	-
16:1	vmid	VMID value **Note** The incoming request's VMID is only compared with this VMID value if the request's VMID valid bit is set. If the request's VMID is valid and the two VMIDs match, filtering is applied to the incoming request.	RW	16'h0000
0	valid	Register valid 1'b1: Register is enabled 1'b0: Register is not enabled	RW	1'b0

por_dn_vmf13_rnf0

Contains the logical RN-F bit vector 63:0 corresponding to por_dn_vmf13_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hDA8

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

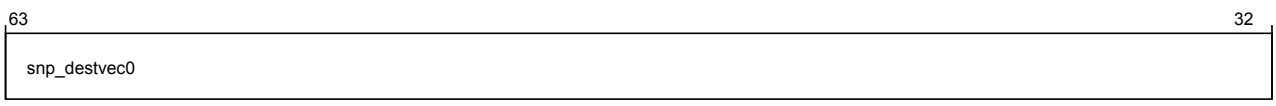

Figure 3-203 por_dn_vmf13_rnf0 (high)

The following table shows the por_dn_vmf13_rnf0 higher register bit assignments.

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Table 3-217 por_dn_vmf13_rnf0 (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf13_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

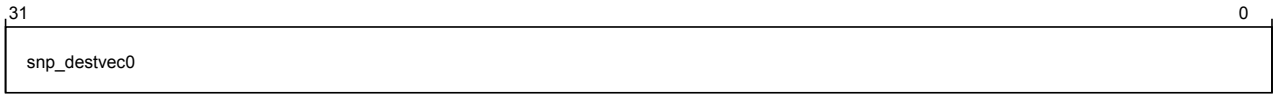

Figure 3-204 por_dn_vmf13_rnf0 (low)

The following table shows the por_dn_vmf13_rnf0 lower register bit assignments.

Table 3-218 por_dn_vmf13_rnf0 (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf13_ctrl.vmid	RW	64'b0

por_dn_vmf13_rnd

Contains the logical RN-D bit vector 63:0 corresponding to por_dn_vmf13_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hDB0

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

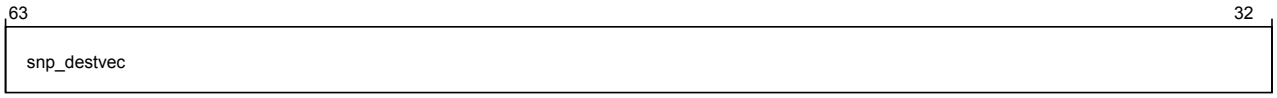

Figure 3-205 por_dn_vmf13_rnd (high)

The following table shows the por_dn_vmf13_rnd higher register bit assignments.

Table 3-219 por_dn_vmf13_rnd (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf13_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

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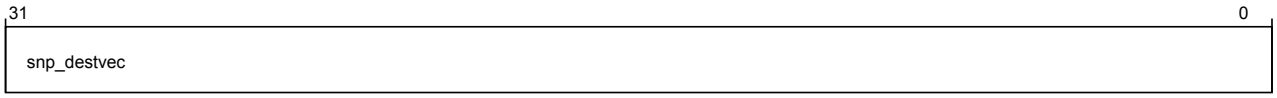

Figure 3-206 por_dn_vmf13_rnd (low)

The following table shows the por_dn_vmf13_rnd lower register bit assignments.

Table 3-220 por_dn_vmf13_rnd (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf13_ctrl.vmid	RW	64'b0

por_dn_vmf13_cxra

Contains the logical CXRA bit vector 63:0 corresponding to por_dn_vmf13_ctrl.vmid. Used for VMID-based DVM snoop filtering. NOTE: Not applicable in a single-chip CMN-600 system. Does not have any effect.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hDB8

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

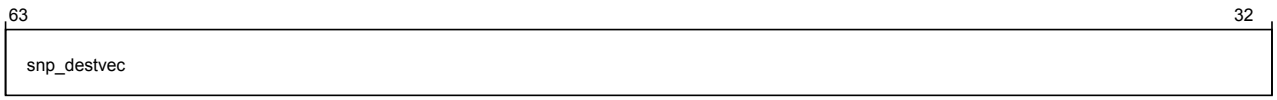

Figure 3-207 por_dn_vmf13_cxra (high)

The following table shows the por_dn_vmf13_cxra higher register bit assignments.

Table 3-221 por_dn_vmf13_cxra (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf13_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

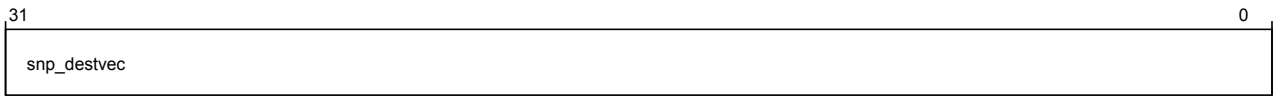

Figure 3-208 por_dn_vmf13_cxra (low)

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The following table shows the por_dn_vmf13_cxra lower register bit assignments.

Table 3-222 por_dn_vmf13_cxra (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf13_ctrl.vmid	RW	64'b0

por_dn_vmf14_ctrl

Functions as the control register for VMID-based DVM snoop filtering. NOTE: This register has no effect when por_dn_aux_ctl.disable_vmf is set to 1.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hDC0

Register reset 64'b1111111111111111000000000000000000

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

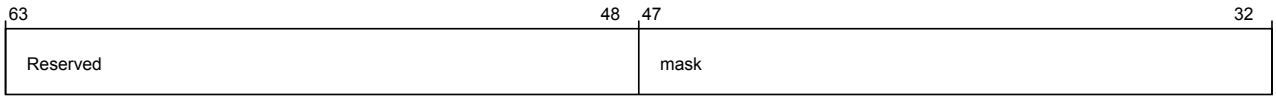

Figure 3-209 por_dn_vmf14_ctrl (high)

The following table shows the por_dn_vmf14_ctrl higher register bit assignments.

Table 3-223 por_dn_vmf14_ctrl (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	mask	VMID mask; enables mapping of multiple VMID values to a single register ——— **Note** ——— Logically, the AND operator is performed on the mask and por_dn_vmf14_ctrl.vmid. Then, the AND operator is performed on the mask and the incoming request's VMID. The two results are then compared, and filtering is applied to the incoming request if the masked VMIDs match. ———	RW	16'hffff

The following image shows the lower register bit assignments.

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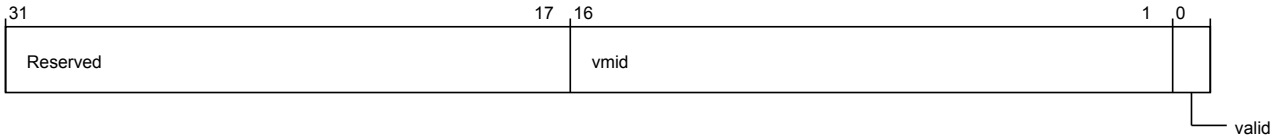

Figure 3-210 por_dn_vmf14_ctrl (low)

The following table shows the por_dn_vmf14_ctrl lower register bit assignments.

Table 3-224 por_dn_vmf14_ctrl (low)

Bits	Field name	Description	Type	Reset
31:17	Reserved	Reserved	RO	-
16:1	vmid	VMID value **Note** The incoming request's VMID is only compared with this VMID value if the request's VMID valid bit is set. If the request's VMID is valid and the two VMIDs match, filtering is applied to the incoming request.	RW	16'h0000
0	valid	Register valid 1'b1: Register is enabled 1'b0: Register is not enabled	RW	1'b0

por_dn_vmf14_rnf0

Contains the logical RN-F bit vector 63:0 corresponding to por_dn_vmf14_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hDC8

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

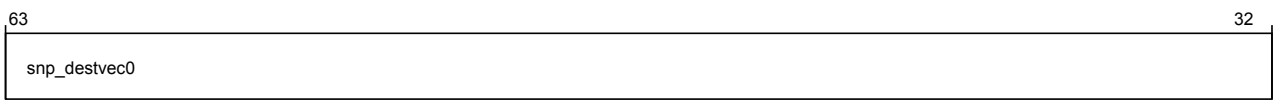

Figure 3-211 por_dn_vmf14_rnf0 (high)

The following table shows the por_dn_vmf14_rnf0 higher register bit assignments.

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Table 3-225 por_dn_vmf14_rnf0 (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf14_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

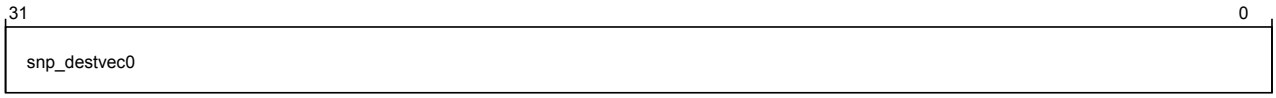

Figure 3-212 por_dn_vmf14_rnf0 (low)

The following table shows the por_dn_vmf14_rnf0 lower register bit assignments.

Table 3-226 por_dn_vmf14_rnf0 (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf14_ctrl.vmid	RW	64'b0

por_dn_vmf14_rnd

Contains the logical RN-D bit vector 63:0 corresponding to por_dn_vmf14_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hDD0

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

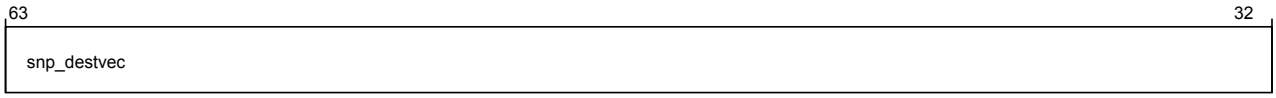

Figure 3-213 por_dn_vmf14_rnd (high)

The following table shows the por_dn_vmf14_rnd higher register bit assignments.

Table 3-227 por_dn_vmf14_rnd (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf14_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

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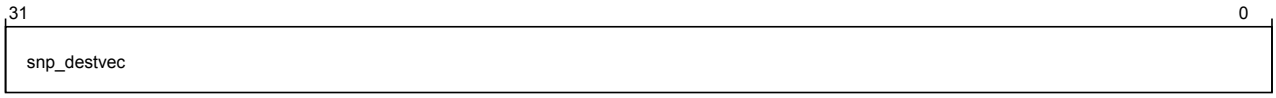

Figure 3-214 por_dn_vmf14_rnd (low)

The following table shows the por_dn_vmf14_rnd lower register bit assignments.

Table 3-228 por_dn_vmf14_rnd (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf14_ctrl.vmid	RW	64'b0

por_dn_vmf14_cxra

Contains the logical CXRA bit vector 63:0 corresponding to por_dn_vmf14_ctrl.vmid. Used for VMID-based DVM snoop filtering. NOTE: Not applicable in a single-chip CMN-600 system. Does not have any effect.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hDD8

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

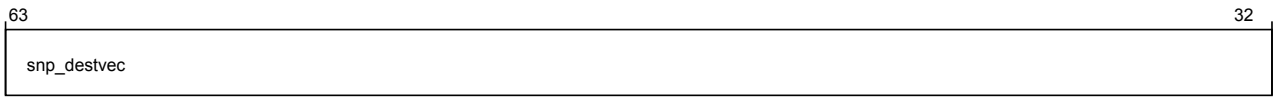

Figure 3-215 por_dn_vmf14_cxra (high)

The following table shows the por_dn_vmf14_cxra higher register bit assignments.

Table 3-229 por_dn_vmf14_cxra (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf14_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

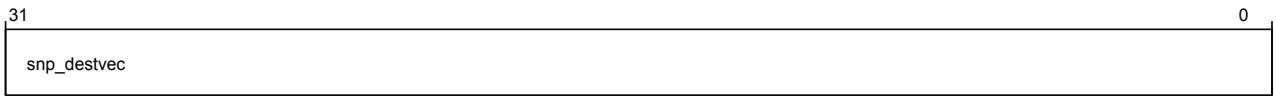

Figure 3-216 por_dn_vmf14_cxra (low)

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The following table shows the por_dn_vmf14_cxra lower register bit assignments.

Table 3-230 por_dn_vmf14_cxra (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf14_ctrl.vmid	RW	64'b0

por_dn_vmf15_ctrl

Functions as the control register for VMID-based DVM snoop filtering. NOTE: This register has no effect when por_dn_aux_ctl.disable_vmf is set to 1.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hDE0

Register reset 64'b1111111111111111000000000000000000

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

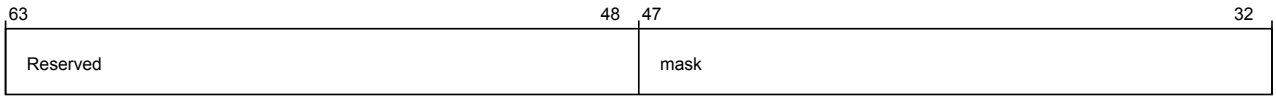

Figure 3-217 por_dn_vmf15_ctrl (high)

The following table shows the por_dn_vmf15_ctrl higher register bit assignments.

Table 3-231 por_dn_vmf15_ctrl (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	mask	VMID mask; enables mapping of multiple VMID values to a single register ——— **Note** ——— Logically, the AND operator is performed on the mask and por_dn_vmf15_ctrl.vmid. Then, the AND operator is performed on the mask and the incoming request's VMID. The two results are then compared, and filtering is applied to the incoming request if the masked VMIDs match. ———	RW	16'hffff

The following image shows the lower register bit assignments.

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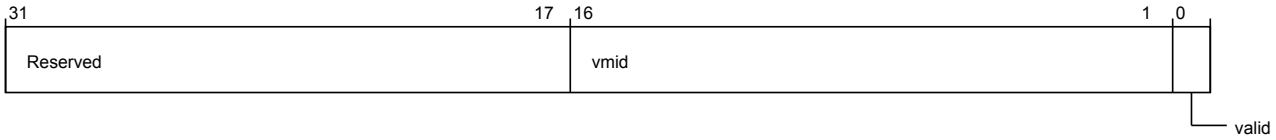

Figure 3-218 por_dn_vmf15_ctrl (low)

The following table shows the por_dn_vmf15_ctrl lower register bit assignments.

Table 3-232 por_dn_vmf15_ctrl (low)

Bits	Field name	Description	Type	Reset
31:17	Reserved	Reserved	RO	-
16:1	vmid	VMID value **Note** The incoming request's VMID is only compared with this VMID value if the request's VMID valid bit is set. If the request's VMID is valid and the two VMIDs match, filtering is applied to the incoming request.	RW	16'h0000
0	valid	Register valid 1'b1: Register is enabled 1'b0: Register is not enabled	RW	1'b0

por_dn_vmf15_rnf0

Contains the logical RN-F bit vector 63:0 corresponding to por_dn_vmf15_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hDE8

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

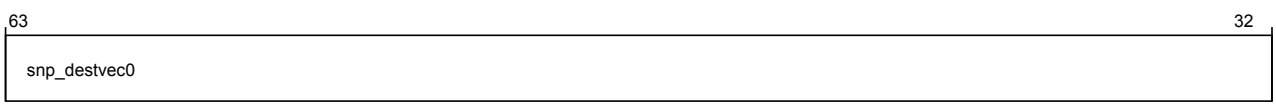

Figure 3-219 por_dn_vmf15_rnf0 (high)

The following table shows the por_dn_vmf15_rnf0 higher register bit assignments.

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Table 3-233 por_dn_vmf15_rnf0 (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf15_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

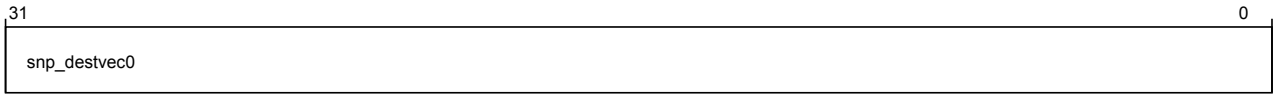

Figure 3-220 por_dn_vmf15_rnf0 (low)

The following table shows the por_dn_vmf15_rnf0 lower register bit assignments.

Table 3-234 por_dn_vmf15_rnf0 (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec0	RN-F bit vector 63:0 corresponding to por_dn_vmf15_ctrl.vmid	RW	64'b0

por_dn_vmf15_rnd

Contains the logical RN-D bit vector 63:0 corresponding to por_dn_vmf15_ctrl.vmid. Used for VMID-based DVM snoop filtering.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hDF0

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

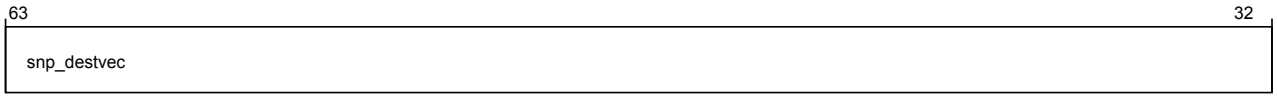

Figure 3-221 por_dn_vmf15_rnd (high)

The following table shows the por_dn_vmf15_rnd higher register bit assignments.

Table 3-235 por_dn_vmf15_rnd (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf15_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

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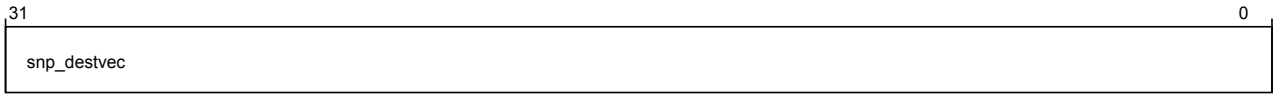

Figure 3-222 por_dn_vmf15_rnd (low)

The following table shows the por_dn_vmf15_rnd lower register bit assignments.

Table 3-236 por_dn_vmf15_rnd (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	RN-D bit vector 63:0 corresponding to por_dn_vmf15_ctrl.vmid	RW	64'b0

por_dn_vmf15_cxra

Contains the logical CXRA bit vector 63:0 corresponding to por_dn_vmf15_ctrl.vmid. Used for VMID-based DVM snoop filtering. NOTE: Not applicable in a single-chip CMN-600 system. Does not have any effect.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hDF8

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_dn_secure_register_groups_override.vmf

The following image shows the higher register bit assignments.

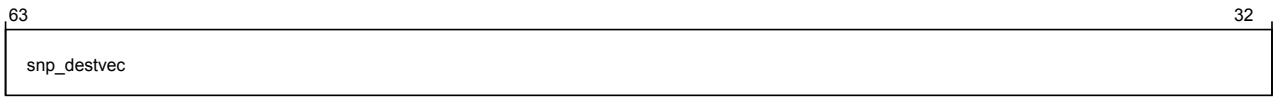

Figure 3-223 por_dn_vmf15_cxra (high)

The following table shows the por_dn_vmf15_cxra higher register bit assignments.

Table 3-237 por_dn_vmf15_cxra (high)

Bits	Field name	Description	Type	Reset
63:32	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf15_ctrl.vmid	RW	64'b0

The following image shows the lower register bit assignments.

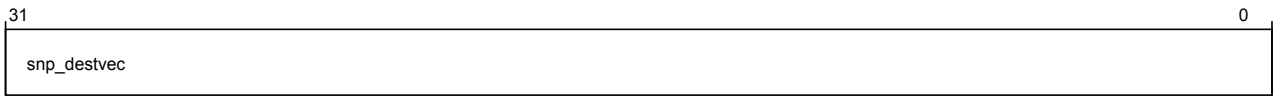

Figure 3-224 por_dn_vmf15_cxra (low)

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The following table shows the por_dn_vmf15_cxra lower register bit assignments.

Table 3-238 por_dn_vmf15_cxra (low)

Bits	Field name	Description	Type	Reset
31:0	snp_destvec	CXRA bit vector 63:0 corresponding to por_dn_vmf15_ctrl.vmid	RW	64'b0

por_dn_pmu_event_sel

Specifies the PMU event to be counted.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h2000
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

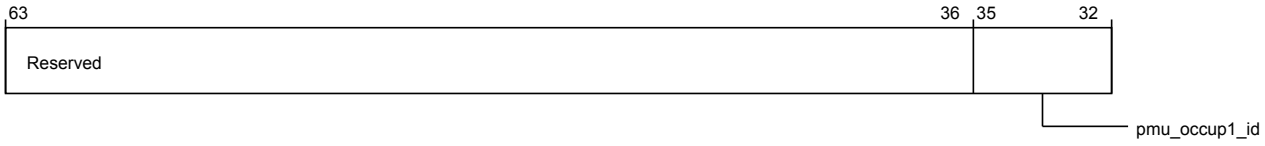

Figure 3-225 por_dn_pmu_event_sel (high)

The following table shows the por_dn_pmu_event_sel higher register bit assignments.

Table 3-239 por_dn_pmu_event_sel (high)

Bits	Field name	Description	Type	Reset
63:36	Reserved	Reserved	RO	-
35:32	pmu_occup1_id	PMU occupancy event selector ID 4'b0000: All 4'b0001: DVM ops 4'b0010: DVM syncs	RW	4'b0

The following image shows the lower register bit assignments.

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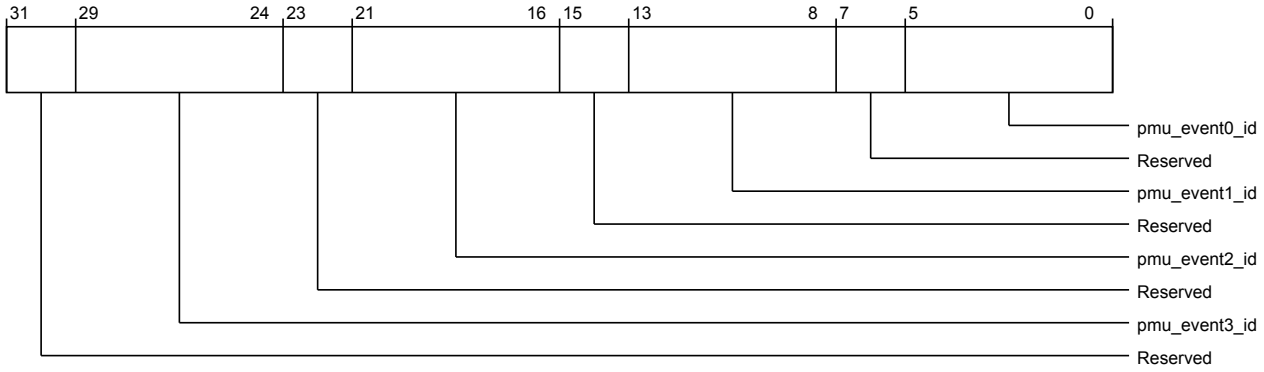

Figure 3-226 por_dn_pmu_event_sel (low)

The following table shows the por_dn_pmu_event_sel lower register bit assignments.

Table 3-240 por_dn_pmu_event_sel (low)

Bits	Field name	Description	Type	Reset
31:30	Reserved	Reserved	RO	-
29:24	pmu_event3_id	PMU Event 3 ID; see pmu_event0_id for encodings	RW	5'b0
23:22	Reserved	Reserved	RO	-
21:16	pmu_event2_id	PMU Event 2 ID; see pmu_event0_id for encodings	RW	5'b0
15:14	Reserved	Reserved	RO	-
13:8	pmu_event1_id	PMU Event 1 ID; see pmu_event0_id for encodings	RW	5'b0
7:6	Reserved	Reserved	RO	-
5:0	pmu_event0_id	PMU Event 0 ID 6'h00: No event 6'h01: Number of TLBI DVM op requests 6'h02: Number of BPI DVM op requests 6'h03: Number of PICI DVM op requests 6'h04: Number of VICI DVM op requests 6'h05: Number of DVM sync requests 6'h06: Number of DVM op requests that were filtered using VMID filtering 6'h07: Number of DVM op requests to RNDs, BPI or PICI/VICI, that were filtered 6'h08: Number of retried REQ 6'h09: Number of SNPs sent to RNs 6'h0a: Number of SNPs stalled to RNs due to lack of Crds 6'h0b: DVM tracker full counter 6'h0c: DVM tracker occupancy counter	RW	5'b0

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3.3.3 Debug and trace register descriptions

This section lists the debug and trace registers.

por_dt_node_info

Provides component identification information.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h0
Register reset Configuration dependent
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

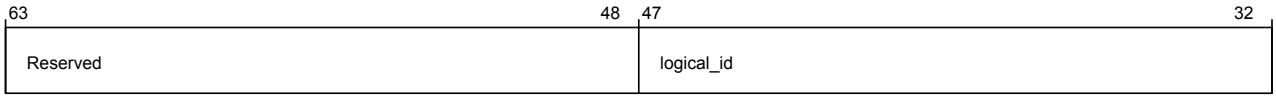

Figure 3-227 por_dt_node_info (high)

The following table shows the por_dt_node_info higher register bit assignments.

Table 3-241 por_dt_node_info (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	logical_id	Component logical ID	RO	Configuration dependent

The following image shows the lower register bit assignments.

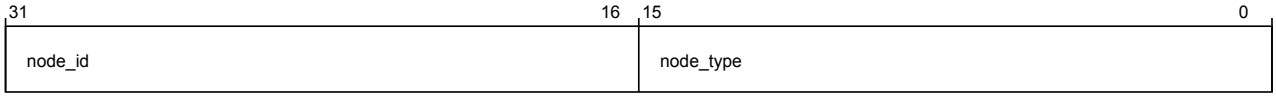

Figure 3-228 por_dt_node_info (low)

The following table shows the por_dt_node_info lower register bit assignments.

Table 3-242 por_dt_node_info (low)

Bits	Field name	Description	Type	Reset
31:16	node_id	Component CHI node ID	RO	Configuration dependent
15:0	node_type	CMN-600 node type identifier	RO	16'h3

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por_dt_child_info

Provides component child identification information.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h80
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

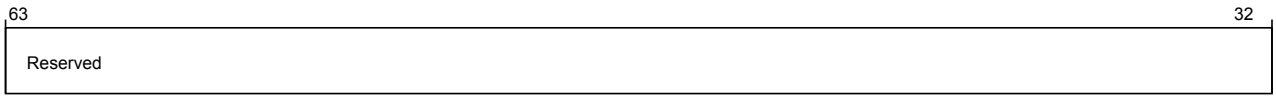

Figure 3-229 por_dt_child_info (high)

The following table shows the por_dt_child_info higher register bit assignments.

Table 3-243 por_dt_child_info (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

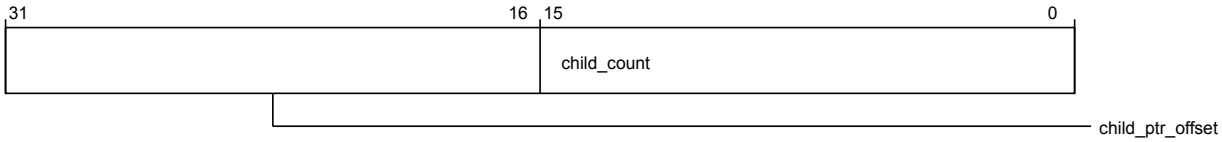

Figure 3-230 por_dt_child_info (low)

The following table shows the por_dt_child_info lower register bit assignments.

Table 3-244 por_dt_child_info (low)

Bits	Field name	Description	Type	Reset
31:16	child_ptr_offset	Starting register offset which contains pointers to the child nodes	RO	16'h0000
15:0	child_count	Number of child nodes; used in discovery process	RO	16'b0

por_dt_secure_access

Functions as the secure access control register.

Its characteristics are:

Type RW
Register width (Bits) 64

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Address offset 14'h980

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

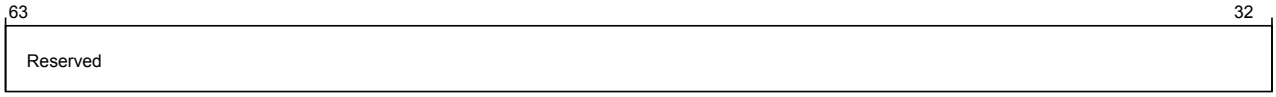

Figure 3-231 por_dt_secure_access (high)

The following table shows the por_dt_secure_access higher register bit assignments.

Table 3-245 por_dt_secure_access (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

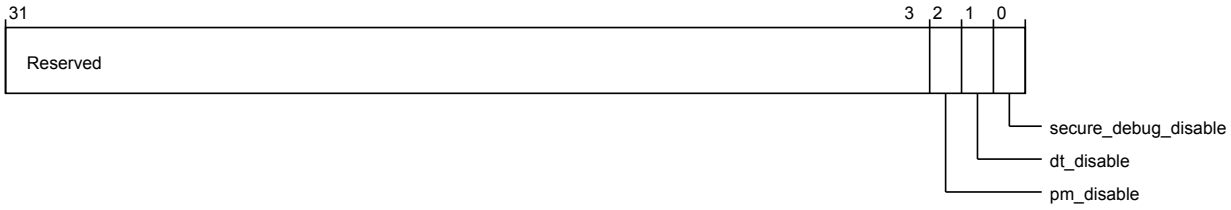

Figure 3-232 por_dt_secure_access (low)

The following table shows the por_dt_secure_access lower register bit assignments.

Table 3-246 por_dt_secure_access (low)

Bits	Field name	Description	Type	Reset
31:3	Reserved	Reserved	RO	-
2	pm_disable	PMU disable 1'b0: PMU function is not affected 1'b1: PMU function is disabled.	RW	1'b0
1	dt_disable	Debug disable 1'b0: DT function is not affected 1'b1: DT function is disabled.	RW	1'b0
0	secure_debug_disable	Secure debug disable 1'b0: Secure events are monitored by the PMU 1'b1: Secure events are only monitored by the PMU if SPNIDEN is set to 1	RW	1'b0

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por_dt_dtc_ctl

Functions as the debug trace control register.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hA00
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

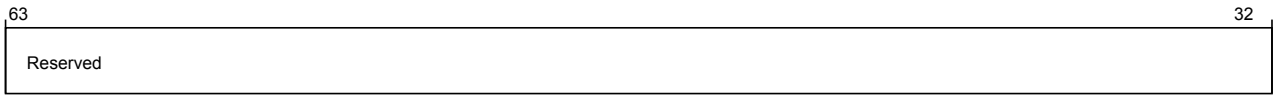

Figure 3-233 por_dt_dtc_ctl (high)

The following table shows the por_dt_dtc_ctl higher register bit assignments.

Table 3-247 por_dt_dtc_ctl (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

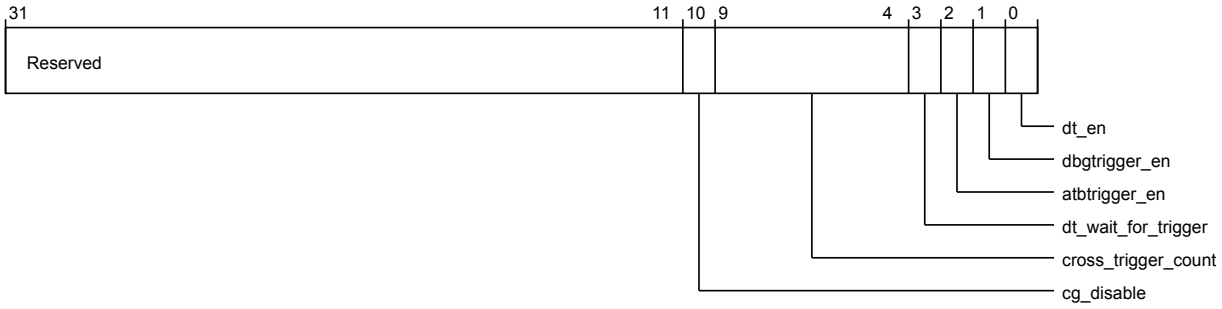

Figure 3-234 por_dt_dtc_ctl (low)

The following table shows the por_dt_dtc_ctl lower register bit assignments.

Table 3-248 por_dt_dtc_ctl (low)

Bits	Field name	Description	Type	Reset
31:11	Reserved	Reserved	RO	-
10	cg_disable	Disables DT architectural clock gates	RW	1'b0

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Table 3-248 por_dt_dtc_ctl (low) (continued)

Bits	Field name	Description	Type	Reset
9:4	cross_trigger_count	Number of cross triggers received before trace enable **Note** Only applicable if dt_wait_for_trigger is set to 1.	RW	6'b0
3	dt_wait_for_trigger	Enables waiting for cross trigger before trace enable	RW	1'b0
2	atbtrigger_en	ATB trigger enable	RW	1'b0
1	dbgtrigger_en	DBGWATCHTRIG enable	RW	1'b0
0	dt_en	Enables debug, trace, and PMU features	RW	1'b0

por_dt_trigger_status

Provides the trigger status.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'hA10
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

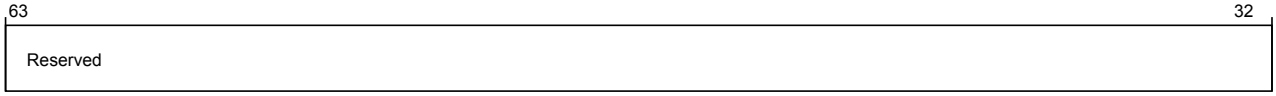

Figure 3-235 por_dt_trigger_status (high)

The following table shows the por_dt_trigger_status higher register bit assignments.

Table 3-249 por_dt_trigger_status (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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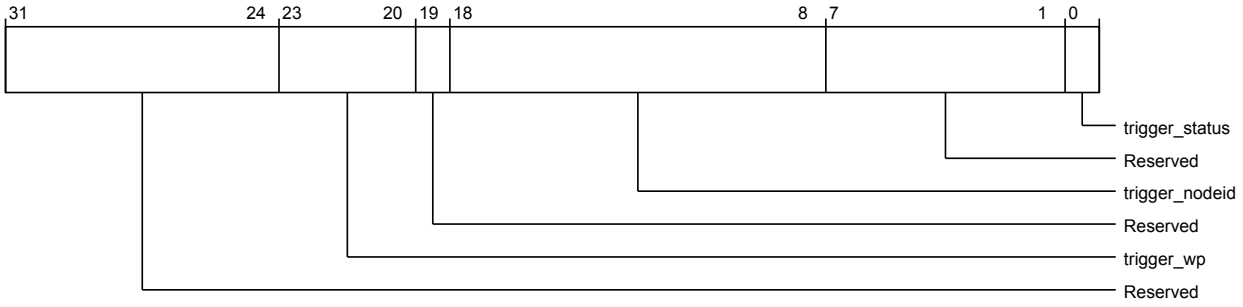

Figure 3-236 por_dt_trigger_status (low)

The following table shows the por_dt_trigger_status lower register bit assignments.

Table 3-250 por_dt_trigger_status (low)

Bits	Field name	Description	Type	Reset
31:24	Reserved	Reserved	RO	-
23:20	trigger_wp	DBGWATCHTRIGREQ assertion and/or ATB trigger are caused by watchpoint	RO	1'h0
19	Reserved	Reserved	RO	-
18:8	trigger_nodeid	DBGWATCHTRIGREQ assertion and/or ATB trigger are caused by node ID	RO	11'h0
7:1	Reserved	Reserved	RO	-
0	trigger_status	Indicates DBGWATCHTRIGREQ assertion and/or ATB trigger	RO	1'h0

por_dt_trigger_status_clr

Clears the trigger status.

Its characteristics are:

Type WO
Register width (Bits) 64
Address offset 14'hA20
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

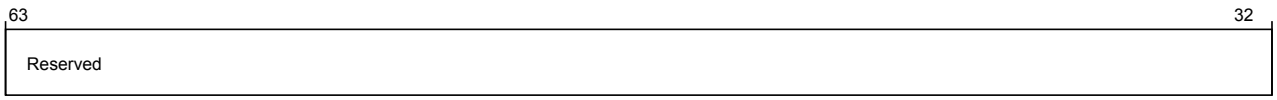

Figure 3-237 por_dt_trigger_status_clr (high)

The following table shows the por_dt_trigger_status_clr higher register bit assignments.

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Table 3-251 por_dt_trigger_status_clr (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

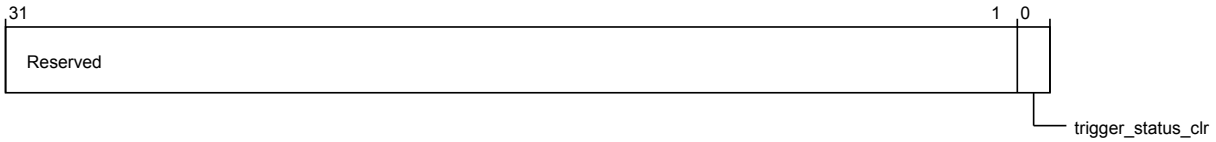

Figure 3-238 por_dt_trigger_status_clr (low)

The following table shows the por_dt_trigger_status_clr lower register bit assignments.

Table 3-252 por_dt_trigger_status_clr (low)

Bits	Field name	Description	Type	Reset
31:1	Reserved	Reserved	RO	-
0	trigger_status_clr	Write a 1 to clear por_dt_trigger_status.trigger_status	WO	1'b0

por_dt_trace_control

Functions as the trace control register.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hA30
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

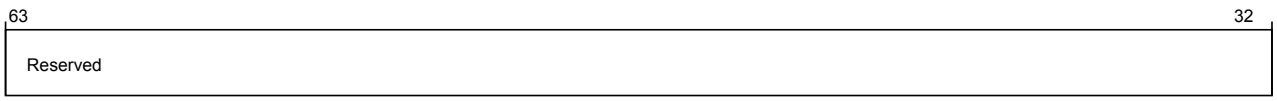

Figure 3-239 por_dt_trace_control (high)

The following table shows the por_dt_trace_control higher register bit assignments.

Table 3-253 por_dt_trace_control (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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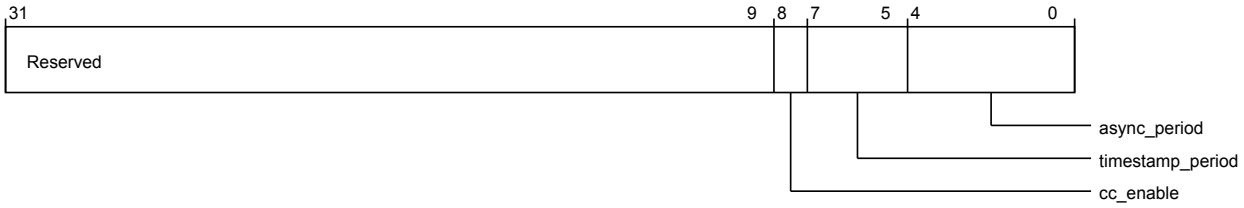

Figure 3-240 por_dt_trace_control (low)

The following table shows the por_dt_trace_control lower register bit assignments.

Table 3-254 por_dt_trace_control (low)

Bits	Field name	Description	Type	Reset
31:9	Reserved	Reserved	RO	-
8	cc_enable	Cycle count enable	RW	1'b0
7:5	timestamp_period	Time stamp packet insertion period 3'b000: Time stamp disabled 3'b011: Time stamp every 8K clock cycles 3'b100: Time stamp every 16K clock cycles 3'b101: Time stamp every 32K clock cycles 3'b110: Time stamp every 64K clock cycles	RW	3'b0
4:0	async_period	Alignment sync packet insertion period 5'h00: Alignment sync disabled 5'h08: Alignment sync inserted after 256B of trace 5'h09: Alignment sync inserted after 512B of trace 5'h14: Alignment sync inserted after 1048576B of trace **Note** All other values are reserved.	RW	5'b0

por_dt_traceid

Contains the ATB ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hA48
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

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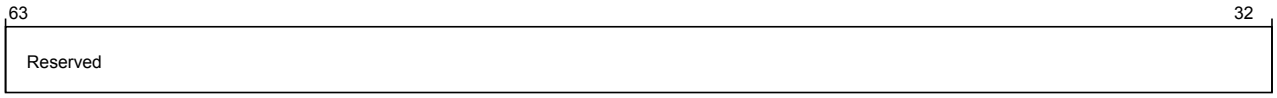

Figure 3-241 por_dt_traceid (high)

The following table shows the por_dt_traceid higher register bit assignments.

Table 3-255 por_dt_traceid (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

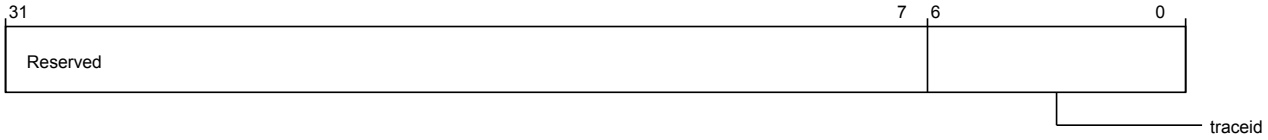

Figure 3-242 por_dt_traceid (low)

The following table shows the por_dt_traceid lower register bit assignments.

Table 3-256 por_dt_traceid (low)

Bits	Field name	Description	Type	Reset
31:7	Reserved	Reserved	RO	-
6:0	traceid	ATB ID	RW	7'h0

por_dt_pmevcntAB

Contains the PMU event counters A and B.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h2000
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

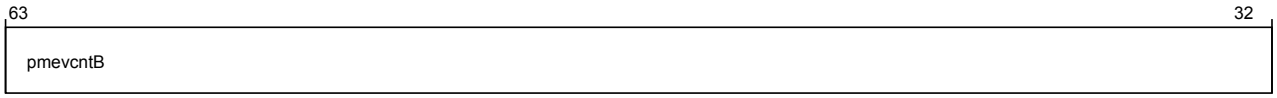

Figure 3-243 por_dt_pmevcntab (high)

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The following table shows the por_dt_pmevcntAB higher register bit assignments.

Table 3-257 por_dt_pmevcntab (high)

Bits	Field name	Description	Type	Reset
63:32	pmevcntB	PMU counter B	RW	32'h0000

The following image shows the lower register bit assignments.

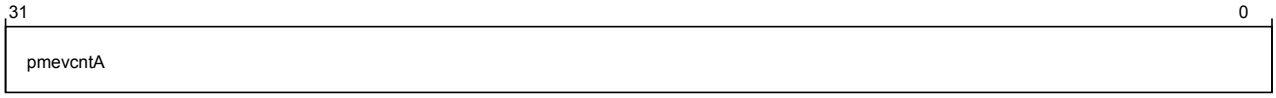

Figure 3-244 por_dt_pmevcntab (low)

The following table shows the por_dt_pmevcntAB lower register bit assignments.

Table 3-258 por_dt_pmevcntab (low)

Bits	Field name	Description	Type	Reset
31:0	pmevcntA	PMU counter A	RW	32'h0000

por_dt_pmevcntCD

Contains the PMU event counters C and D.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h2010
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

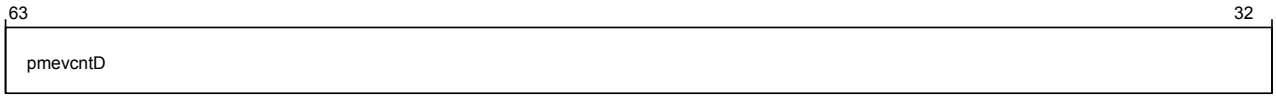

Figure 3-245 por_dt_pmevcntcd (high)

The following table shows the por_dt_pmevcntCD higher register bit assignments.

Table 3-259 por_dt_pmevcntcd (high)

Bits	Field name	Description	Type	Reset
63:32	pmevcntD	PMU counter D	RW	32'h0000

The following image shows the lower register bit assignments.

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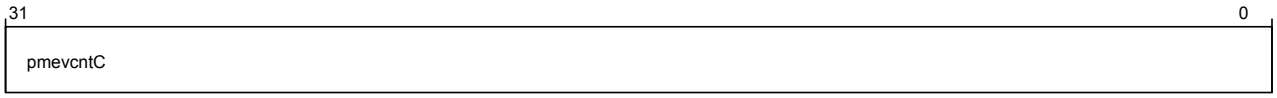

Figure 3-246 por_dt_pmevcntcd (low)

The following table shows the por_dt_pmevcntCD lower register bit assignments.

Table 3-260 por_dt_pmevcntcd (low)

Bits	Field name	Description	Type	Reset
31:0	pmevcntC	PMU counter C	RW	32'h0000

por_dt_pmevcntEF

Contains the PMU event counters E and F.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h2020

Register reset 64'b0

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

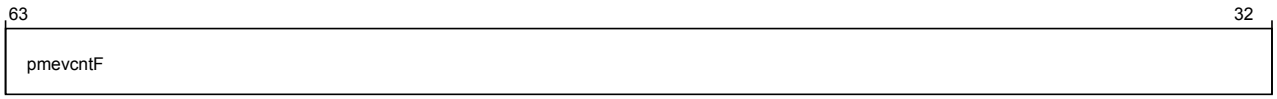

Figure 3-247 por_dt_pmevcntef (high)

The following table shows the por_dt_pmevcntEF higher register bit assignments.

Table 3-261 por_dt_pmevcntef (high)

Bits	Field name	Description	Type	Reset
63:32	pmevcntF	PMU counter F	RW	32'h0000

The following image shows the lower register bit assignments.

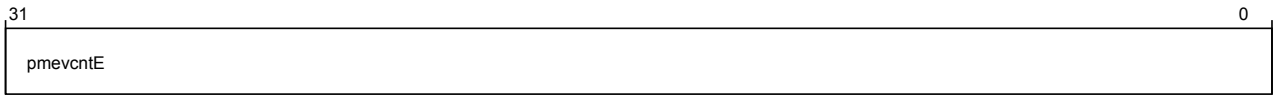

Figure 3-248 por_dt_pmevcntef (low)

The following table shows the por_dt_pmevcntEF lower register bit assignments.

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Table 3-262 por_dt_pmevcntef (low)

Bits	Field name	Description	Type	Reset
31:0	pmevcntE	PMU counter E	RW	32'h0000

por_dt_pmevcntGH

Contains the PMU event counters G and H.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h2030
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

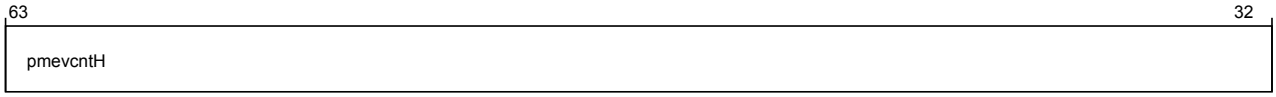

Figure 3-249 por_dt_pmevcntgh (high)

The following table shows the por_dt_pmevcntGH higher register bit assignments.

Table 3-263 por_dt_pmevcntgh (high)

Bits	Field name	Description	Type	Reset
63:32	pmevcntH	PMU counter H	RW	32'h0000

The following image shows the lower register bit assignments.

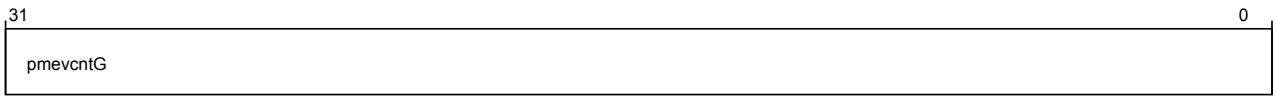

Figure 3-250 por_dt_pmevcntgh (low)

The following table shows the por_dt_pmevcntGH lower register bit assignments.

Table 3-264 por_dt_pmevcntgh (low)

Bits	Field name	Description	Type	Reset
31:0	pmevcntG	PMU counter G	RW	32'h0000

por_dt_pmccntr

Contains the PMU cycle counter.

Its characteristics are:

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Type RW
Register width (Bits) 64
Address offset 14'h2040
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

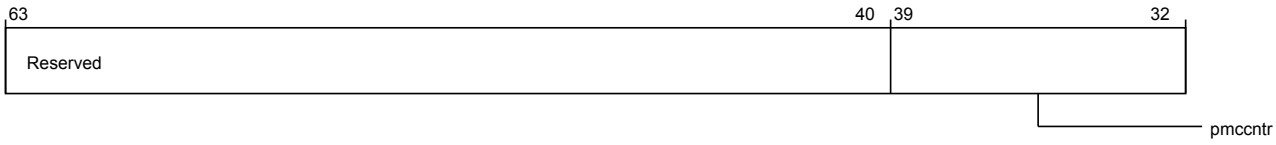

Figure 3-251 por_dt_pmccntr (high)

The following table shows the por_dt_pmccntr higher register bit assignments.

Table 3-265 por_dt_pmccntr (high)

Bits	Field name	Description	Type	Reset
63:40	Reserved	Reserved	RO	-
39:32	pmccntr	PMU cycle counter	RW	40'h0

The following image shows the lower register bit assignments.

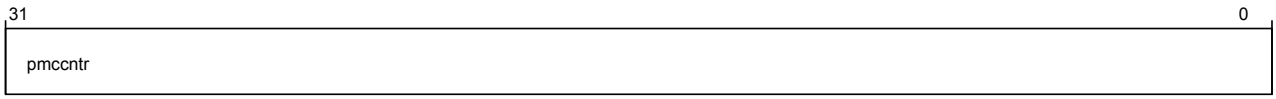

Figure 3-252 por_dt_pmccntr (low)

The following table shows the por_dt_pmccntr lower register bit assignments.

Table 3-266 por_dt_pmccntr (low)

Bits	Field name	Description	Type	Reset
31:0	pmccntr	PMU cycle counter	RW	40'h0

por_dt_pmevcntsrAB

Contains the PMU event counter shadow registers A and B.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h2050
Register reset 64'b0
Usage constraints There are no usage constraints.

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The following image shows the higher register bit assignments.

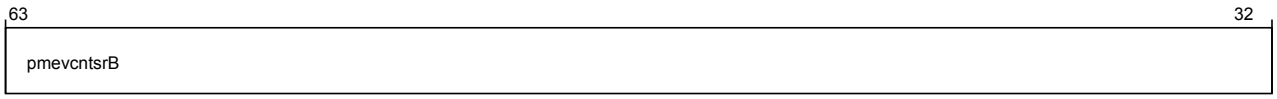

Figure 3-253 por_dt_pmevcntsrab (high)

The following table shows the por_dt_pmevcntsrAB higher register bit assignments.

Table 3-267 por_dt_pmevcntsrab (high)

Bits	Field name	Description	Type	Reset
63:32	pmevcntsrB	PMU counter B shadow register	RW	32'h0000

The following image shows the lower register bit assignments.

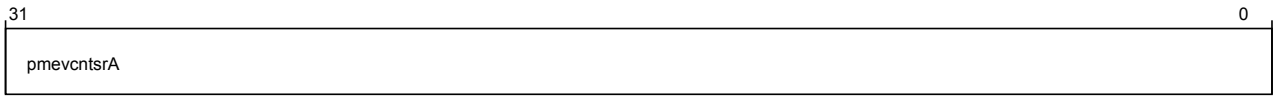

Figure 3-254 por_dt_pmevcntsrab (low)

The following table shows the por_dt_pmevcntsrAB lower register bit assignments.

Table 3-268 por_dt_pmevcntsrab (low)

Bits	Field name	Description	Type	Reset
31:0	pmevcntsrA	PMU counter A shadow register	RW	32'h0000

por_dt_pmevcntsrCD

Contains the PMU event counter shadow registers C and D.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h2060
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

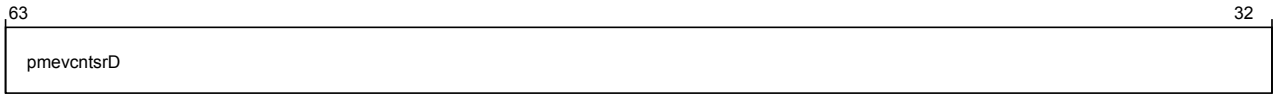

Figure 3-255 por_dt_pmevcntsrcd (high)

The following table shows the por_dt_pmevcntsrCD higher register bit assignments.

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Table 3-269 por_dt_pmevcntsrcd (high)

Bits	Field name	Description	Type	Reset
63:32	pmevcntsrD	PMU counter D shadow register	RW	32'h0000

The following image shows the lower register bit assignments.

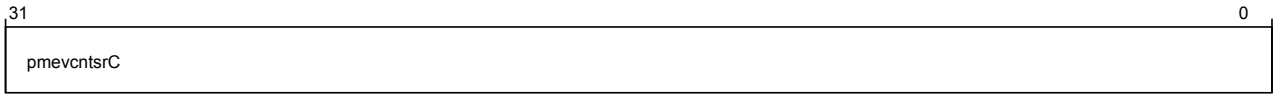

Figure 3-256 por_dt_pmevcntsrcd (low)

The following table shows the por_dt_pmevcntsrCD lower register bit assignments.

Table 3-270 por_dt_pmevcntsrcd (low)

Bits	Field name	Description	Type	Reset
31:0	pmevcntsrC	PMU counter C shadow register	RW	32'h0000

por_dt_pmevcntsrEF

Contains the PMU event counter shadow registers E and F.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h2070

Register reset 64'b0

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

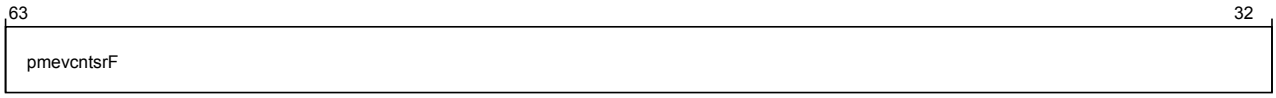

Figure 3-257 por_dt_pmevcntsref (high)

The following table shows the por_dt_pmevcntsrEF higher register bit assignments.

Table 3-271 por_dt_pmevcntsref (high)

Bits	Field name	Description	Type	Reset
63:32	pmevcntsrF	PMU counter F shadow register	RW	32'h0000

The following image shows the lower register bit assignments.

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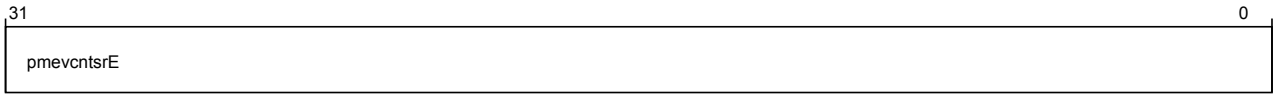

Figure 3-258 por_dt_pmevcntsref (low)

The following table shows the por_dt_pmevcntsrEF lower register bit assignments.

Table 3-272 por_dt_pmevcntsref (low)

Bits	Field name	Description	Type	Reset
31:0	pmevcntsrE	PMU counter E shadow register	RW	32'h0000

por_dt_pmevcntsrGH

Contains the PMU event counter shadow registers G and H.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h2080

Register reset 64'b0

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

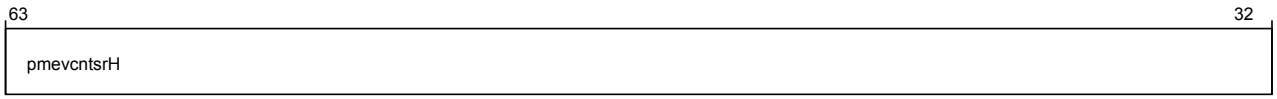

Figure 3-259 por_dt_pmevcntsrgh (high)

The following table shows the por_dt_pmevcntsrGH higher register bit assignments.

Table 3-273 por_dt_pmevcntsrgh (high)

Bits	Field name	Description	Type	Reset
63:32	pmevcntsrH	PMU counter H shadow register	RW	32'h0000

The following image shows the lower register bit assignments.

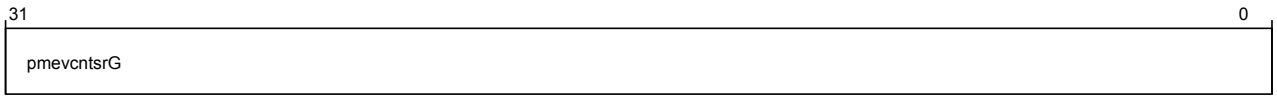

Figure 3-260 por_dt_pmevcntsrgh (low)

The following table shows the por_dt_pmevcntsrGH lower register bit assignments.

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Table 3-274 por_dt_pmevcntsrgh (low)

Bits	Field name	Description	Type	Reset
31:0	pmevcntsrG	PMU counter G shadow register	RW	32'h0000

por_dt_pmccntrsr

Contains the PMU cycle counter shadow register.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h2090

Register reset 64'b0

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

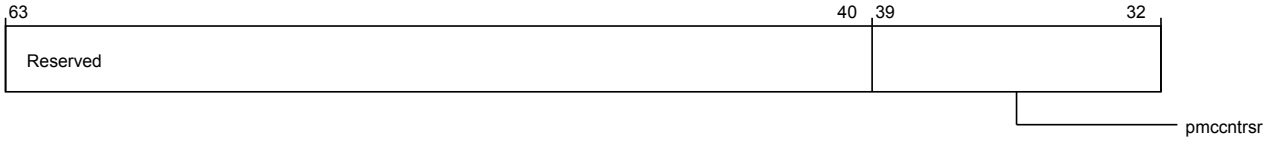

Figure 3-261 por_dt_pmccntrsr (high)

The following table shows the por_dt_pmccntrsr higher register bit assignments.

Table 3-275 por_dt_pmccntrsr (high)

Bits	Field name	Description	Type	Reset
63:40	Reserved	Reserved	RO	-
39:32	pmccntrsr	PMU cycle counter shadow register	RW	40'h0

The following image shows the lower register bit assignments.

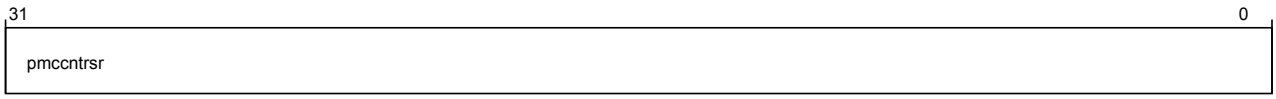

Figure 3-262 por_dt_pmccntrsr (low)

The following table shows the por_dt_pmccntrsr lower register bit assignments.

Table 3-276 por_dt_pmccntrsr (low)

Bits	Field name	Description	Type	Reset
31:0	pmccntrsr	PMU cycle counter shadow register	RW	40'h0

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por_dt_pmcr

Functions as the PMU control register.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h2100
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

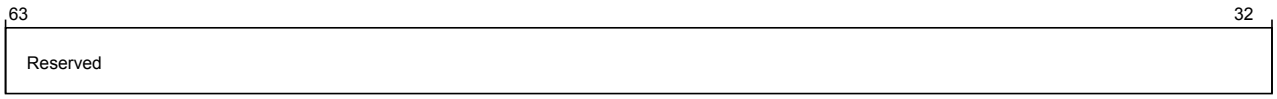

Figure 3-263 por_dt_pmcr (high)

The following table shows the por_dt_pmcr higher register bit assignments.

Table 3-277 por_dt_pmcr (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

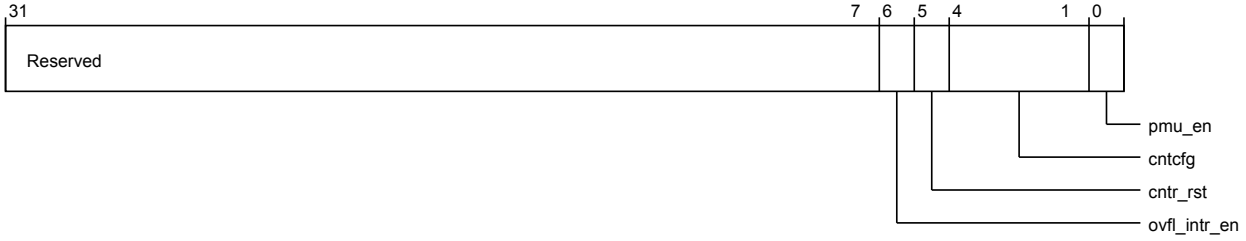

Figure 3-264 por_dt_pmcr (low)

The following table shows the por_dt_pmcr lower register bit assignments.

Table 3-278 por_dt_pmcr (low)

Bits	Field name	Description	Type	Reset
31:7	Reserved	Reserved	RO	-
6	ovfl_intr_en	Enables INTREQPMU assertion on PMU counter overflow	RW	1'h0
5	cntr_rst	Enables clearing of live counters upon assertion of por_dt_pmsrr.ss_req or PMUSNAPSHOTREQ	RW	1'h0

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Table 3-278 por_dt_pmcr (low) (continued)

Bits	Field name	Description	Type	Reset
4:1	cntcfg	Groups adjacent 32-bit registers into a 64-bit register	RW	4'h0
0	pmu_en	Enables PMU features	RW	1'b0

por_dt_pmovsr

Provides the PMU overflow status.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h2118
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

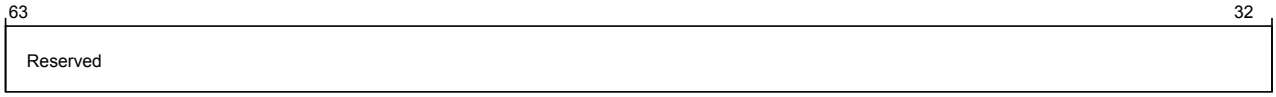

Figure 3-265 por_dt_pmovsr (high)

The following table shows the por_dt_pmovsr higher register bit assignments.

Table 3-279 por_dt_pmovsr (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

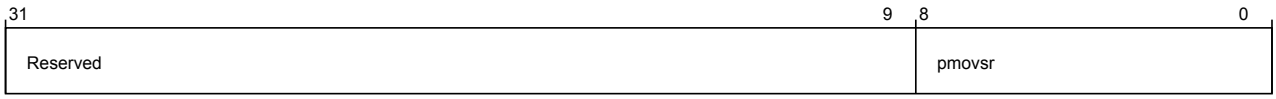

Figure 3-266 por_dt_pmovsr (low)

The following table shows the por_dt_pmovsr lower register bit assignments.

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Table 3-280 por_dt_pmovsr (low)

Bits	Field name	Description	Type	Reset
31:9	Reserved	Reserved	RO	-
8:0	pmovsr	PMU overflow status Bit 8: Indicates overflow from cycle counter Bits [7:0]: Indicates overflow from counters 7 to 0	RO	9'h0

por_dt_pmovsr_clr

Clears the PMU overflow status.

Its characteristics are:

Type WO
Register width (Bits) 64
Address offset 14'h2120
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

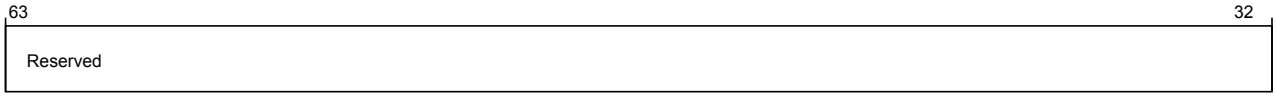

Figure 3-267 por_dt_pmovsr_clr (high)

The following table shows the por_dt_pmovsr_clr higher register bit assignments.

Table 3-281 por_dt_pmovsr_clr (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

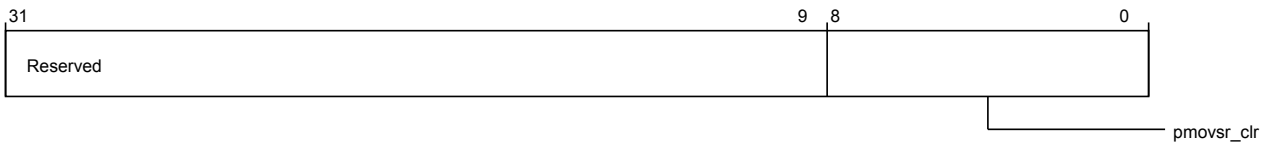

Figure 3-268 por_dt_pmovsr_clr (low)

The following table shows the por_dt_pmovsr_clr lower register bit assignments.

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Table 3-282 por_dt_pmovsr_clr (low)

Bits	Field name	Description	Type	Reset
31:9	Reserved	Reserved	RO	-
8:0	pmovsr_clr	Write a 1 to clear the corresponding bit in por_dt_pmovsr.pmovsr	WO	9'b0

por_dt_pmssr

Provides the PMU snapshot status.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h2128
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

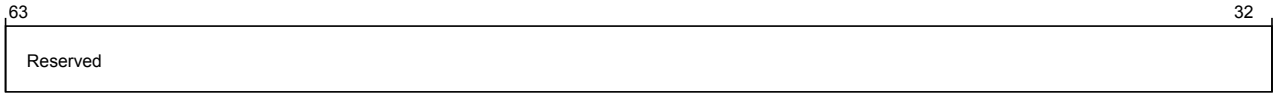

Figure 3-269 por_dt_pmssr (high)

The following table shows the por_dt_pmssr higher register bit assignments.

Table 3-283 por_dt_pmssr (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

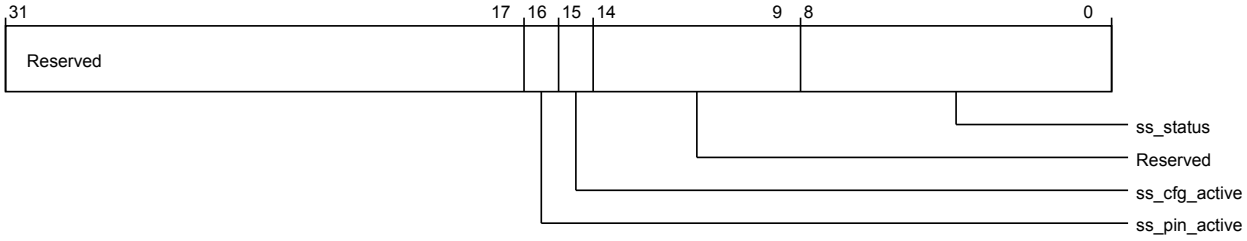

Figure 3-270 por_dt_pmssr (low)

The following table shows the por_dt_pmssr lower register bit assignments.

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Table 3-284 por_dt_pmssr (low)

Bits	Field name	Description	Type	Reset
31:17	Reserved	Reserved	RO	-
16	ss_pin_active	Activates PMU snapshot from PMUSNAPSHOTREQ	RO	1'b0
15	ss_cfg_active	PMU snapshot activated from configuration write	RO	1'b0
14:9	Reserved	Reserved	RO	-
8:0	ss_status	PMU snapshot status Bit 8: Indicates snapshot status for cycle counter Bits [7:0]: Indicates snapshot status for counters 7 to 0	RO	9'b0

por_dt_pmsrr

Sends PMU snapshot requests.

Its characteristics are:

Type WO
Register width (Bits) 64
Address offset 14'h2130
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

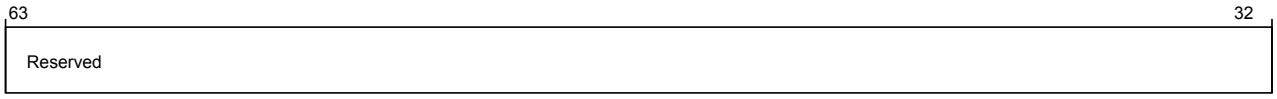

Figure 3-271 por_dt_pmsrr (high)

The following table shows the por_dt_pmsrr higher register bit assignments.

Table 3-285 por_dt_pmsrr (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

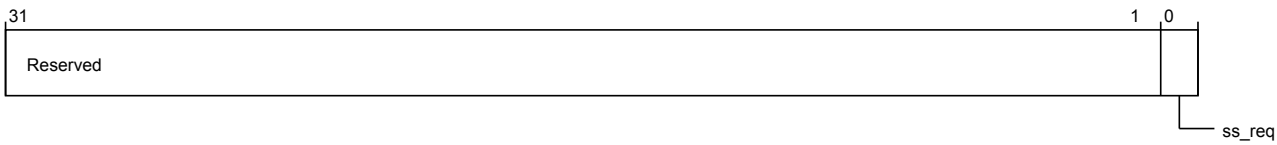

Figure 3-272 por_dt_pmsrr (low)

The following table shows the por_dt_pmsrr lower register bit assignments.

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Table 3-286 por_dt_pmsrr (low)

Bits	Field name	Description	Type	Reset
31:1	Reserved	Reserved	RO	-
0	ss_req	Write a 1 to request PMU snapshot	WO	1'b0

por_dt_claim

Functions as the claim tag set register.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h2DA0

Register reset 64'b0111111111111111111111111111111111

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

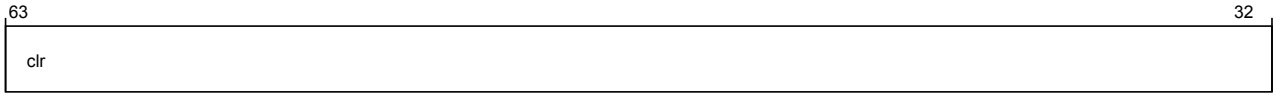

Figure 3-273 por_dt_claim (high)

The following table shows the por_dt_claim higher register bit assignments.

Table 3-287 por_dt_claim (high)

Bits	Field name	Description	Type	Reset
63:32	clr	Upper half of the claim tag value; enables individual bits to be cleared (write) and returns the current claim tag value (read)	RW	32'b0

The following image shows the lower register bit assignments.

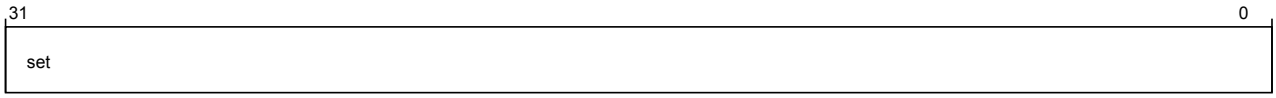

Figure 3-274 por_dt_claim (low)

The following table shows the por_dt_claim lower register bit assignments.

Table 3-288 por_dt_claim (low)

Bits	Field name	Description	Type	Reset
31:0	set	Lower half of the claim tag value; allows individual bits to be set (write) and returns the number of bits that can be set (read)	RW	32'hffffffff

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por_dt_devaff

Functions as the device affinity register.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h2DA8
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

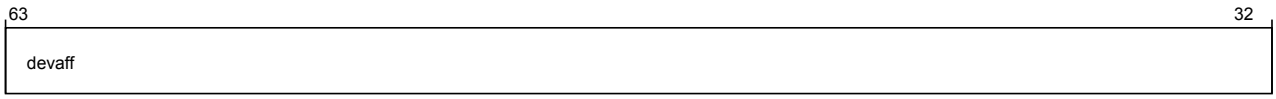

Figure 3-275 por_dt_devaff (high)

The following table shows the por_dt_devaff higher register bit assignments.

Table 3-289 por_dt_devaff (high)

Bits	Field name	Description	Type	Reset
63:32	devaff	Device affinity register	RO	64'b0

The following image shows the lower register bit assignments.

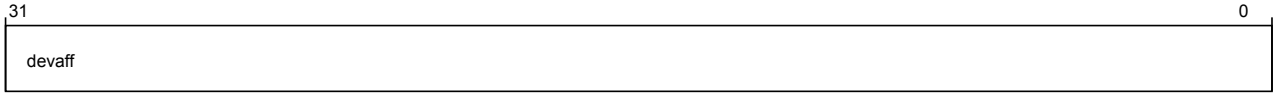

Figure 3-276 por_dt_devaff (low)

The following table shows the por_dt_devaff lower register bit assignments.

Table 3-290 por_dt_devaff (low)

Bits	Field name	Description	Type	Reset
31:0	devaff	Device affinity register	RO	64'b0

por_dt_lsr

Functions as the lock status register.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h2DB0
Register reset 64'b0

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Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

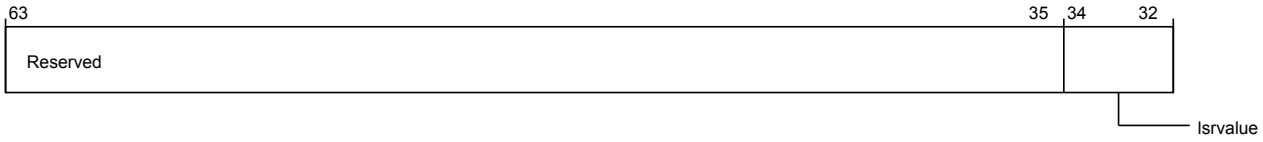

Figure 3-277 por_dt_lsr (high)

The following table shows the por_dt_lsr higher register bit assignments.

Table 3-291 por_dt_lsr (high)

Bits	Field name	Description	Type	Reset
63:35	Reserved	Reserved	RO	-
34:32	lsrvalue	Lock status value	RO	3'b0

The following image shows the lower register bit assignments.

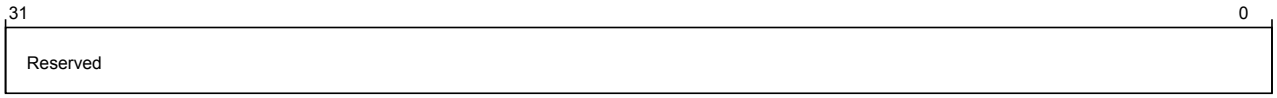

Figure 3-278 por_dt_lsr (low)

The following table shows the por_dt_lsr lower register bit assignments.

Table 3-292 por_dt_lsr (low)

Bits	Field name	Description	Type	Reset
31:0	Reserved	Reserved	RO	-

por_dt_authstatus_devarch

Functions as the authentication status register and the device architecture register.

Its characteristics are:

Type RO

Register width (Bits) 64

Address offset 14'h2DB8

Register reset 64'b01001010

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

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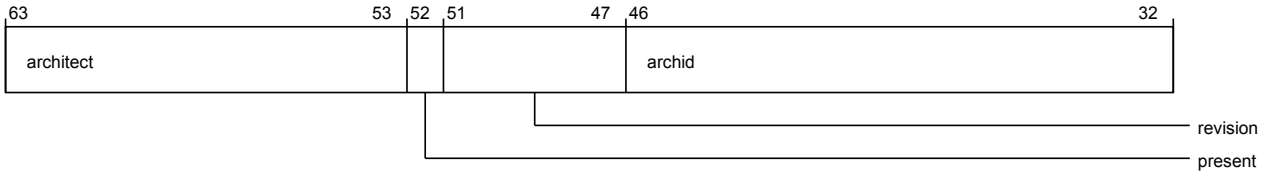

Figure 3-279 por_dt_authstatus_devarch (high)

The following table shows the por_dt_authstatus_devarch higher register bit assignments.

Table 3-293 por_dt_authstatus_devarch (high)

Bits	Field name	Description	Type	Reset
63:53	architect	Architect	RO	11'b0
52	present	Present	RO	1'b1
51:47	revision	Architecture revision	RO	6'b0
46:32	archid	Architecture ID	RO	16'b0

The following image shows the lower register bit assignments.

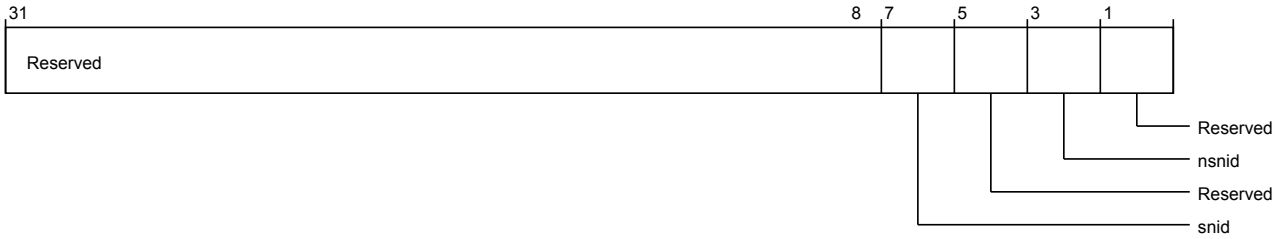

Figure 3-280 por_dt_authstatus_devarch (low)

The following table shows the por_dt_authstatus_devarch lower register bit assignments.

Table 3-294 por_dt_authstatus_devarch (low)

Bits	Field name	Description	Type	Reset
31:8	Reserved	Reserved	RO	-
7:6	snid	Secure non-invasive debug	RO	2'b10
5:4	Reserved	Reserved	RO	-
3:2	nsnid	Non-secure non-invasive debug	RO	2'b10
1:0	Reserved	Reserved	RO	-

por_dt_devid

Functions as the device configuration register.

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Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h2DC0
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

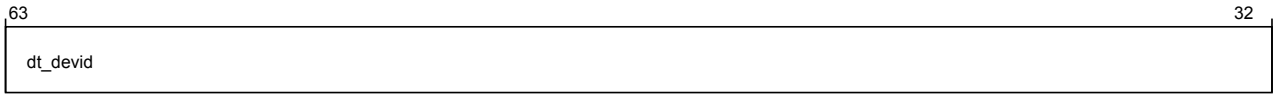

Figure 3-281 por_dt_devid (high)

The following table shows the por_dt_devid higher register bit assignments.

Table 3-295 por_dt_devid (high)

Bits	Field name	Description	Type	Reset
63:32	dt_devid	Device ID	RO	64'b0

The following image shows the lower register bit assignments.

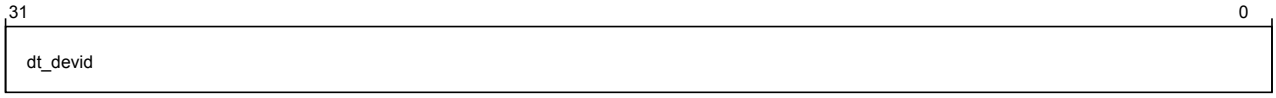

Figure 3-282 por_dt_devid (low)

The following table shows the por_dt_devid lower register bit assignments.

Table 3-296 por_dt_devid (low)

Bits	Field name	Description	Type	Reset
31:0	dt_devid	Device ID	RO	64'b0

por_dt_devtype

Functions as the device type identifier register.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h2DC8
Register reset 64'b01000011
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

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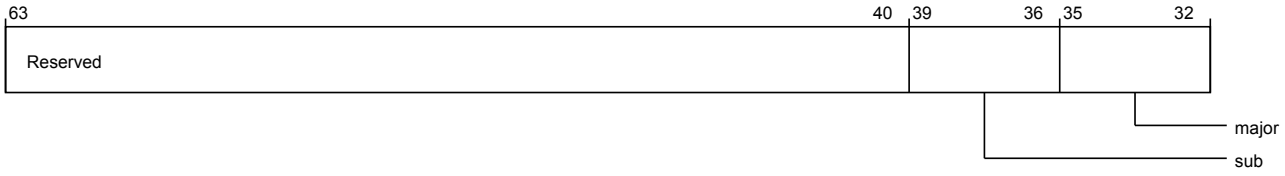

Figure 3-283 por_dt_devtype (high)

The following table shows the por_dt_devtype higher register bit assignments.

Table 3-297 por_dt_devtype (high)

Bits	Field name	Description	Type	Reset
63:40	Reserved	Reserved	RO	-
39:36	sub	Sub type	RO	4'h4
35:32	major	Major type	RO	4'h3

The following image shows the lower register bit assignments.

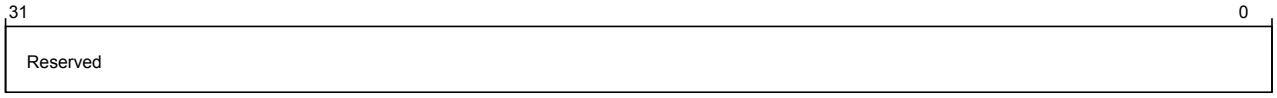

Figure 3-284 por_dt_devtype (low)

The following table shows the por_dt_devtype lower register bit assignments.

Table 3-298 por_dt_devtype (low)

Bits	Field name	Description	Type	Reset
31:0	Reserved	Reserved	RO	-

por_dt_pidr45

Functions as the identification register for peripheral ID 4 and peripheral ID 5.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h2DD0
Register reset 64'b000000100
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

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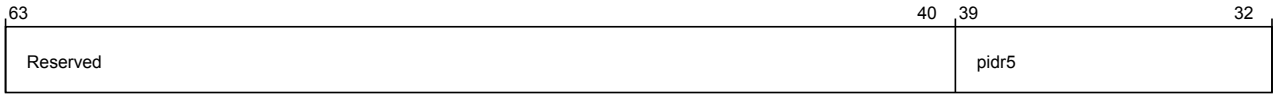

Figure 3-285 por_dt_pidr45 (high)

The following table shows the por_dt_pidr45 higher register bit assignments.

Table 3-299 por_dt_pidr45 (high)

Bits	Field name	Description	Type	Reset
63:40	Reserved	Reserved	RO	-
39:32	pidr5	Peripheral ID 5	RO	8'b0

The following image shows the lower register bit assignments.

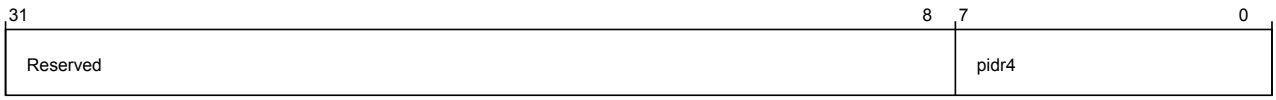

Figure 3-286 por_dt_pidr45 (low)

The following table shows the por_dt_pidr45 lower register bit assignments.

Table 3-300 por_dt_pidr45 (low)

Bits	Field name	Description	Type	Reset
31:8	Reserved	Reserved	RO	-
7:0	pidr4	Peripheral ID 4	RO	8'h4

por_dt_pidr67

Functions as the identification register for peripheral ID 6 and peripheral ID 7.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h2DD8
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

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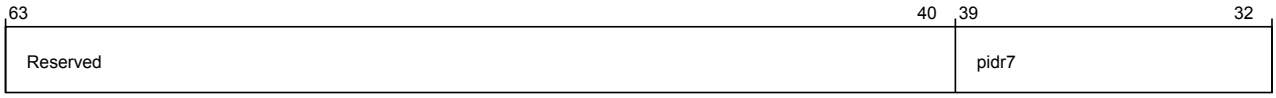

Figure 3-287 por_dt_pidr67 (high)

The following table shows the por_dt_pidr67 higher register bit assignments.

Table 3-301 por_dt_pidr67 (high)

Bits	Field name	Description	Type	Reset
63:40	Reserved	Reserved	RO	-
39:32	pidr7	Peripheral ID 7	RO	8'b0

The following image shows the lower register bit assignments.

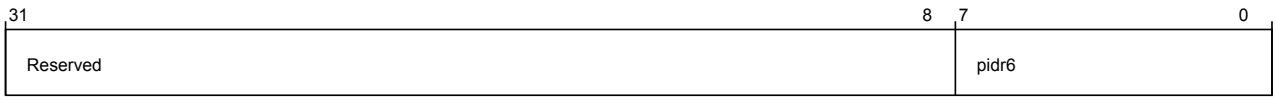

Figure 3-288 por_dt_pidr67 (low)

The following table shows the por_dt_pidr67 lower register bit assignments.

Table 3-302 por_dt_pidr67 (low)

Bits	Field name	Description	Type	Reset
31:8	Reserved	Reserved	RO	-
7:0	pidr6	Peripheral ID 6	RO	8'b0

por_dt_pidr01

Functions as the identification register for peripheral ID 0 and peripheral ID 1.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h2DE0
Register reset 64'b0101110000011100
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

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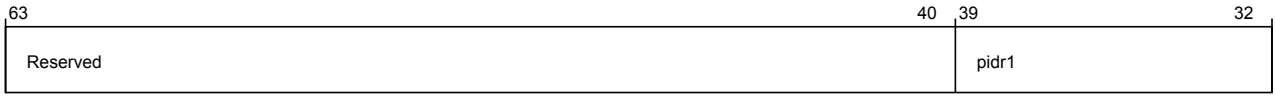

Figure 3-289 por_dt_pidr01 (high)

The following table shows the por_dt_pidr01 higher register bit assignments.

Table 3-303 por_dt_pidr01 (high)

Bits	Field name	Description	Type	Reset
63:40	Reserved	Reserved	RO	-
39:32	pidr1	Peripheral ID 1	RO	8'hb4

The following image shows the lower register bit assignments.

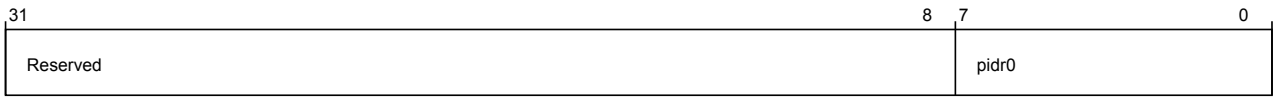

Figure 3-290 por_dt_pidr01 (low)

The following table shows the por_dt_pidr01 lower register bit assignments.

Table 3-304 por_dt_pidr01 (low)

Bits	Field name	Description	Type	Reset
31:8	Reserved	Reserved	RO	-
7:0	pidr0	Peripheral ID 0	RO	8'h34

por_dt_pidr23

Functions as the identification register for peripheral ID 2 and peripheral ID 3.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h2DE8
Register reset 64'b000000111
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

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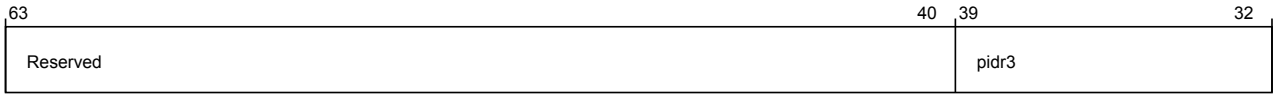

Figure 3-291 por_dt_pidr23 (high)

The following table shows the por_dt_pidr23 higher register bit assignments.

Table 3-305 por_dt_pidr23 (high)

Bits	Field name	Description	Type	Reset
63:40	Reserved	Reserved	RO	-
39:32	pidr3	Peripheral ID 3	RO	8'b0

The following image shows the lower register bit assignments.

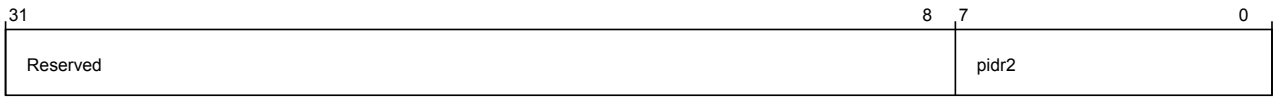

Figure 3-292 por_dt_pidr23 (low)

The following table shows the por_dt_pidr23 lower register bit assignments.

Table 3-306 por_dt_pidr23 (low)

Bits	Field name	Description	Type	Reset
31:8	Reserved	Reserved	RO	-
7:0	pidr2	Peripheral ID 2	RO	8'h7

por_dt_cidr01

Functions as the identification register for component ID 0 and component ID 1.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h2DF0
Register reset 64'b1001111100001101
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

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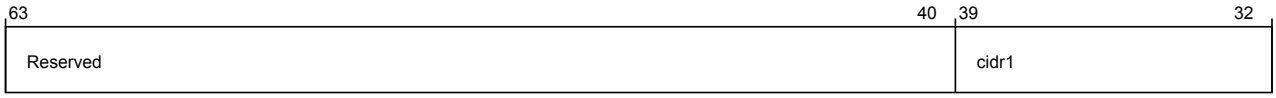

Figure 3-293 por_dt_cidr01 (high)

The following table shows the por_dt_cidr01 higher register bit assignments.

Table 3-307 por_dt_cidr01 (high)

Bits	Field name	Description	Type	Reset
63:40	Reserved	Reserved	RO	-
39:32	cidr1	Component ID 1	RO	8'h9f

The following image shows the lower register bit assignments.

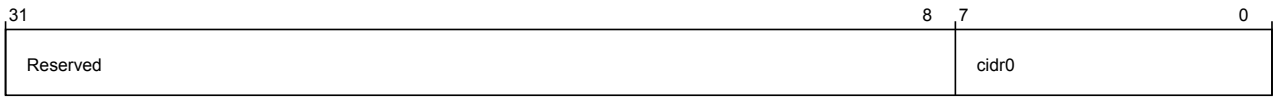

Figure 3-294 por_dt_cidr01 (low)

The following table shows the por_dt_cidr01 lower register bit assignments.

Table 3-308 por_dt_cidr01 (low)

Bits	Field name	Description	Type	Reset
31:8	Reserved	Reserved	RO	-
7:0	cidr0	Component ID 0	RO	8'hd

por_dt_cidr23

Functions as the identification register for component ID 2 and component ID 3.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h2DF8
Register reset 64'b0001011100000101
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

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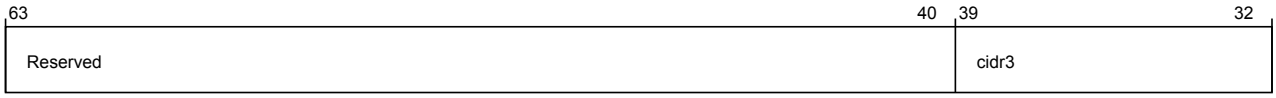

Figure 3-295 por_dt_cidr23 (high)

The following table shows the por_dt_cidr23 higher register bit assignments.

Table 3-309 por_dt_cidr23 (high)

Bits	Field name	Description	Type	Reset
63:40	Reserved	Reserved	RO	-
39:32	cidr3	Component ID 3	RO	8'hb1

The following image shows the lower register bit assignments.

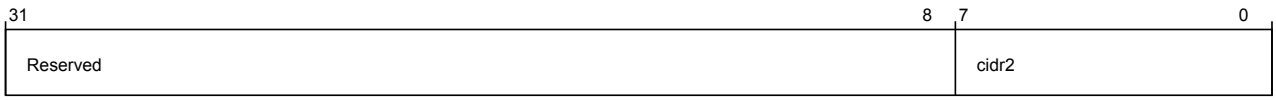

Figure 3-296 por_dt_cidr23 (low)

The following table shows the por_dt_cidr23 lower register bit assignments.

Table 3-310 por_dt_cidr23 (low)

Bits	Field name	Description	Type	Reset
31:8	Reserved	Reserved	RO	-
7:0	cidr2	Component ID 2	RO	8'h5

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3.3.4 HN-F register descriptions

Lists the HN-F registers.

por_hnf_node_info

Provides component identification information.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h0
Register reset Configuration dependent
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

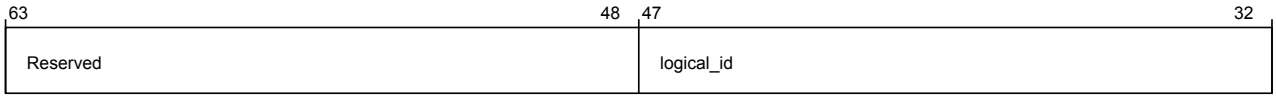

Figure 3-297 por_hnf_node_info (high)

The following table shows the por_hnf_node_info higher register bit assignments.

Table 3-311 por_hnf_node_info (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	logical_id	Component logical ID	RO	Configuration dependent

The following image shows the lower register bit assignments.

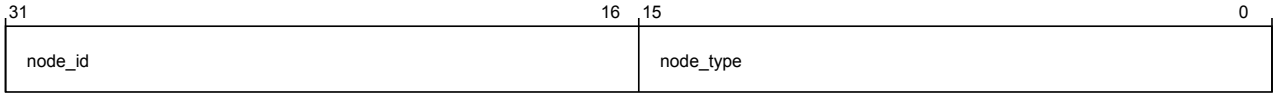

Figure 3-298 por_hnf_node_info (low)

The following table shows the por_hnf_node_info lower register bit assignments.

Table 3-312 por_hnf_node_info (low)

Bits	Field name	Description	Type	Reset
31:16	node_id	Component node ID	RO	Configuration dependent
15:0	node_type	CMN-600 node type identifier	RO	16'h0005

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por_hnf_child_info

Provides component child identification information.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h80
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

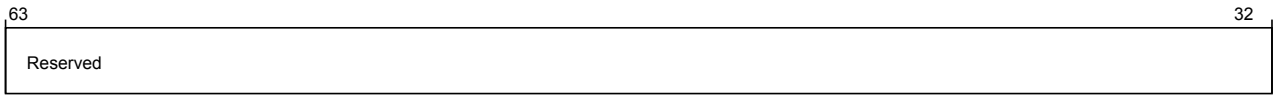

Figure 3-299 por_hnf_child_info (high)

The following table shows the por_hnf_child_info higher register bit assignments.

Table 3-313 por_hnf_child_info (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

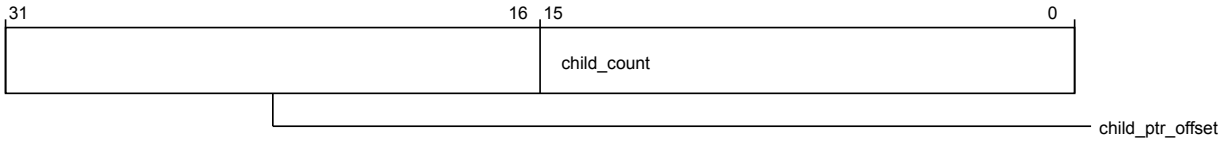

Figure 3-300 por_hnf_child_info (low)

The following table shows the por_hnf_child_info lower register bit assignments.

Table 3-314 por_hnf_child_info (low)

Bits	Field name	Description	Type	Reset
31:16	child_ptr_offset	Starting register offset which contains pointers to the child nodes	RO	16'h0
15:0	child_count	Number of child nodes; used in discovery process	RO	16'b0

por_hnf_secure_register_groups_override

Allows non-secure access to predefined groups of secure registers.

Its characteristics are:

Type RW
Register width (Bits) 64

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Address offset 14'h980

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

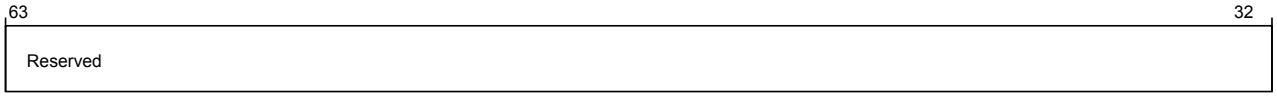

Figure 3-301 por_hnf_secure_register_groups_override (high)

The following table shows the por_hnf_secure_register_groups_override higher register bit assignments.

Table 3-315 por_hnf_secure_register_groups_override (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

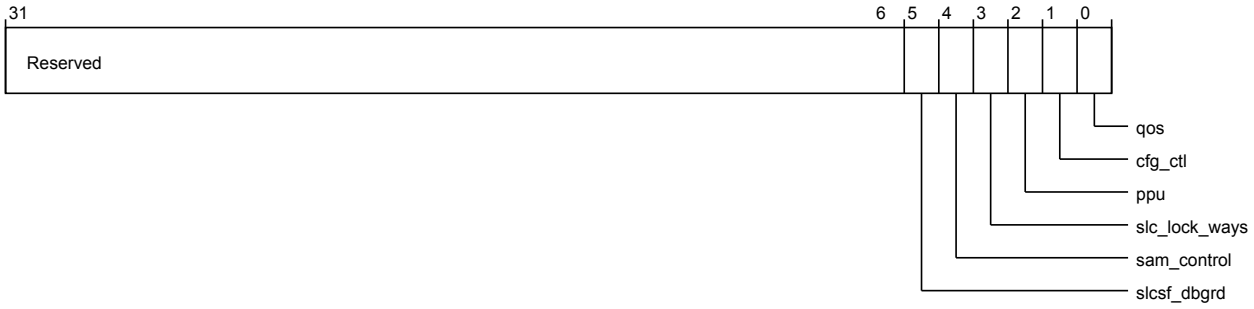

Figure 3-302 por_hnf_secure_register_groups_override (low)

The following table shows the por_hnf_secure_register_groups_override lower register bit assignments.

Table 3-316 por_hnf_secure_register_groups_override (low)

Bits	Field name	Description	Type	Reset
31:6	Reserved	Reserved	RO	-
5	slcsf_dbgrd	Allows non-secure access to secure SLC/SF debug read registers	RW	1'b0
4	sam_control	Allows non-secure access to secure HN-F SAM control registers	RW	1'b0
3	slc_lock_ways	Allows non-secure access to secure cache way locking registers	RW	1'b0
2	ppu	Allows non-secure access to secure power policy registers	RW	1'b0
1	cfg_ctl	Allows non-secure access to secure configuration control register (por_hnf_cfg_ctl)	RW	1'b0
0	qos	Allows non-secure access to secure QoS registers	RW	1'b0

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por_hnf_unit_info

Provides component identification information for HN-F.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h900
Register reset Configuration dependent
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

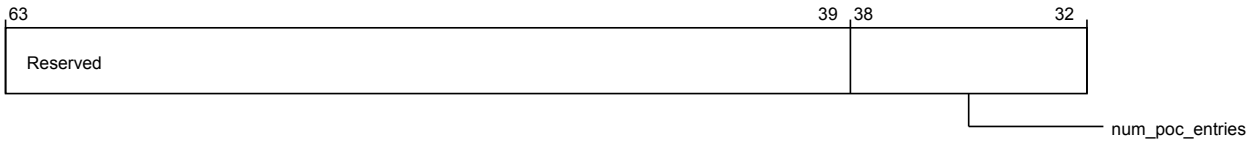

Figure 3-303 por_hnf_unit_info (high)

The following table shows the por_hnf_unit_info higher register bit assignments.

Table 3-317 por_hnf_unit_info (high)

Bits	Field name	Description	Type	Reset
63:39	Reserved	Reserved	RO	-
38:32	num_poc_entries	Number of POCQ entries	RO	Configuration dependent

The following image shows the lower register bit assignments.

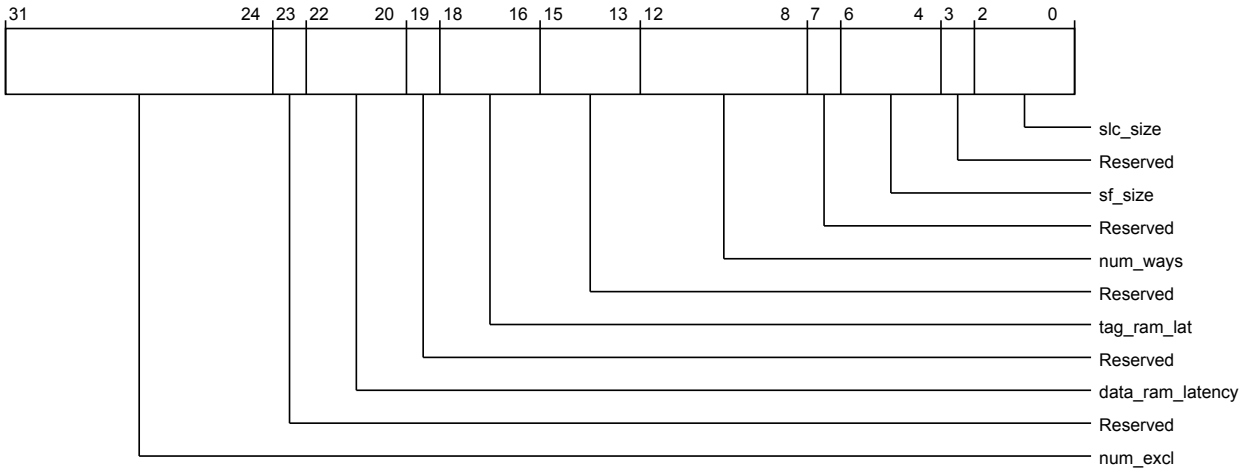

Figure 3-304 por_hnf_unit_info (low)

The following table shows the por_hnf_unit_info lower register bit assignments.

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Table 3-318 por_hnf_unit_info (low)

Bits	Field name	Description	Type	Reset
31:24	num_excl	Number of exclusive monitors	RO	-
23	Reserved	Reserved	RO	-
22:20	data_ram_latency	SLC data RAM latency (in cycles)	RO	-
19	Reserved	Reserved	RO	-
18:16	tag_ram_lat	SLC tag RAM latency (in cycles)	RO	-
15:13	Reserved	Reserved	RO	-
12:8	num_ways	Number of cache ways in the SLC	RO	-
7	Reserved	Reserved	RO	-
6:4	sf_size	SF size 3'b000: 512KB 3'b001: 1MB 3'b010: 2MB 3'b011: 4MB 3'b100: 8MB	RO	-
3	Reserved	Reserved	RO	-
2:0	slc_size	SLC size 3'b000: No SLC 3'b001: 128KB 3'b010: 256KB 3'b011: 512KB 3'b100: 1MB 3'b101: 2MB 3'b110: 3MB 3'b111: 4MB	RO	-

por_hnf_cfg_ctl

Functions as the configuration control register for HN-F.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hA00

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

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Secure group override por_hnf_secure_register_groups_override.cfg_ctl

The following image shows the higher register bit assignments.

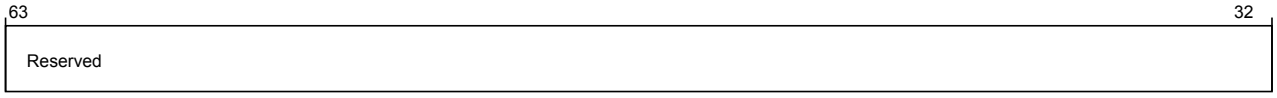

Figure 3-305 por_hnf_cfg_ctl (high)

The following table shows the por_hnf_cfg_ctl higher register bit assignments.

Table 3-319 por_hnf_cfg_ctl (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

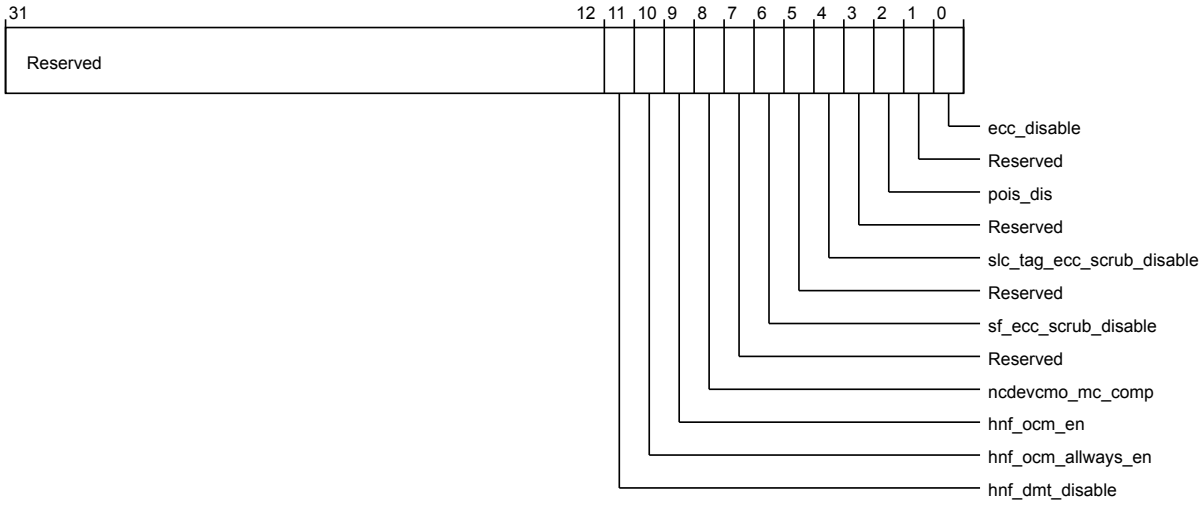

Figure 3-306 por_hnf_cfg_ctl (low)

The following table shows the por_hnf_cfg_ctl lower register bit assignments.

Table 3-320 por_hnf_cfg_ctl (low)

Bits	Field name	Description	Type	Reset
31:12	Reserved	Reserved	RO	-
11	hnf_dmt_disable	Disables DMT when set	RW	1'b0
10	hnf_ocm_allways_en	Enables all SLC ways with OCM	RW	1'b0
9	hnf_ocm_en	Enables region locking with OCM support	RW	1'b0

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Table 3-320 por_hnf_cfg_ctl (low) (continued)

Bits	Field name	Description	Type	Reset
8	ncdevcmo_mc_comp	Disables HN-F completion when set ——— **Note** ——— When set, HN-F sends completion for the following transactions received after completion from SN: ——— 1. Non-cacheable WriteNoSnp 2. Device WriteNoSnp 3. CMO (cache maintenance operations) CONSTRAINT: When this bit is set, por_rni_cfg_ctl.dis_ncwr_stream and por_rnd_cfg_ctl.dis_ncwr_stream must also be set.	RW	1'b0
7	Reserved	Reserved	RO	-
6	sf_ecc_scrub_disable	Disables SF tag single-bit ECC error scrubbing when set	RW	1'b0
5	Reserved	Reserved	RO	-
4	slc_tag_ecc_scrub_disable	Disables SLC tag single-bit ECC error scrubbing when set	RW	1'b0
3	Reserved	Reserved	RO	-
2	pois_dis	Disables parity error data poison when set	RW	1'b0
1	Reserved	Reserved	RO	-
0	ecc_disable	Disables SLC and SF ECC generation/detection when set	RW	1'b0

por_hnf_aux_ctl

Functions as the auxiliary control register for HN-F.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hA08

Register reset Configuration dependent

Usage constraints Only accessible by secure accesses. This register can be modified only with prior written permission from Arm.

The following image shows the higher register bit assignments.

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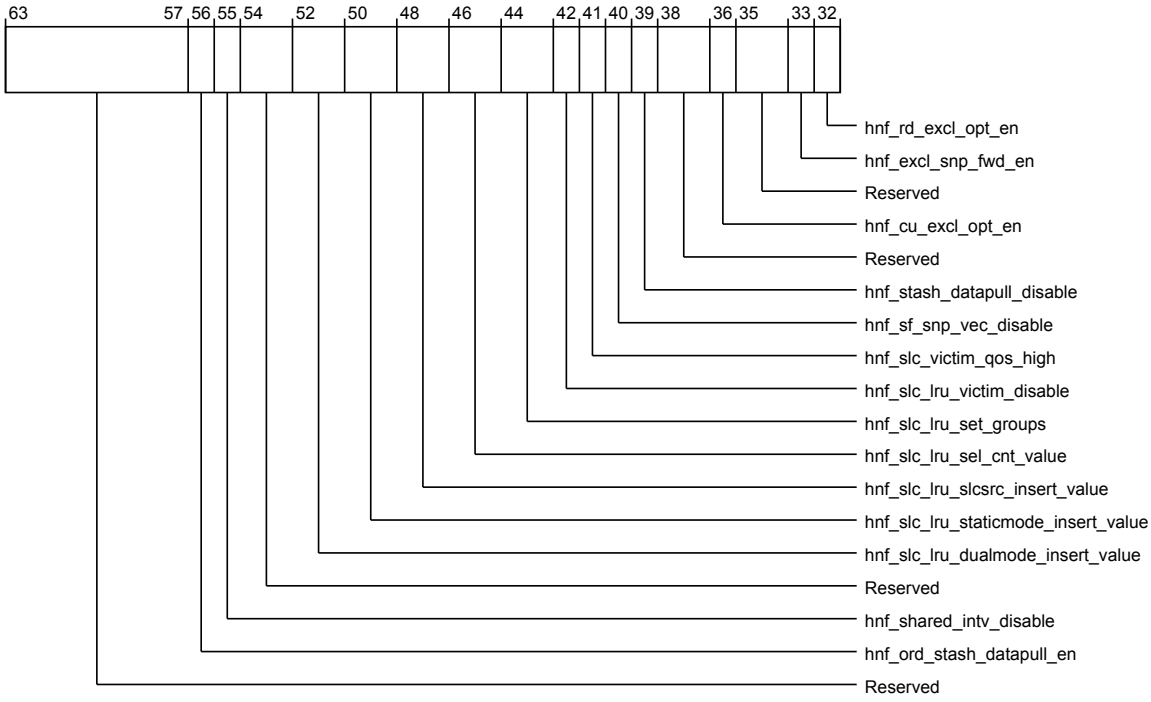

Figure 3-307 por_hnf_aux_ctl (high)

The following table shows the por_hnf_aux_ctl higher register bit assignments.

Table 3-321 por_hnf_aux_ctl (high)

Bits	Field name	Description	Type	Reset
63:57	Reserved	Reserved	RO	-
56	hnf_ord_stash_datapull_en	Enables stash datapull for ordered write stash requests	RW	Configuration dependent
55	hnf_shared_intv_disable	Disables snoop requests to CHIB RN-F with shared copy	RW	Configuration dependent
54:53	Reserved	Reserved	RO	-
52:51	hnf_slc_lru_dualmode_insert_value	Insertion value for Dual mode eLRU **Note** Default is 2'b11.	RW	2'b11
50:49	hnf_slc_lru_staticmode_insert_value	Insertion value for Static mode eLRU **Note** Default is 2'b10.	RW	2'b10
48:47	hnf_slc_lru_slcsrc_insert_value	Insertion value if SLC source bit is set **Note** Default is 2'b00.	RW	2'b00

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Table 3-321 por_hnf_aux_ctl (high) (continued)

Bits	Field name	Description	Type	Reset
46:45	hnf_slc_lru_sel_cnt_value	Selection counter value for eLRU to determine which group policy is more effective 2'b00: Sel counter is like an 8-bit range; upper limit is 255; middle point is 128 2'b01: Sel counter is like a 9-bit range; upper limit is 511; middle point is 256 2'b10: Sel counter is like a 10-bit range; upper limit is 1023; middle point is 512 2'b11: Sel counter is like an 11-bit range; upper limit is 2047; middle point is 1024 **Note** Default is 10-bit with counter reset to a value of 512.	RW	2'b10
44:43	hnf_slc_lru_set_groups	Number of sets in monitor group for enhance LRU 2'b00: 16 2'b01: 32 2'b10: 64 2'b11: 128 **Note** Default is 32 sets per monitor group. If cache size is small (128KB or less), there would be only one set per group.	RW	2'b01
42	hnf_slc_lru_victim_disable	Disable enhanced LRU based victim selection for SLC 1'b0: SLC victim selection is based on eLRU. 1'b1: SLC victim selection is based on LFSR. **Note** Victim selection for SF is always LFSR-based.	RW	1'b1
41	hnf_slc_victim_qos_high	SLC victim QoS behavior for SN write request 1'b0: Each victim inherits the QoS value of the request which caused it 1'b1: All victims use high QoS class (14)	RW	1'b0
40	hnf_sf_snp_vec_disable	Disables SF snoop vector when set	RW	1'b0
39	hnf_stash_datapull_disable	Disables HN-F stash data pull support when set	RW	1'b0
38:37	Reserved	Reserved	RO	-
36	hnf_cu_excl_opt_en	CleanUnique exclusive optimization enable	RW	Configuration dependent

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Table 3-321 por_hnf_aux_ctl (high) (continued)

Bits	Field name	Description	Type	Reset
35:34	Reserved	Reserved	RO	-
33	hnf_excl_snp_fwd_en	This bit is currently not supported. Software must not program this bit.	RW	1'b0
32	hnf_rd_excl_opt_en	ReadNotSharedDirty exclusive optimization enable	RW	1'b0

The following image shows the lower register bit assignments.

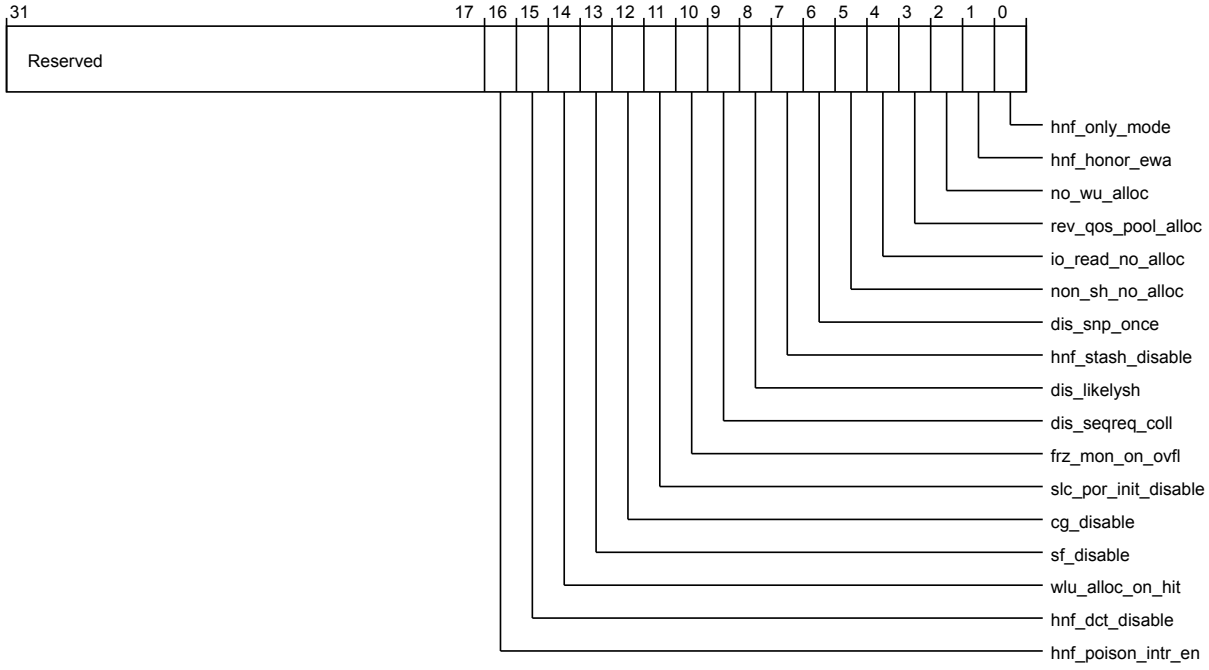

Figure 3-308 por_hnf_aux_ctl (low)

The following table shows the por_hnf_aux_ctl lower register bit assignments.

Table 3-322 por_hnf_aux_ctl (low)

Bits	Field name	Description	Type	Reset
31:17	Reserved	Reserved	RO	-
16	hnf_poison_intr_en	Enables reporting an interrupt by HN-F when poison is detected at SLC	RW	Configuration dependent
15	hnf_dct_disable	Disables DCT when set	RW	Configuration dependent
14	wlu_alloc_on_hit	Forces WLU requests to allocate if the line hit in SLC	RW	1'b0
13	sf_disable	Disables SF	RW	1'b0
12	cg_disable	Disables HN-F architectural clock gates	RW	1'b0

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Table 3-322 por_hnf_aux_ctl (low) (continued)

Bits	Field name	Description	Type	Reset
11	slc_por_init_disable	Disables SLC and SF initialization on Reset	RW	1'b0
10	frz_mon_on_ovfl	Freezes the exclusive monitors	RW	1'b0
9	dis_seqreq_coll		RW	1'b0
8	dis_likelysh	Disables Likely Shared based allocations	RW	1'b0
7	hnf_stash_disable	Disables HN-F stash support	RW	Configuration dependent
6	dis_snp_once	When set, disables SnpOnce and converts to SnpShared	RW	Configuration dependent
5	non_sh_no_alloc	Disables SLC allocation for non-shareable cacheable transactions when set	RW	1'b0
4	io_read_no_alloc	When set, disables ReadOnce and ReadNoSnp allocation in SLC from RN-Is	RW	1'b0
3	rev_qos_pool_alloc	Reverses QoS pool allocation algorithm	RW	1'b0
2	no_wu_alloc	Disables WriteUnique/WriteLineUnique allocations in SLC when set	RW	1'b0
1	hnf_honor_ewa	When set, postpones completion for writes where EWA=0 in the request until HN-F receives completion from MC or SBSX	RW	1'b1
0	hnf_only_mode	Enables HN-F only mode; disables SLC and SF when set	RW	1'b0

por_hnf_r2_aux_ctl

Functions as the auxiliary control register for HN-F for CMN-600 R2 features.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hA10

Register reset 64'b0

Usage constraints Only accessible by secure accesses. This register can be modified only with prior written permission from Arm.

The following image shows the higher register bit assignments.

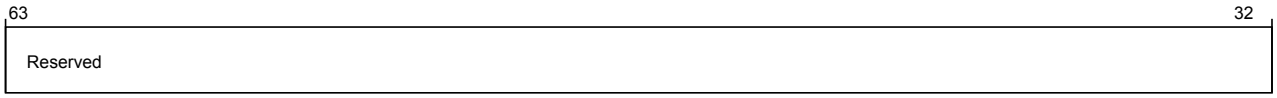

Figure 3-309 por_hnf_r2_aux_ctl (high)

The following table shows the por_hnf_r2_aux_ctl higher register bit assignments.

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Table 3-323 por_hnf_r2_aux_ctl (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

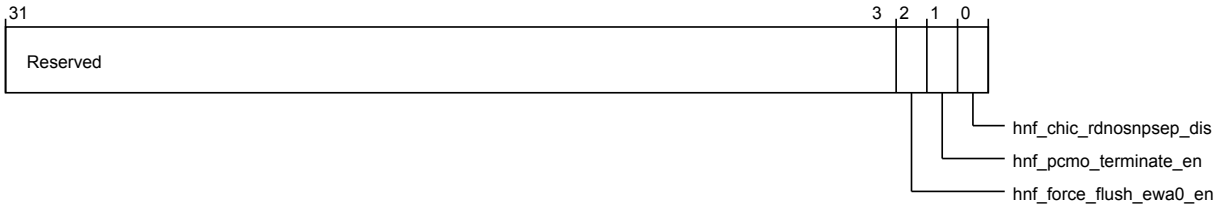

Figure 3-310 por_hnf_r2_aux_ctl (low)

The following table shows the por_hnf_r2_aux_ctl lower register bit assignments.

Table 3-324 por_hnf_r2_aux_ctl (low)

Bits	Field name	Description	Type	Reset
31:3	Reserved	Reserved	RO	-
2	hnf_force_flush_ewa0_en	Force SLC and SF flush to use EWA 0 for SN writes	RW	1'b0
1	hnf_pcmo_terminate_en	Terminate PCMO in HNF when this bit is set to 1'b1	RW	1'b0
0	hnf_chic_rdnosnpsep_dis	Disables separation of Data and Comp in CHIC mode	RW	1'b0

por_hnf_ppu_pwpr

Functions as the power policy register for HN-F.

Its characteristics are:

Type RW

Register width (Bits) 32

Address offset 14'h1000

Register reset 32'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.ppu

The following image shows the lower register bit assignments.

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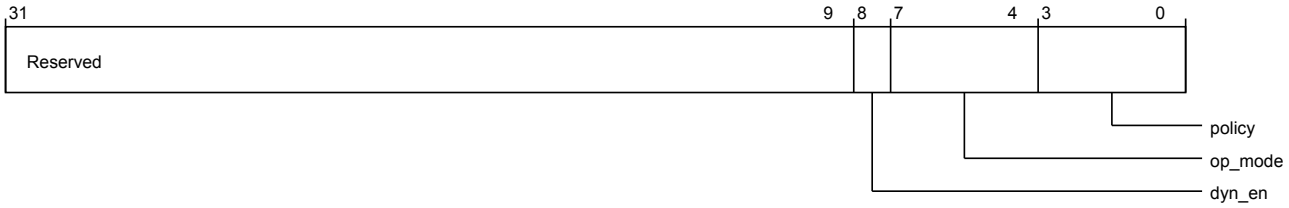

Figure 3-311 por_hnf_ppu_pwpr

The following table shows the por_hnf_ppu_pwpr register bit assignments.

Table 3-325 por_hnf_ppu_pwpr (low)

Bits	Field name	Description	Type	Reset
31:9	Reserved	Reserved	RO	-
8	dyn_en	Dynamic transition enable	RW	1'b0
7:4	op_mode	HN-F operational power mode 4'b0011: FAM 4'b0010: HAM 4'b0001: SFONLY 4'b0000: NOSFSLC	RW	4'b0
3:0	policy	HN-F power mode policy 4'b1000: ON 4'b0111: FUNC_RET 4'b0010: MEM_RET 4'b0000: OFF	RW	4'b0

por_hnf_ppu_pwsr

Provides power status information for HN-F.

Its characteristics are:

Type RO
Register width (Bits) 32
Address offset 14'h1008
Register reset 32'b0
Usage constraints There are no usage constraints.

The following image shows the lower register bit assignments.

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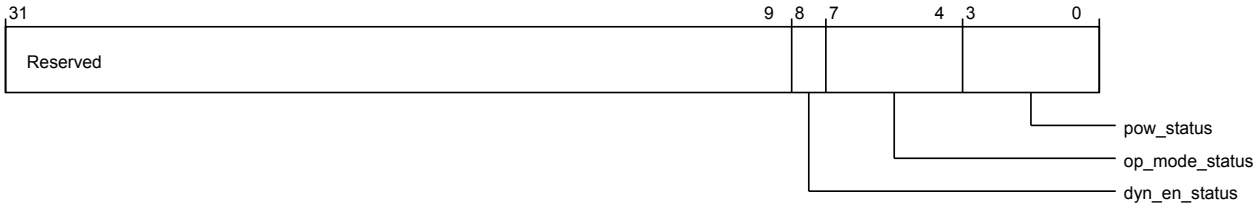

Figure 3-312 por_hnf_ppu_pwsr

The following table shows the por_hnf_ppu_pwsr register bit assignments.

Table 3-326 por_hnf_ppu_pwsr (low)

Bits	Field name	Description	Type	Reset
31:9	Reserved	Reserved	RO	-
8	dyn_en_status	Dynamic transition status	RO	1'b0
7:4	op_mode_status	HN-F operational mode status 4'b0011: FAM 4'b0010: HAM 4'b0001: SFONLY 4'b0000: NOSFSLC	RO	4'b0
3:0	pow_status	HN-F power mode status 4'b1000: ON 4'b0111: FUNC_RET 4'b0010: MEM_RET 4'b0000: OFF	RO	4'b0

por_hnf_ppu_misr

Functions as the power miscellaneous input current status register for HN-F.

Its characteristics are:

Type RO
Register width (Bits) 32
Address offset 14'h1014
Register reset 32'b0
Usage constraints There are no usage constraints.

The following image shows the lower register bit assignments.

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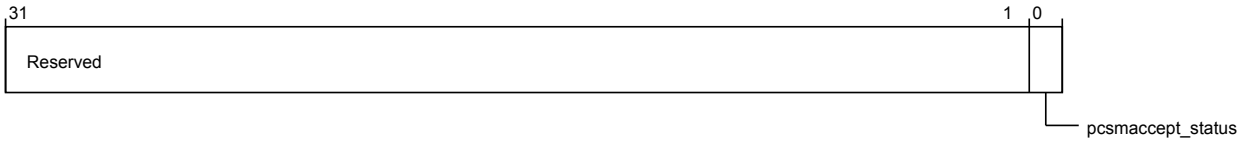

Figure 3-313 por_hnf_ppu_misr

The following table shows the por_hnf_ppu_misr register bit assignments.

Table 3-327 por_hnf_ppu_misr (low)

Bits	Field name	Description	Type	Reset
31:1	Reserved	Reserved	RO	-
0	pcsmaccept_status	HN-F RAM PCSMACCEPT status	RO	1'b0

por_hnf_ppu_idr0

Provides identification information for the HN-F PPU.

Its characteristics are:

Type RO
Register width (Bits) 32
Address offset 14'h1FB0
Register reset 32'b00100000000011010010101000
Usage constraints There are no usage constraints.

The following image shows the lower register bit assignments.

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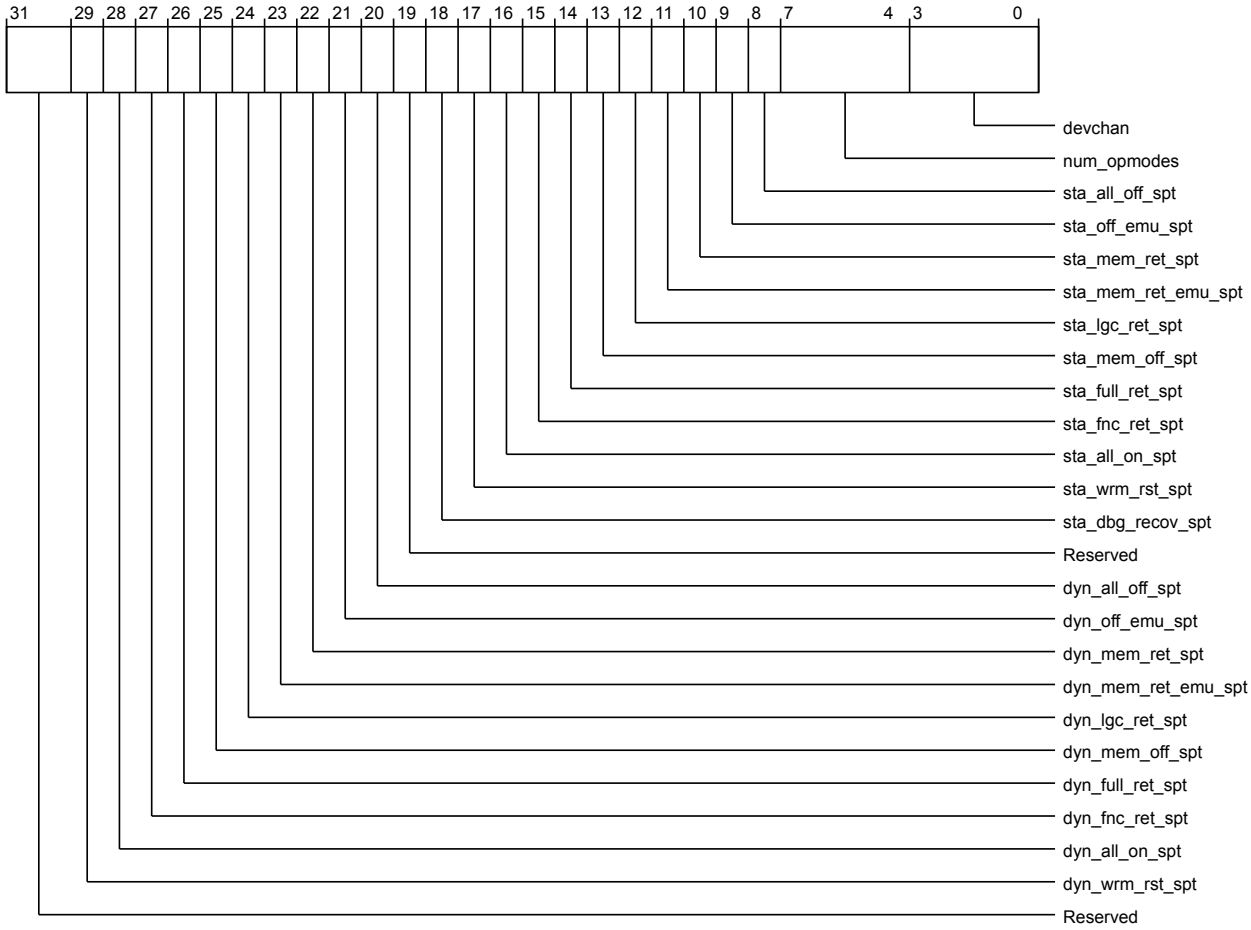

Figure 3-314 por_hnf_ppu_idr0

The following table shows the por_hnf_ppu_idr0 register bit assignments.

Table 3-328 por_hnf_ppu_idr0 (low)

Bits	Field name	Description	Type	Reset
31:30	Reserved	Reserved	RO	-
29	dyn_wrm_rst_spt	Dynamic warm_rst support	RO	1'b0
28	dyn_all_on_spt	Dynamic on support	RO	1'b0
27	dyn_fnc_ret_spt	Dynamic func_ret support	RO	1'b1
26	dyn_full_ret_spt	Dynamic full_ret support	RO	1'b0
25	dyn_mem_off_spt	Dynamic mem_off support	RO	1'b0
24	dyn_lgc_ret_spt	Dynamic logic_ret support	RO	1'b0
23	dyn_mem_ret_emu_spt	Dynamic mem_ret_emu support	RO	1'b0
22	dyn_mem_ret_spt	Dynamic mem_ret support	RO	1'b0
21	dyn_off_emu_spt	Dynamic off_emu support	RO	1'b0

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Table 3-328 por_hnf_ppu_idr0 (low) (continued)

Bits	Field name	Description	Type	Reset
20	dyn_all_off_spt	Dynamic off support	RO	1'b0
19	Reserved	Reserved	RO	-
18	sta_dbg_recov_spt	Static dbg_recov support	RO	1'b0
17	sta_wrm_rst_spt	Static warm_rst support	RO	1'b0
16	sta_all_on_spt	Static on support	RO	1'b1
15	sta_fnc_ret_spt	Static func_ret support	RO	1'b1
14	sta_full_ret_spt	Static full_ret support	RO	1'b0
13	sta_mem_off_spt	Static mem_off support	RO	1'b1
12	sta_lgc_ret_spt	Static logic_ret support	RO	1'b0
11	sta_mem_ret_emu_spt	Static mem_ret_emu support	RO	1'b0
10	sta_mem_ret_spt	Static mem_ret support	RO	1'b1
9	sta_off_emu_spt	Static off_emu support	RO	1'b0
8	sta_all_off_spt	Static off support	RO	1'b1
7:4	num_opmodes	Number of operational modes	RO	4'b0100
3:0	devchan	Number of device interface channels	RO	1'b0

por_hnf_ppu_idr1

Provides identification information for the HN-F PPU.

Its characteristics are:

Type RO

Register width (Bits) 32

Address offset 14'h1FB4

Register reset 32'b0

Usage constraints There are no usage constraints.

The following image shows the lower register bit assignments.

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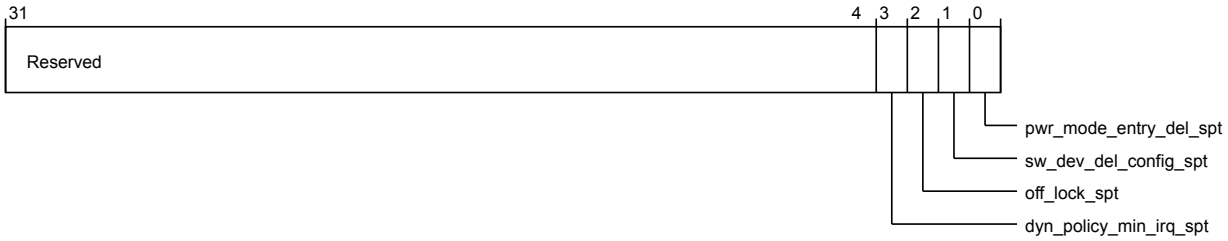

Figure 3-315 por_hnf_ppu_idr1

The following table shows the por_hnf_ppu_idr1 register bit assignments.

Table 3-329 por_hnf_ppu_idr1 (low)

Bits	Field name	Description	Type	Reset
31:4	Reserved	Reserved	RO	-
3	dyn_policy_min_irq_spt	Dynamic minimum policy interrupt support	RO	1'b0
2	off_lock_spt	Off and mem_ret lock support	RO	1'b0
1	sw_dev_del_config_spt	Software device delay control configuration support	RO	1'b0
0	pwr_mode_entry_del_spt	Power mode entry delay support	RO	1'b0

por_hnf_ppu_iidr

Functions as the power implementation identification register for HN-F.

Its characteristics are:

Type RO
Register width (Bits) 32
Address offset 14'h1FC8
Register reset 32'b00001001110000000000000100111011
Usage constraints There are no usage constraints.

The following image shows the lower register bit assignments.

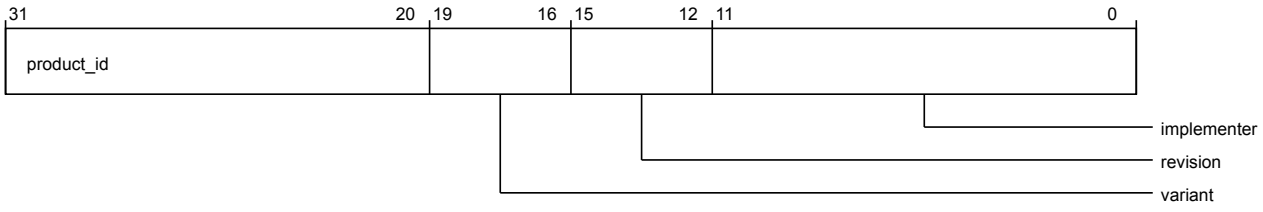

Figure 3-316 por_hnf_ppu_iidr

The following table shows the por_hnf_ppu_iidr register bit assignments.

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Table 3-330 por_hnf_ppu_iidr (low)

Bits	Field name	Description	Type	Reset
31:20	product_id	Implementation identifier	RO	12'h434
19:16	variant	Implementation variant	RO	4'h0
15:12	revision	Implementation revision	RO	4'h0
11:0	implementer	Arm implementation	RO	12'h43B

por_hnf_ppu_aidr

Functions as the power architecture identification register for HN-F.

Its characteristics are:

Type RO
Register width (Bits) 32
Address offset 14'h1FCC
Register reset 32'b00010001
Usage constraints There are no usage constraints.

The following image shows the lower register bit assignments.

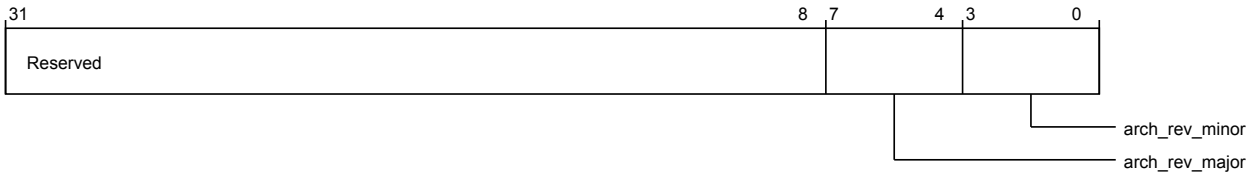

Figure 3-317 por_hnf_ppu_aidr

The following table shows the por_hnf_ppu_aidr register bit assignments.

Table 3-331 por_hnf_ppu_aidr (low)

Bits	Field name	Description	Type	Reset
31:8	Reserved	Reserved	RO	-
7:4	arch_rev_major	PPU architecture major revision	RO	4'h1
3:0	arch_rev_minor	PPU architecture minor revision	RO	4'h1

por_hnf_ppu_dyn_ret_threshold

Configures the dynamic retention threshold for SLC and SF RAM.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h1100
Register reset 64'b0

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Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.ppu

The following image shows the higher register bit assignments.

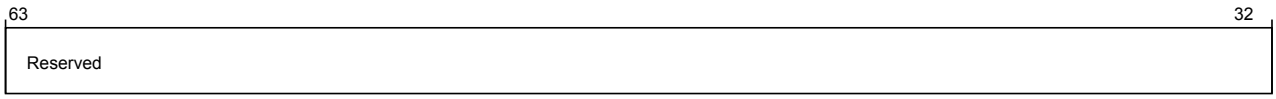

Figure 3-318 por_hnf_ppu_dyn_ret_threshold (high)

The following table shows the por_hnf_ppu_dyn_ret_threshold higher register bit assignments.

Table 3-332 por_hnf_ppu_dyn_ret_threshold (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

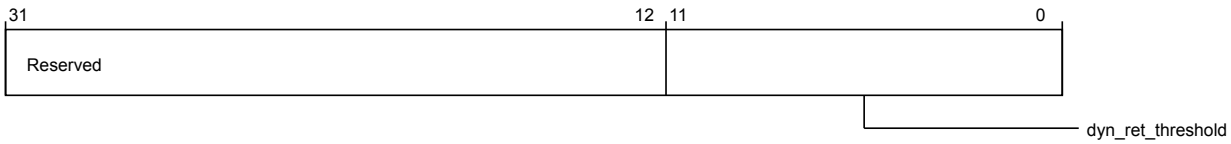

Figure 3-319 por_hnf_ppu_dyn_ret_threshold (low)

The following table shows the por_hnf_ppu_dyn_ret_threshold lower register bit assignments.

Table 3-333 por_hnf_ppu_dyn_ret_threshold (low)

Bits	Field name	Description	Type	Reset
31:12	Reserved	Reserved	RO	-
11:0	dyn_ret_threshold	HN-F RAM idle cycle count threshold	RW	32'b0

por_hnf_qos_band

Provides QoS classifications based on the QoS value ranges.

Its characteristics are:

Type RO

Register width (Bits) 64

Address offset 14'hA80

Register reset 64'b1111111111101100101110000111000 0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.qos

The following image shows the higher register bit assignments.

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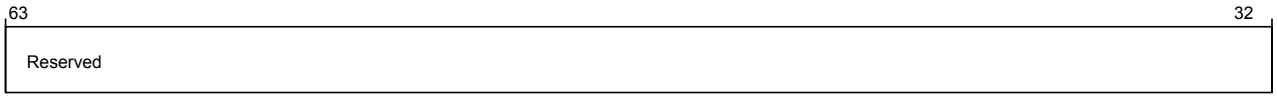

Figure 3-320 por_hnf_qos_band (high)

The following table shows the por_hnf_qos_band higher register bit assignments.

Table 3-334 por_hnf_qos_band (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

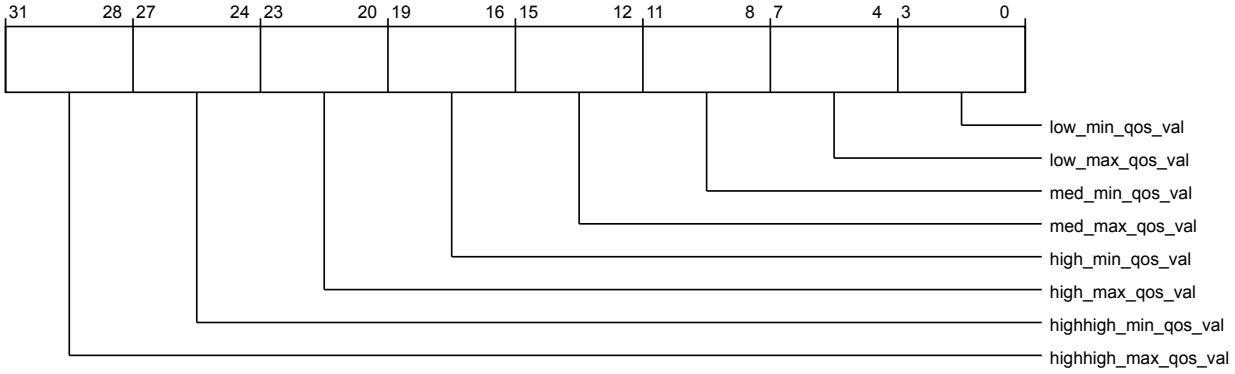

Figure 3-321 por_hnf_qos_band (low)

The following table shows the por_hnf_qos_band lower register bit assignments.

Table 3-335 por_hnf_qos_band (low)

Bits	Field name	Description	Type	Reset
31:28	highhigh_max_qos_val	Maximum value for HighHigh QoS class	RO	4'hF
27:24	highhigh_min_qos_val	Minimum value for HighHigh QoS class	RO	4'hF
23:20	high_max_qos_val	Maximum value for High QoS class	RO	4'hE
19:16	high_min_qos_val	Minimum value for High QoS class	RO	4'hC
15:12	med_max_qos_val	Maximum value for Medium QoS class	RO	4'hB
11:8	med_min_qos_val	Minimum value for Medium QoS class	RO	4'h8
7:4	low_max_qos_val	Maximum value for Low QoS class	RO	4'h7
3:0	low_min_qos_val	Minimum value for Low QoS class	RO	4'h0

por_hnf_qos_reservation

Controls POCQ maximum occupancy counts for each QoS class (HighHigh, High, Medium, and Low).

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Its characteristics are:

Type	RW
Register width (Bits)	64
Address offset	14'hA88
Register reset	Configuration dependent
Usage constraints	Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.
Secure group override	por_hnf_secure_register_groups_override.qos

The following image shows the higher register bit assignments.

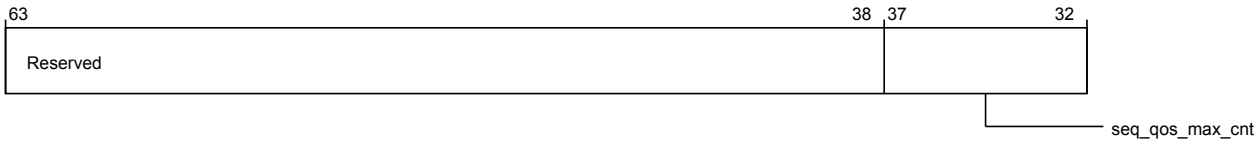

Figure 3-322 por_hnf_qos_reservation (high)

The following table shows the por_hnf_qos_reservation higher register bit assignments.

Table 3-336 por_hnf_qos_reservation (high)

Bits	Field name	Description	Type	Reset
63:38	Reserved	Reserved	RO	-
37:32	seq_qos_max_cnt	Number of entries reserved for SF evictions in POCQ CONSTRAINT: Maximum number is 2 entries.	RW	6'h1

The following image shows the lower register bit assignments.

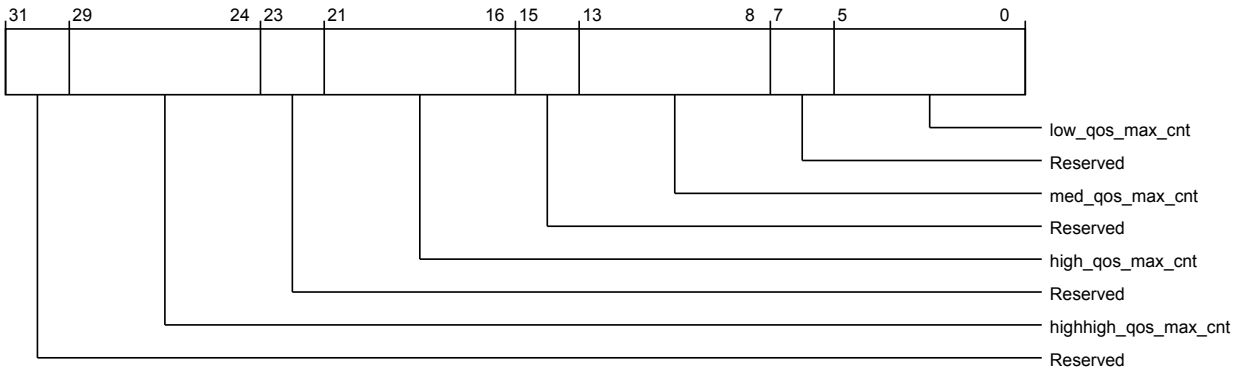

Figure 3-323 por_hnf_qos_reservation (low)

The following table shows the por_hnf_qos_reservation lower register bit assignments.

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Table 3-337 por_hnf_qos_reservation (low)

Bits	Field name	Description	Type	Reset
31:30	Reserved	Reserved	RO	-
29:24	highhigh_qos_max_cnt	Maximum number of HighHigh QoS class occupancy. CONSTRAINT: Minimum is 2 entries	RW	Configuration dependent
23:22	Reserved	Reserved	RO	-
21:16	high_qos_max_cnt	Maximum number of High QoS class occupancy. CONSTRAINT: Minimum is 2 entries	RW	Configuration dependent
15:14	Reserved	Reserved	RO	-
13:8	med_qos_max_cnt	Maximum number of Medium QoS class occupancy. CONSTRAINT: Minimum is 2 entries	RW	Configuration dependent
7:6	Reserved	Reserved	RO	-
5:0	low_qos_max_cnt	Maximum number of Low QoS class occupancy. CONSTRAINT: Minimum is 2 entries	RW	Configuration dependent

por_hnf_rn_starvation

Controls starvation counts for each QoS class. Determines static credit grantee selection.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hA90

Register reset 64'b1111111111111111011111111111111111

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_hnf_secure_register_groups_override.qos

The following image shows the higher register bit assignments.

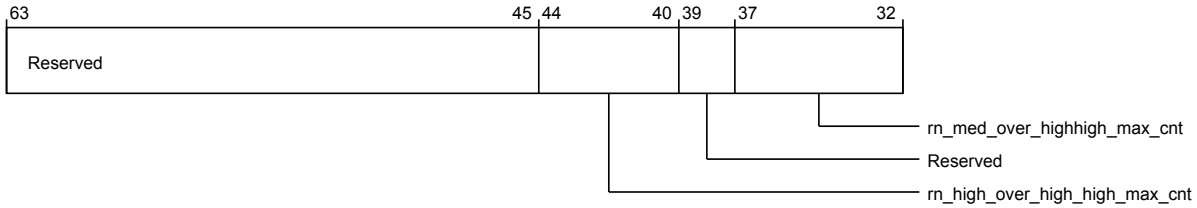

Figure 3-324 por_hnf_rn_starvation (high)

The following table shows the por_hnf_rn_starvation higher register bit assignments.

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Table 3-338 por_hnf_rn_starvation (high)

Bits	Field name	Description	Type	Reset
63:45	Reserved	Reserved	RO	-
44:40	rn_high_over_high_high_max_cnt	Maximum number of consecutive instances where HighHigh QoS class wins priority over High QoS class	RW	5'h1F
39:38	Reserved	Reserved	RO	-
37:32	rn_med_over_highhigh_max_cnt	Maximum number of consecutive instances where HighHigh QoS class wins priority over Medium QoS class	RW	6'h3F

The following image shows the lower register bit assignments.

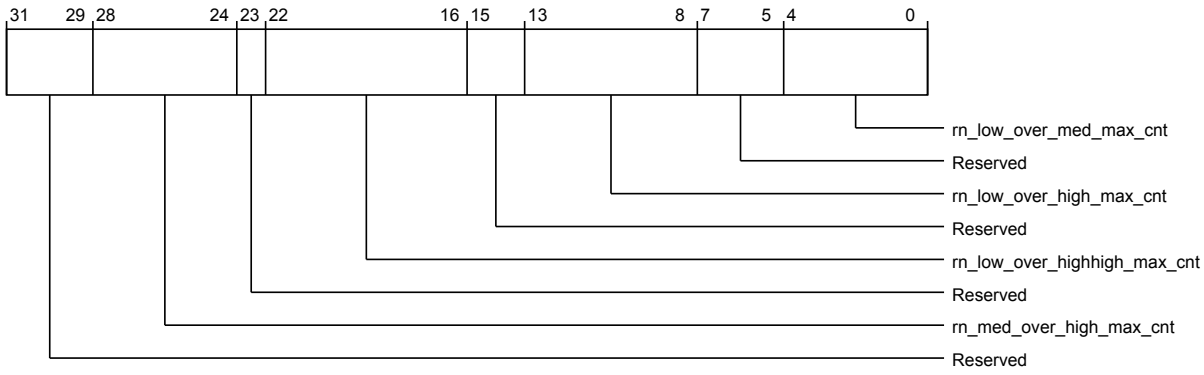

Figure 3-325 por_hnf_rn_starvation (low)

The following table shows the por_hnf_rn_starvation lower register bit assignments.

Table 3-339 por_hnf_rn_starvation (low)

Bits	Field name	Description	Type	Reset
31:29	Reserved	Reserved	RO	-
28:24	rn_med_over_high_max_cnt	Maximum number of consecutive instances where High QoS class wins priority over Medium QoS class	RW	5'h1F
23	Reserved	Reserved	RO	-
22:16	rn_low_over_highhigh_max_cnt	Maximum number of consecutive instances where HighHigh QoS class wins priority over Low QoS class	RW	7'h3F
15:14	Reserved	Reserved	RO	-
13:8	rn_low_over_high_max_cnt	Maximum number of consecutive instances where High QoS class wins priority over Low QoS class	RW	6'h3F
7:5	Reserved	Reserved	RO	-
4:0	rn_low_over_med_max_cnt	Maximum number of consecutive instances where Medium QoS class wins priority over Low QoS class	RW	5'h1F

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por_hnf_errfr

Functions as the error feature register.

Its characteristics are:

Type RO

Register width (Bits) 64

Address offset 14'h3000

Register reset 64'b1001010100101

Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

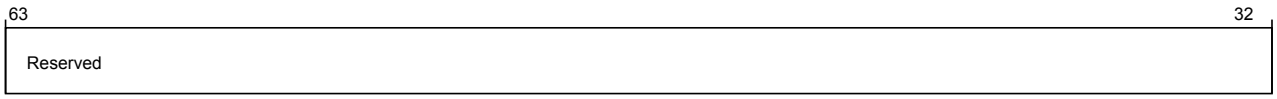

Figure 3-326 por_hnf_errfr (high)

The following table shows the por_hnf_errfr higher register bit assignments.

Table 3-340 por_hnf_errfr (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

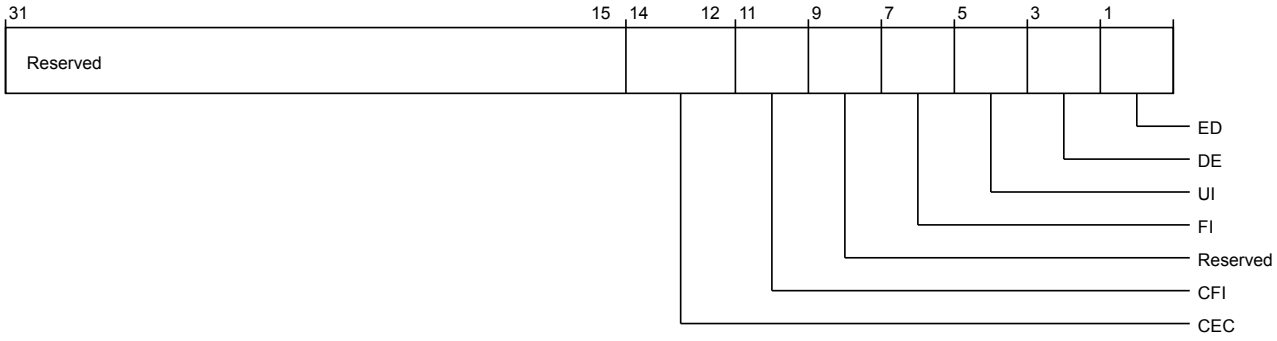

Figure 3-327 por_hnf_errfr (low)

The following table shows the por_hnf_errfr lower register bit assignments.

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Table 3-341 por_hnf_errfr (low)

Bits	Field name	Description	Type	Reset
31:15	Reserved	Reserved	RO	-
14:12	CEC	Standard corrected error count mechanism 3'b000: Does not implement standardized error counter model 3'b010: Implements 8-bit error counter in por_hnf_errmisc[39:32] 3'b100: Implements 16-bit error counter in por_hnf_errmisc[47:32]	RO	3'b100
11:10	CFI	Corrected error interrupt	RO	2'b10
9:8	Reserved	Reserved	RO	-
7:6	FI	Fault handling interrupt	RO	2'b10
5:4	UI	Uncorrected error interrupt	RO	2'b10
3:2	DE	Deferred errors for data poison	RO	2'b01
1:0	ED	Error detection	RO	2'b01

por_hnf_errctlr

Functions as the error control register. Controls whether specific error-handling interrupts and error detection/deferment are enabled.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h3008
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

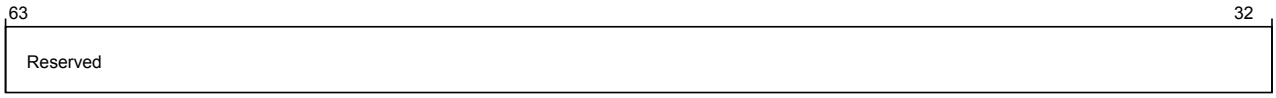

Figure 3-328 por_hnf_errctlr (high)

The following table shows the por_hnf_errctlr higher register bit assignments.

Table 3-342 por_hnf_errctlr (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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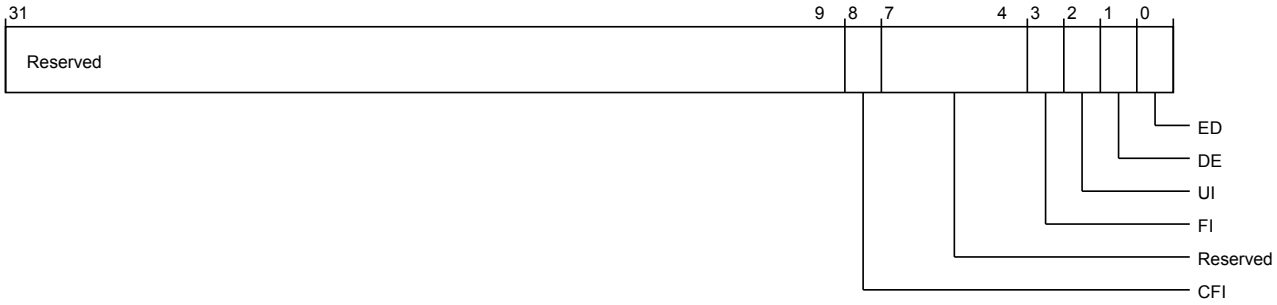

Figure 3-329 por_hnf_errctlr (low)

The following table shows the por_hnf_errctlr lower register bit assignments.

Table 3-343 por_hnf_errctlr (low)

Bits	Field name	Description	Type	Reset
31:9	Reserved	Reserved	RO	-
8	CFI	Enables corrected error interrupt as specified in por_hnf_errfr.CFI	RW	1'b0
7:4	Reserved	Reserved	RO	-
3	FI	Enables fault handling interrupt for all detected deferred errors as specified in por_hnf_errfr.FI	RW	1'b0
2	UI	Enables uncorrected error interrupt as specified in por_hnf_errfr.UI	RW	1'b0
1	DE	Enables error deferment as specified in por_hnf_errfr.DE	RW	1'b0
0	ED	Enables error detection as specified in por_hnf_errfr.ED	RW	1'b0

por_hnf_errstatus

Functions as the error status register. AV and MV bits must be cleared in the same cycle, otherwise the error record does not have a consistent view.

Its characteristics are:

Type W1C
Register width (Bits) 64
Address offset 14'h3010
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

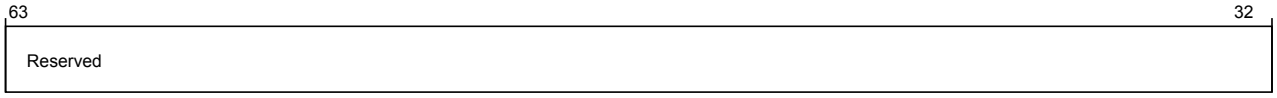

Figure 3-330 por_hnf_errstatus (high)

The following table shows the por_hnf_errstatus higher register bit assignments.

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Table 3-344 por_hnf_errstatus (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

Figure 3-331 por_hnf_errstatus (low)

The following table shows the por_hnf_errstatus lower register bit assignments.

Table 3-345 por_hnf_errstatus (low)

Bits	Field name	Description	Type	Reset
31	AV	Address register valid; writes to this bit are ignored if any of the UE, DE, or CE bits are set to 1, and the highest priority are not cleared to 0 in the same write; write a 1 to clear 1'b1: Address is valid; por_hnf_erraddr contains a physical address for that recorded error 1'b0: Address is not valid	W1C	1'b0
30	V	Register valid; writes to this bit are ignored if any of the UE, DE, or CE bits are set to 1, and are not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one error recorded; register is valid 1'b0: No errors recorded	W1C	1'b0
29	UE	Uncorrected errors; writes to this bit are ignored if the OF bit is set to 1, and is not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one error detected that is not corrected and is not deferred to a slave 1'b0: No uncorrected errors detected	W1C	1'b0
28	Reserved	Reserved	RO	-
27	OF	Overflow; asserted when multiple errors of the highest priority type are detected; write a 1 to clear 1'b1: More than one error detected 1'b0: Only one error of the highest priority type detected as described by UE/DE/CE fields	W1C	1'b0

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Table 3-345 por_hnf_errstatus (low) (continued)

Bits	Field name	Description	Type	Reset
26	MV	por_hnf_errmisc valid; writes to this bit are ignored if any of the UE, DE, or CE bits are set to 1, and the highest priority are not cleared to 0 in the same write; write a 1 to clear 1'b1: Miscellaneous registers are valid 1'b0: Miscellaneous registers are not valid	W1C	1'b0
25	Reserved	Reserved	RO	-
24	CE	Corrected errors; writes to this bit are ignored if the OF bit is set to 1, and is not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one transient corrected error recorded 1'b0: No corrected errors recorded	W1C	1'b0
23	DE	Deferred errors; writes to this bit are ignored if the OF bit is set to 1, and is not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one error is not corrected and is deferred 1'b0: No errors deferred	W1C	1'b0
22:0	Reserved	Reserved	RO	-

por_hnf_erraddr

Contains the error record address.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h3018
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

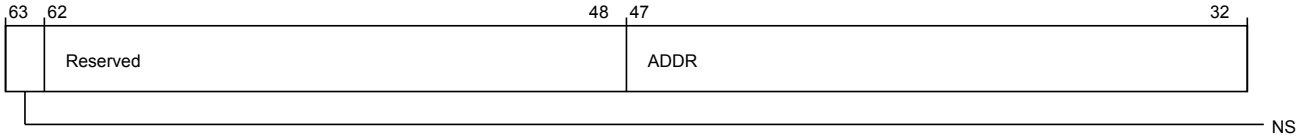

Figure 3-332 por_hnf_erraddr (high)

The following table shows the por_hnf_erraddr higher register bit assignments.

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Table 3-346 por_hnf_erraddr (high)

Bits	Field name	Description	Type	Reset
63	NS	Security status of transaction 1'b1: Non-secure transaction 1'b0: Secure transaction CONSTRAINT: por_hnf_erraddr.NS is redundant. Since it is writable, it cannot be used for logic qualification.	RW	1'b0
62:48	Reserved	Reserved	RO	-
47:32	ADDR	Transaction address	RW	48'b0

The following image shows the lower register bit assignments.

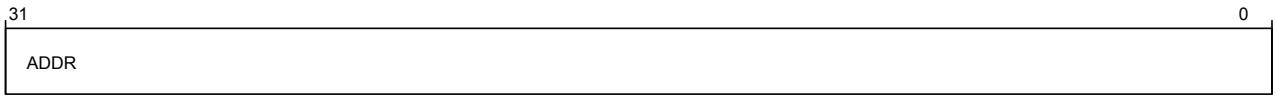

Figure 3-333 por_hnf_erraddr (low)

The following table shows the por_hnf_erraddr lower register bit assignments.

Table 3-347 por_hnf_erraddr (low)

Bits	Field name	Description	Type	Reset
31:0	ADDR	Transaction address	RW	48'b0

por_hnf_errmisc

Functions as the miscellaneous error register. Contains miscellaneous information about deferred/ uncorrected errors.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h3020
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

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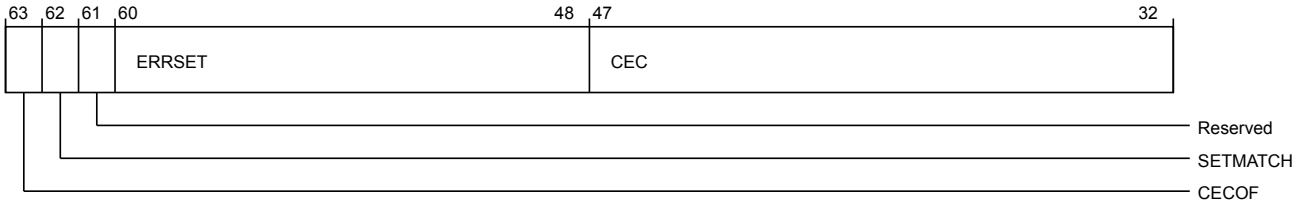

Figure 3-334 por_hnf_errmisc (high)

The following table shows the por_hnf_errmisc higher register bit assignments.

Table 3-348 por_hnf_errmisc (high)

Bits	Field name	Description	Type	Reset
63	CECOF	Corrected error counter overflow	RW	1'b0
62	SETMATCH	Set address match	RW	1'b0
61	Reserved	Reserved	RO	-
60:48	ERRSET	SLC/SF set address for ECC error	RW	13'b0
47:32	CEC	Corrected ECC error count	RW	16'b0

The following image shows the lower register bit assignments.

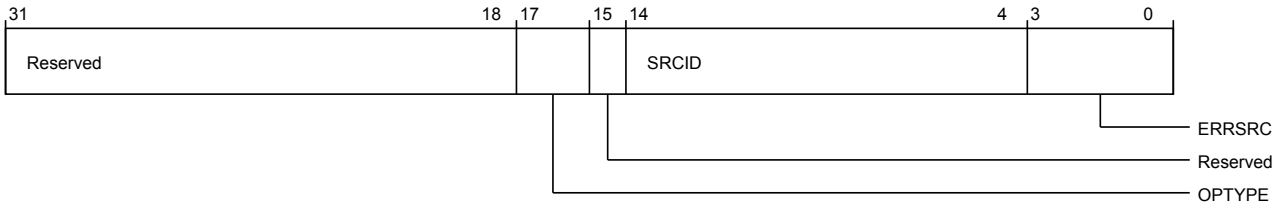

Figure 3-335 por_hnf_errmisc (low)

The following table shows the por_hnf_errmisc lower register bit assignments.

Table 3-349 por_hnf_errmisc (low)

Bits	Field name	Description	Type	Reset
31:18	Reserved	Reserved	RO	-
17:16	OPTYPE	Error op type 2'b00: Writes, CleanShared, Atomics and stash requests with invalid targets 2'b01: WriteBack, Evict, and Stash requests with valid target 2'b10: CMO 2'b11: Other op types	RW	2'b00

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Table 3-349 por_hnf_errmisc (low) (continued)

Bits	Field name	Description	Type	Reset
15	Reserved	Reserved	RO	-
14:4	SRCID	Error source ID	RW	11'b0
3:0	ERRSRC	Error source 4'b0001: Data single-bit ECC 4'b0010: Data double-bit ECC 4'b0011: Single-bit ECC overflow 4'b0100: Tag single-bit ECC 4'b0101: Tag double-bit ECC 4'b0111: SF tag single-bit ECC 4'b1000: SF tag double-bit ECC 4'b1010: Data parity error 4'b1011: Data parity and poison 4'b1100: NDE	RW	4'b0000

por_hnf_err_inj

Enables error injection and setup. When enabled for a given source ID and logic processor ID, HN-F returns a slave error and reports an error interrupt. This error interrupt emulates a SLC double-bit data ECC error. This feature enables software to test the error handler. The slave error is reported for cacheable read access for which SLC hit is the data source. No slave error or error interrupt is reported for cacheable read access in which SLC miss is the data source.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h3030

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

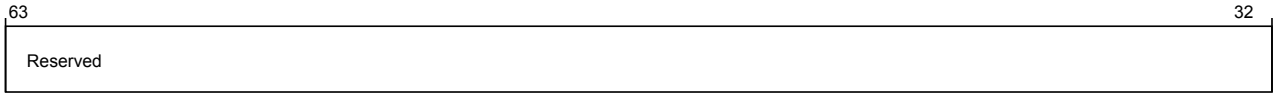

Figure 3-336 por_hnf_err_inj (high)

The following table shows the por_hnf_err_inj higher register bit assignments.

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Table 3-350 por_hnf_err_inj (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

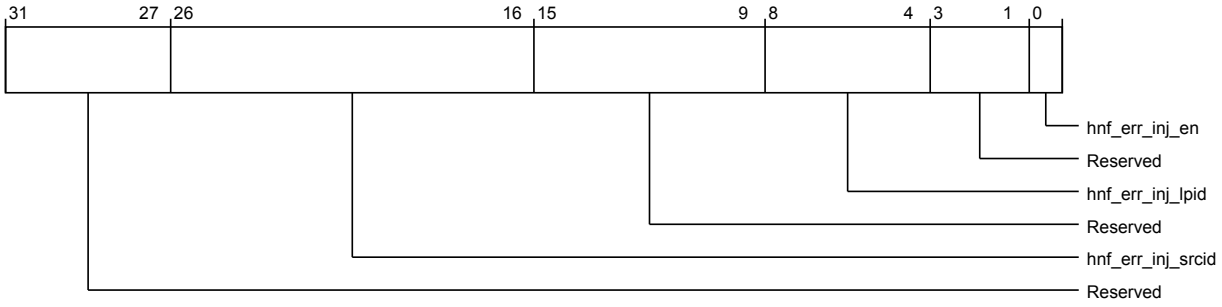

Figure 3-337 por_hnf_err_inj (low)

The following table shows the por_hnf_err_inj lower register bit assignments.

Table 3-351 por_hnf_err_inj (low)

Bits	Field name	Description	Type	Reset
31:27	Reserved	Reserved	RO	-
26:16	hnf_err_inj_srcid	RN source ID for read access which results in a SLC miss; does not report slave error or error to match error injection	RW	11'h0
15:9	Reserved	Reserved	RO	-
8:4	hnf_err_inj_lpid	LPID used to match for error injection	RW	5'h0
3:1	Reserved	Reserved	RO	-
0	hnf_err_inj_en	Enables error injection and report	RW	1'b0

por_hnf_byte_par_err_inj

Functions as the byte parity error injection register for HN-F.

Its characteristics are:

Type WO
Register width (Bits) 64
Address offset 14'h3038
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

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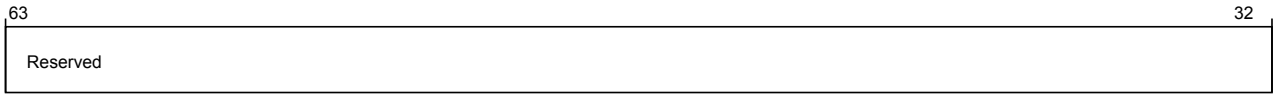

Figure 3-338 por_hnf_byte_par_err_inj (high)

The following table shows the por_hnf_byte_par_err_inj higher register bit assignments.

Table 3-352 por_hnf_byte_par_err_inj (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

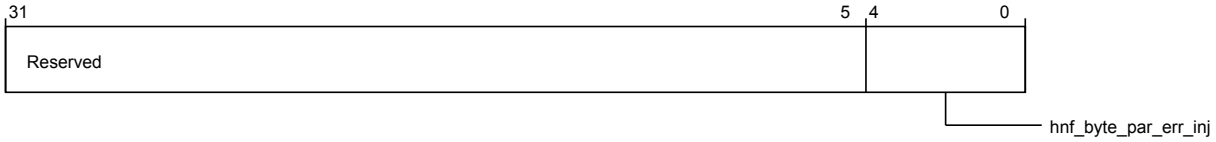

Figure 3-339 por_hnf_byte_par_err_inj (low)

The following table shows the por_hnf_byte_par_err_inj lower register bit assignments.

Table 3-353 por_hnf_byte_par_err_inj (low)

Bits	Field name	Description	Type	Reset
31:5	Reserved	Reserved	RO	-
4:0	hnf_byte_par_err_inj	Specifies a byte lane; once this register is written, a byte parity error is injected in the specified byte lane on the next SLC hit; the error will be injected in all data flits on specified byte (0 to 31)	WO	5'h0

por_hnf_errfr_NS

Functions as the non-secure error feature register.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h3100
Register reset 64'b1001010100101
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

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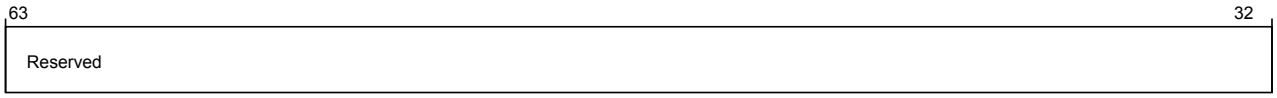

Figure 3-340 por_hnf_errfr_ns (high)

The following table shows the por_hnf_errfr_NS higher register bit assignments.

Table 3-354 por_hnf_errfr_ns (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

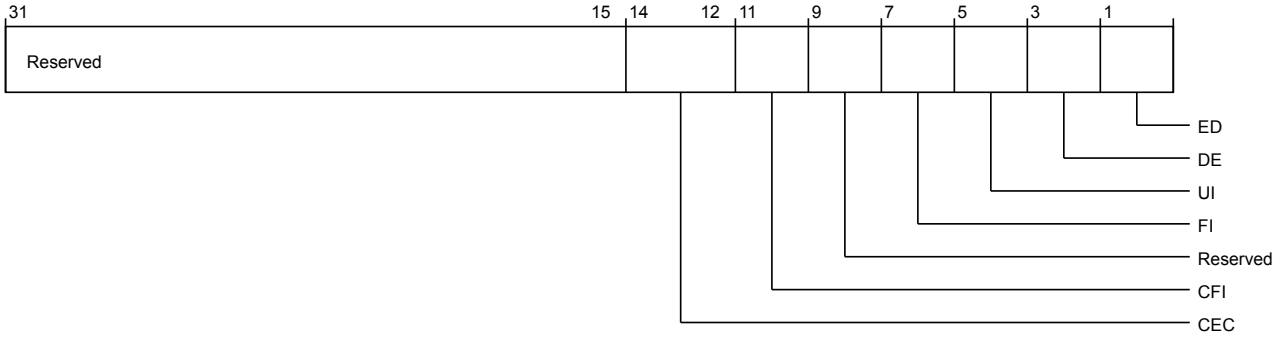

Figure 3-341 por_hnf_errfr_ns (low)

The following table shows the por_hnf_errfr_NS lower register bit assignments.

Table 3-355 por_hnf_errfr_ns (low)

Bits	Field name	Description	Type	Reset
31:15	Reserved	Reserved	RO	-
14:12	CEC	Standard corrected error count mechanism 3'b000: Does not implement standardized error counter model 3'b010: Implements 8-bit error counter in por_hnf_errmisc_NS[39:32] 3'b100: Implements 16-bit error counter in por_hnf_errmisc_NS[47:32]	RO	3'b100
11:10	CFI	Corrected error interrupt	RO	2'b10
9:8	Reserved	Reserved	RO	-
7:6	FI	Fault handling interrupt	RO	2'b10
5:4	UI	Uncorrected error interrupt	RO	2'b10
3:2	DE	Deferred errors for data poison	RO	2'b01
1:0	ED	Error detection	RO	2'b01

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por_hnf_errctlr_NS

Functions as the non-secure error control register. Controls whether specific error-handling interrupts and error detection/deferment are enabled.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h3108

Register reset 64'b0

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

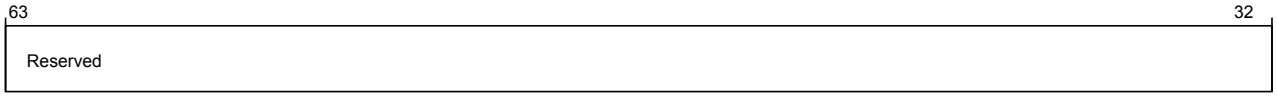

Figure 3-342 por_hnf_errctlr_ns (high)

The following table shows the por_hnf_errctlr_NS higher register bit assignments.

Table 3-356 por_hnf_errctlr_ns (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

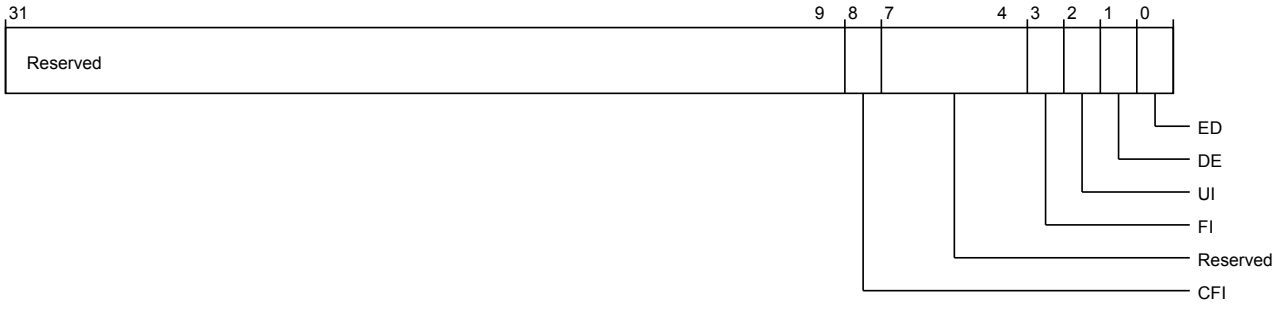

Figure 3-343 por_hnf_errctlr_ns (low)

The following table shows the por_hnf_errctlr_NS lower register bit assignments.

Table 3-357 por_hnf_errctlr_ns (low)

Bits	Field name	Description	Type	Reset
31:9	Reserved	Reserved	RO	-
8	CFI	Enables corrected error interrupt as specified in por_hnf_errfr_NS.CFI	RW	1'b0
7:4	Reserved	Reserved	RO	-

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Table 3-357 por_hnf_errctlr_ns (low) (continued)

Bits	Field name	Description	Type	Reset
3	FI	Enables fault handling interrupt for all detected deferred errors as specified in por_hnf_errfr_NS.FI	RW	1'b0
2	UI	Enables uncorrected error interrupt as specified in por_hnf_errfr_NS.UI	RW	1'b0
1	DE	Enables error deferment as specified in por_hnf_errfr_NS.DE	RW	1'b0
0	ED	Enables error detection as specified in por_hnf_errfr_NS.ED	RW	1'b0

por_hnf_errstatus_NS

Functions as the non-secure error status register. AV and MV bits must be cleared in the same cycle, otherwise the error record does not have a consistent view.

Its characteristics are:

Type W1C

Register width (Bits) 64

Address offset 14'h3110

Register reset 64'b0

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

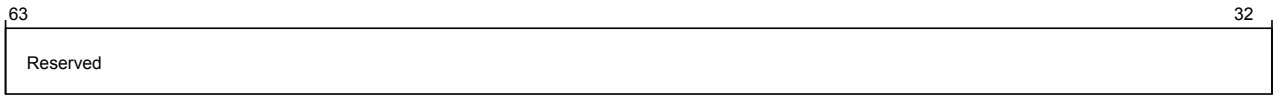

Figure 3-344 por_hnf_errstatus_ns (high)

The following table shows the por_hnf_errstatus_NS higher register bit assignments.

Table 3-358 por_hnf_errstatus_ns (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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Figure 3-345 por_hnf_errstatus_ns (low)

The following table shows the por_hnf_errstatus_NS lower register bit assignments.

Table 3-359 por_hnf_errstatus_ns (low)

Bits	Field name	Description	Type	Reset
31	AV	Address register valid; writes to this bit are ignored if any of the UE, DE, or CE bits are set to 1, and the highest priority are not cleared to 0 in the same write; write a 1 to clear 1'b1: Address is valid; por_hnf_erraddr_NS contains a physical address for that recorded error 1'b0: Address is not valid	W1C	1'b0
30	V	Register valid; writes to this bit are ignored if any of the UE, DE, or CE bits are set to 1, and are not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one error recorded; register is valid 1'b0: No errors recorded	W1C	1'b0
29	UE	Uncorrected errors; writes to this bit are ignored if the OF bit is set to 1, and is not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one error detected that is not corrected and is not deferred to a slave 1'b0: No uncorrected errors detected	W1C	1'b0
28	Reserved	Reserved	RO	-
27	OF	Overflow; asserted when multiple errors of the highest priority type are detected; write a 1 to clear 1'b1: More than one error detected 1'b0: Only one error of the highest priority type detected as described by UE/DE/CE fields	W1C	1'b0
26	MV	por_hnf_errmisc_NS valid; writes to this bit are ignored if any of the UE, DE, or CE bits are set to 1, and the highest priority are not cleared to 0 in the same write; write a 1 to clear 1'b1: Miscellaneous registers are valid 1'b0: Miscellaneous registers are not valid	W1C	1'b0
25	Reserved	Reserved	RO	-

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Table 3-359 por_hnf_errstatus_ns (low) (continued)

Bits	Field name	Description	Type	Reset
24	CE	Corrected errors; writes to this bit are ignored if the OF bit is set to 1, and is not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one transient corrected error recorded 1'b0: No corrected errors recorded	W1C	1'b0
23	DE	Deferred errors; writes to this bit are ignored if the OF bit is set to 1, and is not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one error is not corrected and is deferred 1'b0: No errors deferred	W1C	1'b0
22:0	Reserved	Reserved	RO	-

por_hnf_erraddr_NS

Contains the non-secure error record address.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h3118
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

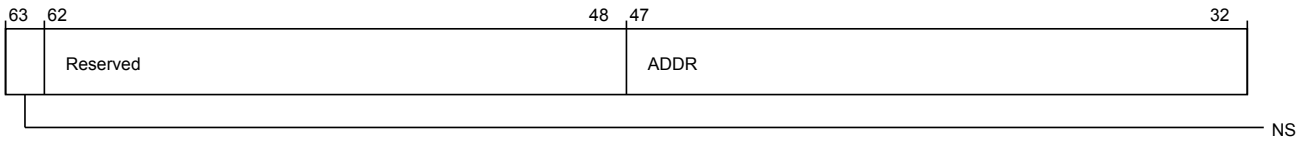

Figure 3-346 por_hnf_erraddr_ns (high)

The following table shows the por_hnf_erraddr_NS higher register bit assignments.

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Table 3-360 por_hnf_erraddr_ns (high)

Bits	Field name	Description	Type	Reset
63	NS	Security status of transaction 1'b1: Non-secure transaction 1'b0: Secure transaction CONSTRAINT: por_hnf_erraddr_NS.NS is redundant. Since it is writable, it cannot be used for logic qualification.	RW	1'b0
62:48	Reserved	Reserved	RO	-
47:32	ADDR	Transaction address	RW	48'b0

The following image shows the lower register bit assignments.

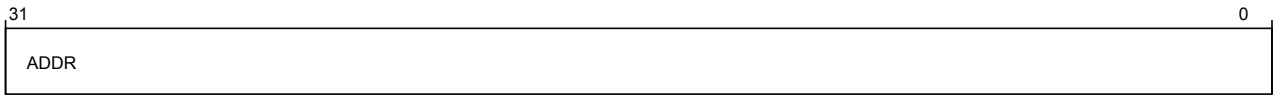

Figure 3-347 por_hnf_erraddr_ns (low)

The following table shows the por_hnf_erraddr_NS lower register bit assignments.

Table 3-361 por_hnf_erraddr_ns (low)

Bits	Field name	Description	Type	Reset
31:0	ADDR	Transaction address	RW	48'b0

por_hnf_errmisc_NS

Functions as the non-secure miscellaneous error register. Contains miscellaneous information about deferred/uncorrected errors.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h3120

Register reset 64'b0

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

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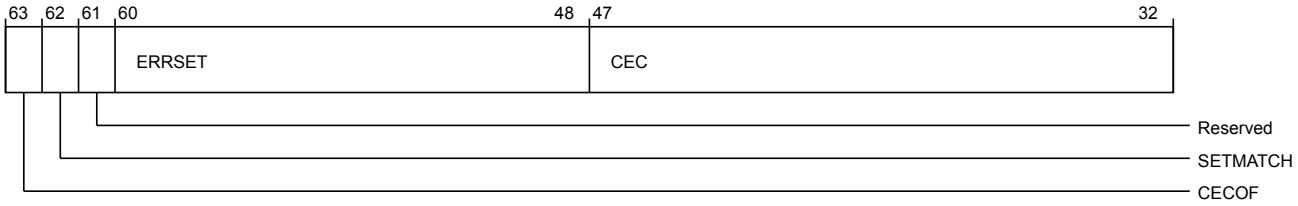

Figure 3-348 por_hnf_errmisc_ns (high)

The following table shows the por_hnf_errmisc_NS higher register bit assignments.

Table 3-362 por_hnf_errmisc_ns (high)

Bits	Field name	Description	Type	Reset
63	CECOF	Corrected error counter overflow	RW	1'b0
62	SETMATCH	Set address match	RW	1'b0
61	Reserved	Reserved	RO	-
60:48	ERRSET	SLC/SF set address for ECC error	RW	13'b0
47:32	CEC	Corrected ECC error count	RW	16'b0

The following image shows the lower register bit assignments.

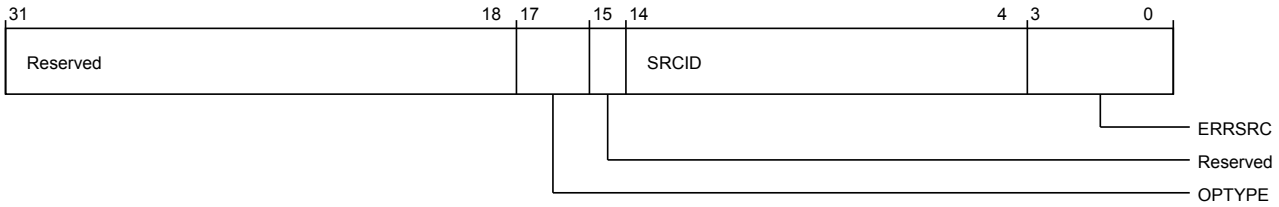

Figure 3-349 por_hnf_errmisc_ns (low)

The following table shows the por_hnf_errmisc_NS lower register bit assignments.

Table 3-363 por_hnf_errmisc_ns (low)

Bits	Field name	Description	Type	Reset
31:18	Reserved	Reserved	RO	-
17:16	OPTYPE	Error op type 2'b00: Writes, CleanShared, Atomics and stash requests with invalid targets 2'b01: WriteBack, Evict, and Stash requests with valid target 2'b10: CMO 2'b11: Other op types	RW	2'b00

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Table 3-363 por_hnf_errmisc_ns (low) (continued)

Bits	Field name	Description	Type	Reset
15	Reserved	Reserved	RO	-
14:4	SRCID	Error source ID	RW	11'b0
3:0	ERRSRC	Error source 4'b0001: Data single-bit ECC 4'b0010: Data double-bit ECC 4'b0011: Single-bit ECC overflow 4'b0100: Tag single-bit ECC 4'b0101: Tag double-bit ECC 4'b0111: SF tag single-bit ECC 4'b1000: SF tag double-bit ECC 4'b1010: Data parity error 4'b1011: Data parity and poison 4'b1100: NDE	RW	4'b0000

por_hnf_slc_lock_ways

Controls SLC way lock settings.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC00

Register reset Configuration dependent

Usage constraints Only accessible by secure accesses. The SLC must be flushed before writing to this register. Non-configuration accesses to this HN-F cannot occur before this configuration write and after the SLC flush.

Secure group override por_hnf_secure_register_groups_override.slc_lock_ways

The following image shows the higher register bit assignments.

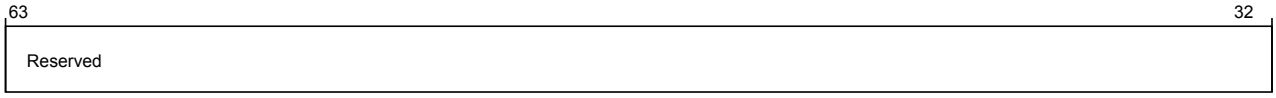

Figure 3-350 por_hnf_slc_lock_ways (high)

The following table shows the por_hnf_slc_lock_ways higher register bit assignments.

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Table 3-364 por_hnf_slc_lock_ways (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

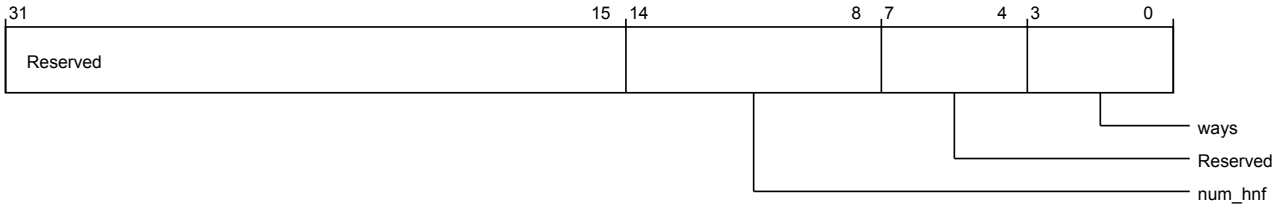

Figure 3-351 por_hnf_slc_lock_ways (low)

The following table shows the por_hnf_slc_lock_ways lower register bit assignments.

Table 3-365 por_hnf_slc_lock_ways (low)

Bits	Field name	Description	Type	Reset
31:15	Reserved	Reserved	RO	-
14:8	num_hnf	Number of HN-Fs in NUMA (non-uniform memory access) region	RW	Configuration dependent
7:4	Reserved	Reserved	RO	-
3:0	ways	Number of SLC ways locked (1, 2, 4, 8, 12)	RW	4'b0

por_hnf_slc_lock_base0

Functions as the base register for lock region 0 [47:0].

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC08

Register reset 64'b0

Usage constraints Only accessible by secure accesses. The SLC must be flushed before writing to this register. Non-configuration accesses to this HN-F cannot occur before this configuration write and after the SLC flush.

Secure group override por_hnf_secure_register_groups_override.slc_lock_ways

The following image shows the higher register bit assignments.

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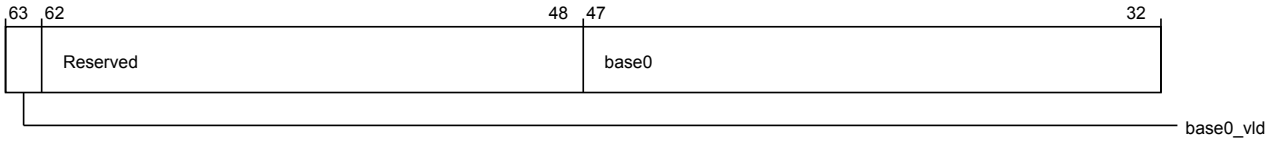

Figure 3-352 por_hnf_slc_lock_base0 (high)

The following table shows the por_hnf_slc_lock_base0 higher register bit assignments.

Table 3-366 por_hnf_slc_lock_base0 (high)

Bits	Field name	Description	Type	Reset
63	base0_vld	Lock region 0 base valid	RW	1'b0
62:48	Reserved	Reserved	RO	-
47:32	base0	Lock region 0 base address	RW	48'b0

The following image shows the lower register bit assignments.

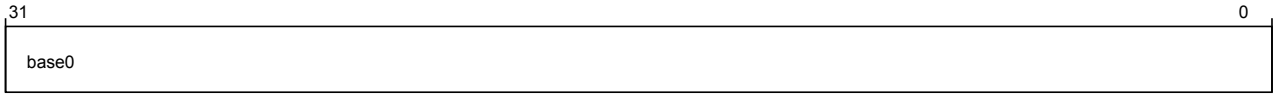

Figure 3-353 por_hnf_slc_lock_base0 (low)

The following table shows the por_hnf_slc_lock_base0 lower register bit assignments.

Table 3-367 por_hnf_slc_lock_base0 (low)

Bits	Field name	Description	Type	Reset
31:0	base0	Lock region 0 base address	RW	48'b0

por_hnf_slc_lock_base1

Functions as the base register for lock region 1 [47:0].

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC10

Register reset 64'b0

Usage constraints Only accessible by secure accesses. The SLC must be flushed before writing to this register. Non-configuration accesses to this HN-F cannot occur before this configuration write and after the SLC flush.

Secure group override por_hnf_secure_register_groups_override.slc_lock_ways

The following image shows the higher register bit assignments.

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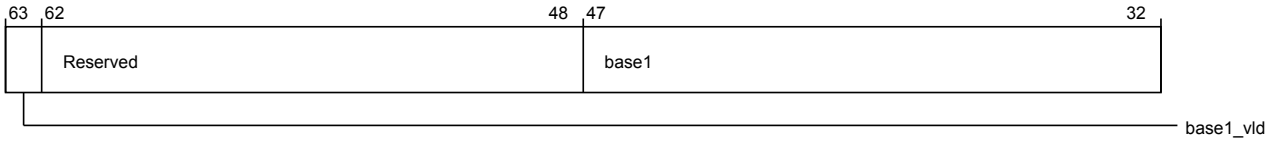

Figure 3-354 por_hnf_slc_lock_base1 (high)

The following table shows the por_hnf_slc_lock_base1 higher register bit assignments.

Table 3-368 por_hnf_slc_lock_base1 (high)

Bits	Field name	Description	Type	Reset
63	base1_vld	Lock region 1 base valid	RW	1'b0
62:48	Reserved	Reserved	RO	-
47:32	base1	Lock region 1 base address	RW	48'b0

The following image shows the lower register bit assignments.

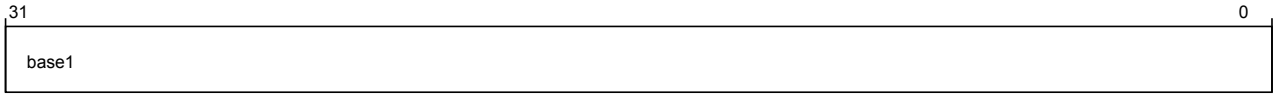

Figure 3-355 por_hnf_slc_lock_base1 (low)

The following table shows the por_hnf_slc_lock_base1 lower register bit assignments.

Table 3-369 por_hnf_slc_lock_base1 (low)

Bits	Field name	Description	Type	Reset
31:0	base1	Lock region 1 base address	RW	48'b0

por_hnf_slc_lock_base2

Functions as the base register for lock region 2 [47:0].

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC18

Register reset 64'b0

Usage constraints Only accessible by secure accesses. The SLC must be flushed before writing to this register. Non-configuration accesses to this HN-F cannot occur before this configuration write and after the SLC flush.

Secure group override por_hnf_secure_register_groups_override.slc_lock_ways

The following image shows the higher register bit assignments.

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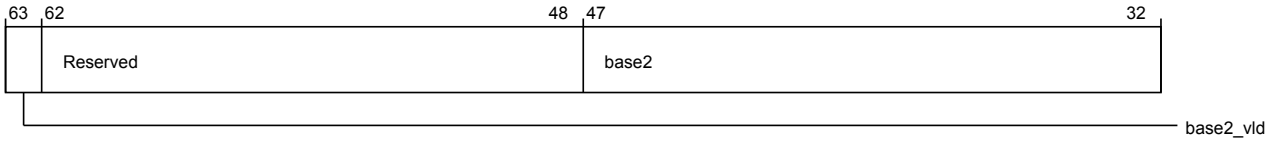

Figure 3-356 por_hnf_slc_lock_base2 (high)

The following table shows the por_hnf_slc_lock_base2 higher register bit assignments.

Table 3-370 por_hnf_slc_lock_base2 (high)

Bits	Field name	Description	Type	Reset
63	base2_vld	Lock region 2 base valid	RW	1'b0
62:48	Reserved	Reserved	RO	-
47:32	base2	Lock region 2 base address	RW	48'b0

The following image shows the lower register bit assignments.

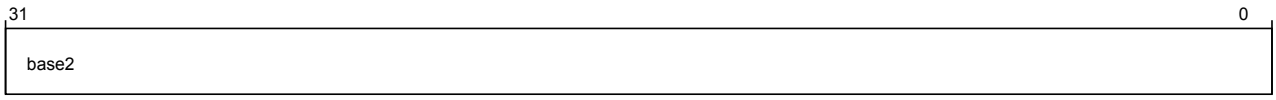

Figure 3-357 por_hnf_slc_lock_base2 (low)

The following table shows the por_hnf_slc_lock_base2 lower register bit assignments.

Table 3-371 por_hnf_slc_lock_base2 (low)

Bits	Field name	Description	Type	Reset
31:0	base2	Lock region 2 base address	RW	48'b0

por_hnf_slc_lock_base3

Functions as the base register for lock region 3 [47:0].

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC20

Register reset 64'b0

Usage constraints Only accessible by secure accesses. The SLC must be flushed before writing to this register. Non-configuration accesses to this HN-F cannot occur before this configuration write and after the SLC flush.

Secure group override por_hnf_secure_register_groups_override.slc_lock_ways

The following image shows the higher register bit assignments.

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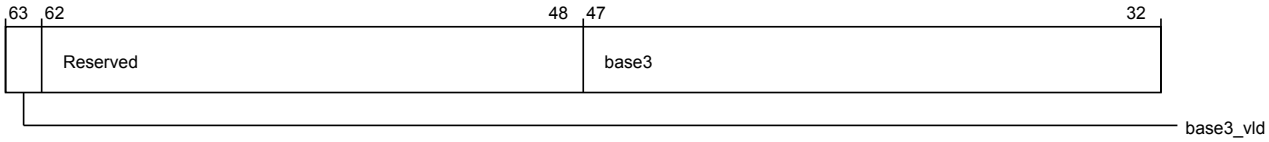

Figure 3-358 por_hnf_slc_lock_base3 (high)

The following table shows the por_hnf_slc_lock_base3 higher register bit assignments.

Table 3-372 por_hnf_slc_lock_base3 (high)

Bits	Field name	Description	Type	Reset
63	base3_vld	Lock region 3 base valid	RW	1'b0
62:48	Reserved	Reserved	RO	-
47:32	base3	Lock region 3 base address	RW	48'b0

The following image shows the lower register bit assignments.

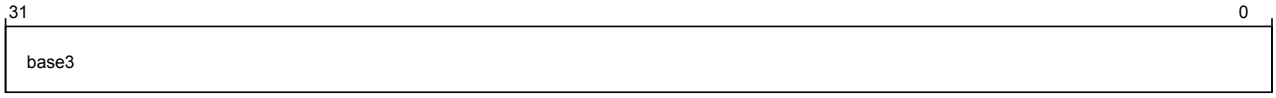

Figure 3-359 por_hnf_slc_lock_base3 (low)

The following table shows the por_hnf_slc_lock_base3 lower register bit assignments.

Table 3-373 por_hnf_slc_lock_base3 (low)

Bits	Field name	Description	Type	Reset
31:0	base3	Lock region 3 base address	RW	48'b0

por_hnf_rni_region_vec

Functions as the control register for RN-I source SLC way allocation.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC30

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.slc_lock_ways

The following image shows the higher register bit assignments.

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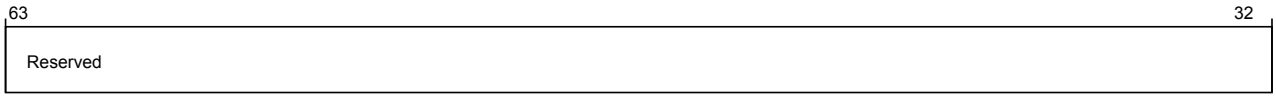

Figure 3-360 por_hnf_rni_region_vec (high)

The following table shows the por_hnf_rni_region_vec higher register bit assignments.

Table 3-374 por_hnf_rni_region_vec (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

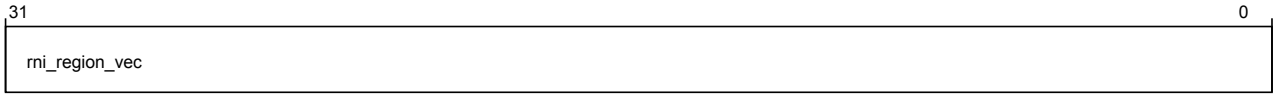

Figure 3-361 por_hnf_rni_region_vec (low)

The following table shows the por_hnf_rni_region_vec lower register bit assignments.

Table 3-375 por_hnf_rni_region_vec (low)

Bits	Field name	Description	Type	Reset
31:0	rni_region_vec	Bit vector mask; identifies which logical IDs of the RN-Is to allocate to the locked region ——— **Note** ——— Must be set to 32'b0 if range-based region locking or OCM is enabled. ———	RW	32'b0

por_hnf_rnf_region_vec

Functions as the control register for RN-F source SLC way allocation.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC38

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.slc_lock_ways

The following image shows the higher register bit assignments.

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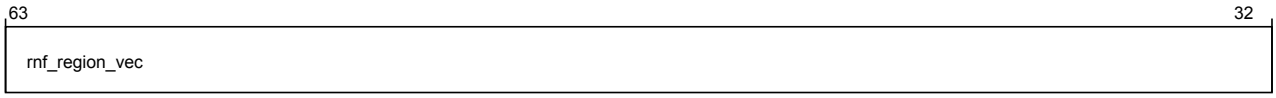

Figure 3-362 por_hnf_rnf_region_vec (high)

The following table shows the por_hnf_rnf_region_vec higher register bit assignments.

Table 3-376 por_hnf_rnf_region_vec (high)

Bits	Field name	Description	Type	Reset
63:32	rnf_region_vec	Bit vector mask; identifies which logical IDs of the RN-Fs to allocate to the locked region **Note** Must be 64'b0 if range-based region locking or OCM is enabled.	RW	64'b0

The following image shows the lower register bit assignments.

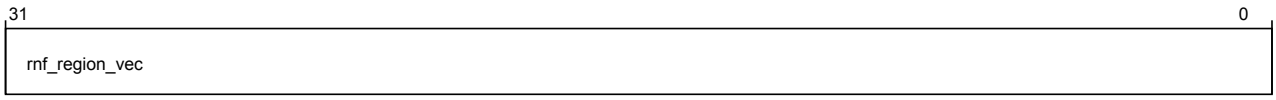

Figure 3-363 por_hnf_rnf_region_vec (low)

The following table shows the por_hnf_rnf_region_vec lower register bit assignments.

Table 3-377 por_hnf_rnf_region_vec (low)

Bits	Field name	Description	Type	Reset
31:0	rnf_region_vec	Bit vector mask; identifies which logical IDs of the RN-Fs to allocate to the locked region **Note** Must be 64'b0 if range-based region locking or OCM is enabled.	RW	64'b0

por_hnf_rnd_region_vec

Functions as the control register for RN-D source SLC way allocation.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC40

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.slc_lock_ways

The following image shows the higher register bit assignments.

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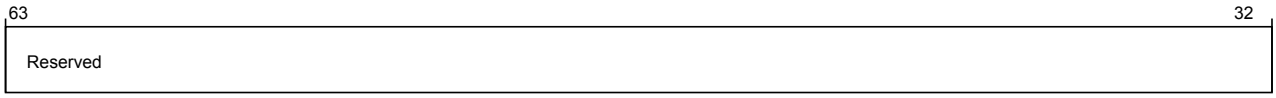

Figure 3-364 por_hnf_rnd_region_vec (high)

The following table shows the por_hnf_rnd_region_vec higher register bit assignments.

Table 3-378 por_hnf_rnd_region_vec (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

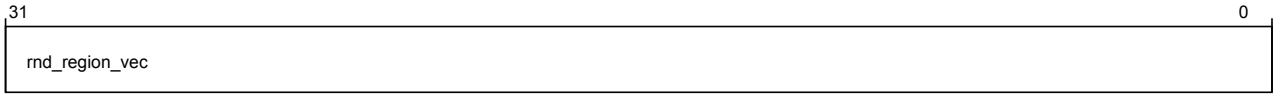

Figure 3-365 por_hnf_rnd_region_vec (low)

The following table shows the por_hnf_rnd_region_vec lower register bit assignments.

Table 3-379 por_hnf_rnd_region_vec (low)

Bits	Field name	Description	Type	Reset
31:0	rnd_region_vec	Bit vector mask; identifies which logical IDs of the RN-Ds to allocate to the locked region **Note** Must be set to 32'b0 if range-based region locking or OCM is enabled.	RW	32'b0

por_hnf_slcway_partition0_rnf_vec

Functions as the control register for RN-Fs that can allocate to partition 0 (ways 0, 1, 2, and 3).

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC48

Register reset 64'b1111111111111111111111111111111111111111111111111111111111111111

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.slc_lock_ways

The following image shows the higher register bit assignments.

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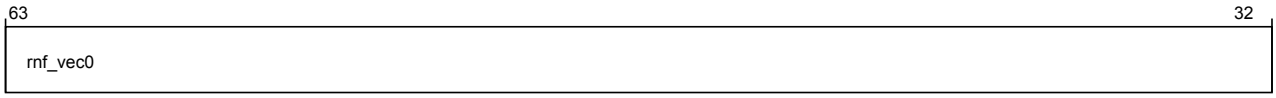

Figure 3-366 por_hnf_slcway_partition0_rnf_vec (high)

The following table shows the por_hnf_slcway_partition0_rnf_vec higher register bit assignments.

Table 3-380 por_hnf_slcway_partition0_rnf_vec (high)

Bits	Field name	Description	Type	Reset
63:32	rnf_vec0	Bit vector mask; identifies which logical IDs of the RN-F can allocate	RW	64'hFFFFFFFFFFFFFFFF

The following image shows the lower register bit assignments.

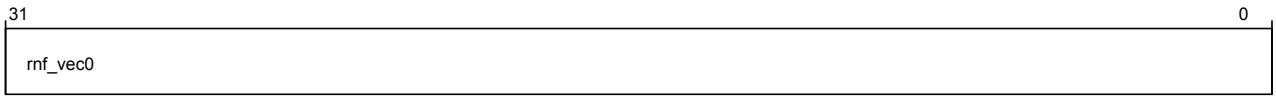

Figure 3-367 por_hnf_slcway_partition0_rnf_vec (low)

The following table shows the por_hnf_slcway_partition0_rnf_vec lower register bit assignments.

Table 3-381 por_hnf_slcway_partition0_rnf_vec (low)

Bits	Field name	Description	Type	Reset
31:0	rnf_vec0	Bit vector mask; identifies which logical IDs of the RN-F can allocate	RW	64'hFFFFFFFFFFFFFFFF

por_hnf_slcway_partition1_rnf_vec

Functions as the control register for RN-Fs that can allocate to partition 1 (ways 4, 5, 6, and 7).

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC50

Register reset 64'b1111111111111111111111111111111111111111111111111111111111111111

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.slc_lock_ways

The following image shows the higher register bit assignments.

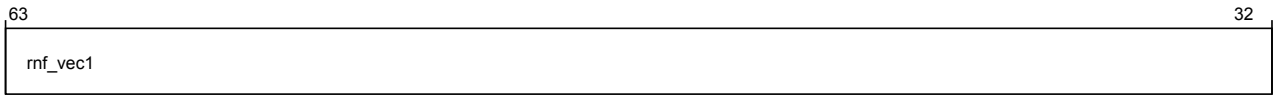

Figure 3-368 por_hnf_slcway_partition1_rnf_vec (high)

The following table shows the por_hnf_slcway_partition1_rnf_vec higher register bit assignments.

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Table 3-382 por_hnf_slcway_partition1_rnf_vec (high)

Bits	Field name	Description	Type	Reset
63:32	rnf_vec1	Bit vector mask; identifies which logical IDs of the RN-F can allocate	RW	64'hFFFFFFFFFFFFFFFF

The following image shows the lower register bit assignments.

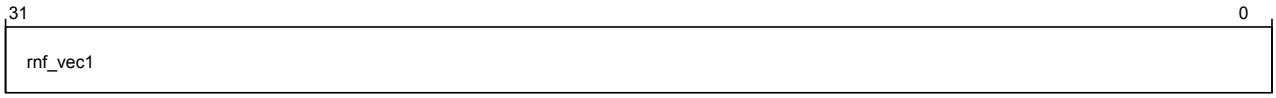

Figure 3-369 por_hnf_slcway_partition1_rnf_vec (low)

The following table shows the por_hnf_slcway_partition1_rnf_vec lower register bit assignments.

Table 3-383 por_hnf_slcway_partition1_rnf_vec (low)

Bits	Field name	Description	Type	Reset
31:0	rnf_vec1	Bit vector mask; identifies which logical IDs of the RN-F can allocate	RW	64'hFFFFFFFFFFFFFFFF

por_hnf_slcway_partition2_rnf_vec

Functions as the control register for RN-Fs that can allocate to partition 2 (ways 8, 9, 10, and 11).

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC58

Register reset 64'b1111111111111111111111111111111111111111111111111111111111111111

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.slc_lock_ways

The following image shows the higher register bit assignments.

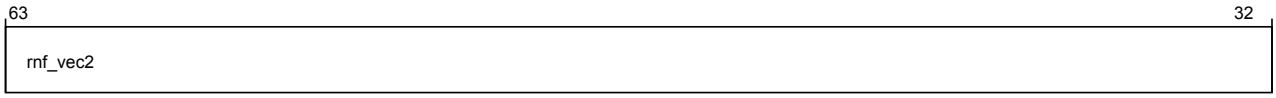

Figure 3-370 por_hnf_slcway_partition2_rnf_vec (high)

The following table shows the por_hnf_slcway_partition2_rnf_vec higher register bit assignments.

Table 3-384 por_hnf_slcway_partition2_rnf_vec (high)

Bits	Field name	Description	Type	Reset
63:32	rnf_vec2	Bit vector mask; identifies which logical IDs of the RN-F can allocate	RW	64'hFFFFFFFFFFFFFFFF

The following image shows the lower register bit assignments.

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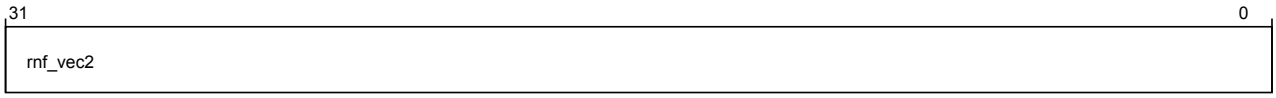

Figure 3-371 por_hnf_slcway_partition2_rnf_vec (low)

The following table shows the por_hnf_slcway_partition2_rnf_vec lower register bit assignments.

Table 3-385 por_hnf_slcway_partition2_rnf_vec (low)

Bits	Field name	Description	Type	Reset
31:0	rnf_vec2	Bit vector mask; identifies which logical IDs of the RN-F can allocate	RW	64'hFFFFFFFFFFFFFFFF

por_hnf_slcway_partition3_rnf_vec

Functions as the control register for RN-Fs that can allocate to partition 3 (ways 12, 13, 14, and 15).

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC60

Register reset 64'b1111111111111111111111111111111111111111111111111111111111111111

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.slc_lock_ways

The following image shows the higher register bit assignments.

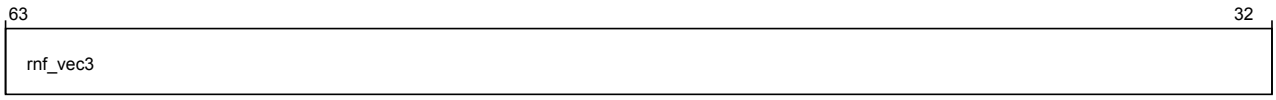

Figure 3-372 por_hnf_slcway_partition3_rnf_vec (high)

The following table shows the por_hnf_slcway_partition3_rnf_vec higher register bit assignments.

Table 3-386 por_hnf_slcway_partition3_rnf_vec (high)

Bits	Field name	Description	Type	Reset
63:32	rnf_vec3	Bit vector mask; identifies which logical IDs of the RN-F can allocate	RW	64'hFFFFFFFFFFFFFFFF

The following image shows the lower register bit assignments.

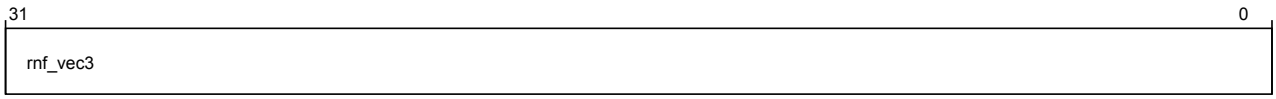

Figure 3-373 por_hnf_slcway_partition3_rnf_vec (low)

The following table shows the por_hnf_slcway_partition3_rnf_vec lower register bit assignments.

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Table 3-387 por_hnf_slcway_partition3_rnf_vec (low)

Bits	Field name	Description	Type	Reset
31:0	rnf_vec3	Bit vector mask; identifies which logical IDs of the RN-F can allocate	RW	64'hFFFFFFFFFFFFFFFF

por_hnf_rnf_region_vec1

Functions as the control register for RN-F source SLC way allocation for logical IDs 64 through 127.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC28

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.slc_lock_ways

The following image shows the higher register bit assignments.

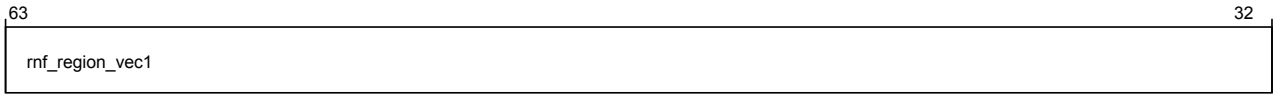

Figure 3-374 por_hnf_rnf_region_vec1 (high)

The following table shows the por_hnf_rnf_region_vec1 higher register bit assignments.

Table 3-388 por_hnf_rnf_region_vec1 (high)

Bits	Field name	Description	Type	Reset
63:32	rnf_region_vec1	Bit vector mask; identifies which logical IDs of the RN-Fs to allocate to the locked region **Note** Must be 64'b0 if range-based region locking or OCM is enabled.	RW	64'b0

The following image shows the lower register bit assignments.

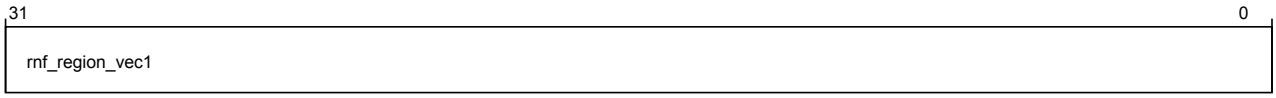

Figure 3-375 por_hnf_rnf_region_vec1 (low)

The following table shows the por_hnf_rnf_region_vec1 lower register bit assignments.

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Table 3-389 por_hnf_rnf_region_vec1 (low)

Bits	Field name	Description	Type	Reset
31:0	rnf_region_vec1	Bit vector mask; identifies which logical IDs of the RN-Fs to allocate to the locked region —————— **Note** —————— Must be 64'b0 if range-based region locking or OCM is enabled. ————————————	RW	64'b0

por_hnf_slcway_partition0_rnf_vec1

Functions as the control register for RN-Fs that can allocate to partition 0 (ways 0, 1, 2, and 3).

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hCB0

Register reset 64'b1111111111111111111111111111111111111111111111111111111111111111

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.slc_lock_ways

The following image shows the higher register bit assignments.

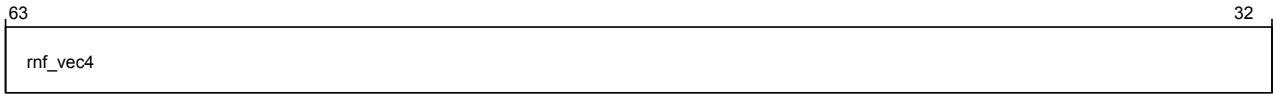

Figure 3-376 por_hnf_slcway_partition0_rnf_vec1 (high)

The following table shows the por_hnf_slcway_partition0_rnf_vec1 higher register bit assignments.

Table 3-390 por_hnf_slcway_partition0_rnf_vec1 (high)

Bits	Field name	Description	Type	Reset
63:32	rnf_vec4	Bit vector mask; identifies which logical IDs of the RN-F can allocate	RW	64'hFFFFFFFFFFFFFFFF

The following image shows the lower register bit assignments.

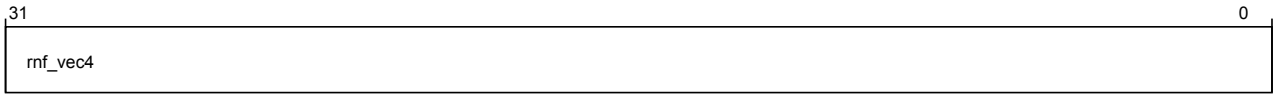

Figure 3-377 por_hnf_slcway_partition0_rnf_vec1 (low)

The following table shows the por_hnf_slcway_partition0_rnf_vec1 lower register bit assignments.

Table 3-391 por_hnf_slcway_partition0_rnf_vec1 (low)

Bits	Field name	Description	Type	Reset
31:0	rnf_vec4	Bit vector mask; identifies which logical IDs of the RN-F can allocate	RW	64'hFFFFFFFFFFFFFFFF

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por_hnf_slcway_partition1_rnf_vec1

Functions as the control register for RN-Fs that can allocate to partition 1 (ways 4, 5, 6, and 7) for Logical RNF IDs 64 to 127.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hCB8

Register reset 64'b1111111111111111111111111111111111111111111111111111111111111111

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.slc_lock_ways

The following image shows the higher register bit assignments.

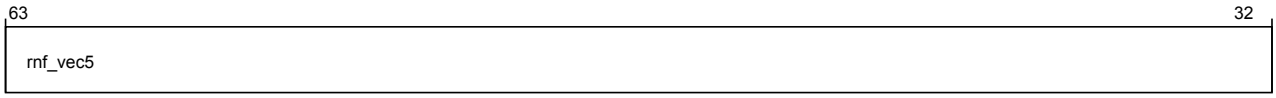

Figure 3-378 por_hnf_slcway_partition1_rnf_vec1 (high)

The following table shows the por_hnf_slcway_partition1_rnf_vec1 higher register bit assignments.

Table 3-392 por_hnf_slcway_partition1_rnf_vec1 (high)

Bits	Field name	Description	Type	Reset
63:32	rnf_vec5	Bit vector mask; identifies which logical IDs of the RN-F can allocate	RW	64'hFFFFFFFFFFFFFFFF

The following image shows the lower register bit assignments.

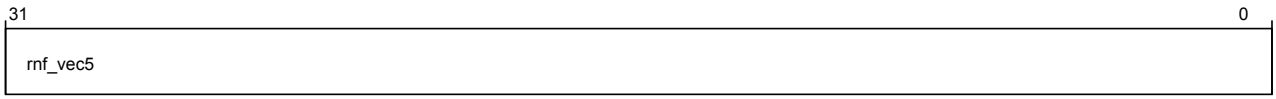

Figure 3-379 por_hnf_slcway_partition1_rnf_vec1 (low)

The following table shows the por_hnf_slcway_partition1_rnf_vec1 lower register bit assignments.

Table 3-393 por_hnf_slcway_partition1_rnf_vec1 (low)

Bits	Field name	Description	Type	Reset
31:0	rnf_vec5	Bit vector mask; identifies which logical IDs of the RN-F can allocate	RW	64'hFFFFFFFFFFFFFFFF

por_hnf_slcway_partition2_rnf_vec1

Functions as the control register for RN-Fs that can allocate to partition 2 (ways 8, 9, 10, and 11) for Logical RNF IDs 64 to 127.

Its characteristics are:

Type RW

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Register width (Bits) 64

Address offset 14'hCC0

Register reset 64'b1111111111111111111111111111111111111111111111111111111111111111

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.slc_lock_ways

The following image shows the higher register bit assignments.

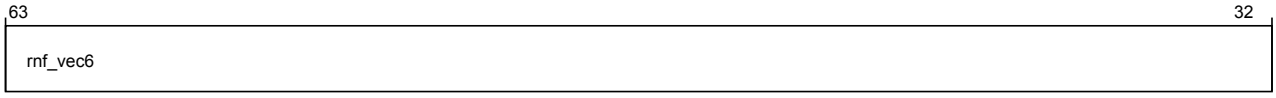

Figure 3-380 por_hnf_slcway_partition2_rnf_vec1 (high)

The following table shows the por_hnf_slcway_partition2_rnf_vec1 higher register bit assignments.

Table 3-394 por_hnf_slcway_partition2_rnf_vec1 (high)

Bits	Field name	Description	Type	Reset
63:32	rnf_vec6	Bit vector mask; identifies which logical IDs of the RN-F can allocate	RW	64'hFFFFFFFFFFFFFFFF

The following image shows the lower register bit assignments.

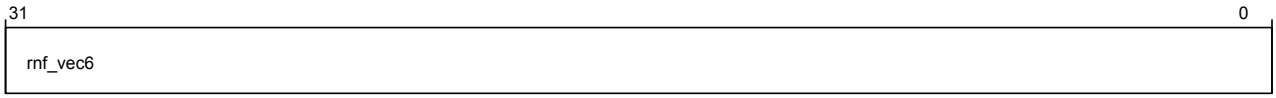

Figure 3-381 por_hnf_slcway_partition2_rnf_vec1 (low)

The following table shows the por_hnf_slcway_partition2_rnf_vec1 lower register bit assignments.

Table 3-395 por_hnf_slcway_partition2_rnf_vec1 (low)

Bits	Field name	Description	Type	Reset
31:0	rnf_vec6	Bit vector mask; identifies which logical IDs of the RN-F can allocate	RW	64'hFFFFFFFFFFFFFFFF

por_hnf_slcway_partition3_rnf_vec1

Functions as the control register for RN-Fs that can allocate to partition 3 (ways 12, 13, 14, and 15) for Logical RNF IDs 64 to 127.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hCC8

Register reset 64'b1111111111111111111111111111111111111111111111111111111111111111

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.slc_lock_ways

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The following image shows the higher register bit assignments.

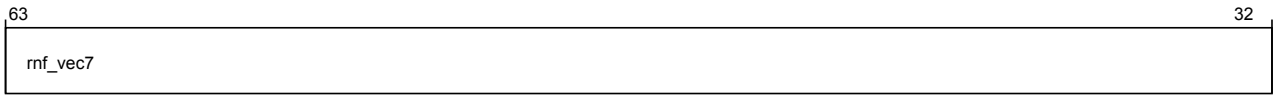

Figure 3-382 por_hnf_slcway_partition3_rnf_vec1 (high)

The following table shows the por_hnf_slcway_partition3_rnf_vec1 higher register bit assignments.

Table 3-396 por_hnf_slcway_partition3_rnf_vec1 (high)

Bits	Field name	Description	Type	Reset
63:32	rnf_vec7	Bit vector mask; identifies which logical IDs of the RN-F can allocate	RW	64'hFFFFFFFFFFFFFFFF

The following image shows the lower register bit assignments.

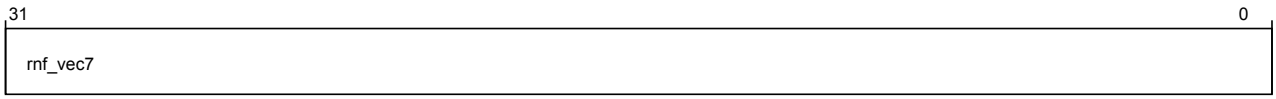

Figure 3-383 por_hnf_slcway_partition3_rnf_vec1 (low)

The following table shows the por_hnf_slcway_partition3_rnf_vec1 lower register bit assignments.

Table 3-397 por_hnf_slcway_partition3_rnf_vec1 (low)

Bits	Field name	Description	Type	Reset
31:0	rnf_vec7	Bit vector mask; identifies which logical IDs of the RN-F can allocate	RW	64'hFFFFFFFFFFFFFFFF

por_hnf_slcway_partition0_rni_vec

Functions as the control register for RN-Is that can allocate to partition 0 (ways 0, 1, 2, and 3).

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC68

Register reset 64'b1111111111111111111111111111111

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.slc_lock_ways

The following image shows the higher register bit assignments.

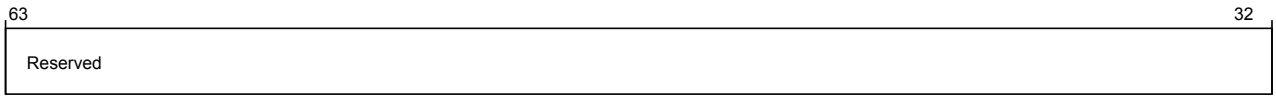

Figure 3-384 por_hnf_slcway_partition0_rni_vec (high)

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The following table shows the por_hnf_slcway_partition0_rni_vec higher register bit assignments.

Table 3-398 por_hnf_slcway_partition0_rni_vec (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

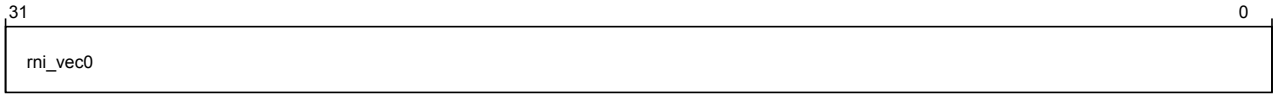

Figure 3-385 por_hnf_slcway_partition0_rni_vec (low)

The following table shows the por_hnf_slcway_partition0_rni_vec lower register bit assignments.

Table 3-399 por_hnf_slcway_partition0_rni_vec (low)

Bits	Field name	Description	Type	Reset
31:0	rni_vec0	Bit vector mask; identifies which logical IDs of the RN-I/RN-D can allocate	RW	32'hFFFFFFFF

por_hnf_slcway_partition1_rni_vec

Functions as the control register for RN-Is that can allocate to partition 1 (ways 4, 5, 6, and 7).

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC70

Register reset 64'b1111111111111111111111111111111

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.slc_lock_ways

The following image shows the higher register bit assignments.

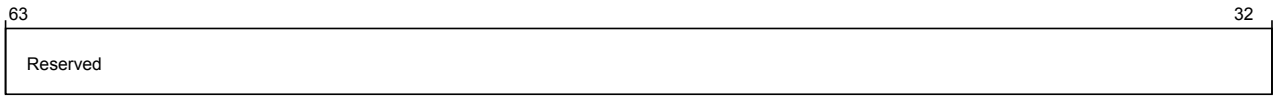

Figure 3-386 por_hnf_slcway_partition1_rni_vec (high)

The following table shows the por_hnf_slcway_partition1_rni_vec higher register bit assignments.

Table 3-400 por_hnf_slcway_partition1_rni_vec (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

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The following image shows the lower register bit assignments.

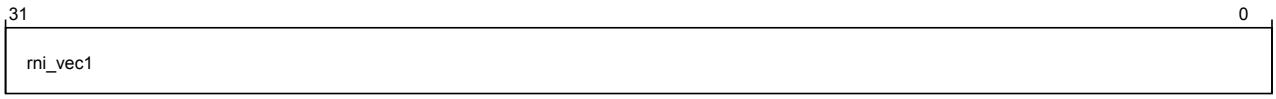

Figure 3-387 por_hnf_slcway_partition1_rni_vec (low)

The following table shows the por_hnf_slcway_partition1_rni_vec lower register bit assignments.

Table 3-401 por_hnf_slcway_partition1_rni_vec (low)

Bits	Field name	Description	Type	Reset
31:0	rni_vec1	Bit vector mask; identifies which logical IDs of the RN-I/RN-D can allocate	RW	32'hFFFFFFFF

por_hnf_slcway_partition2_rni_vec

Functions as the control register for RN-Is that can allocate to partition 2 (ways 8, 9, 10, and 11).

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC78

Register reset 64'b1111111111111111111111111111111

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.slc_lock_ways

The following image shows the higher register bit assignments.

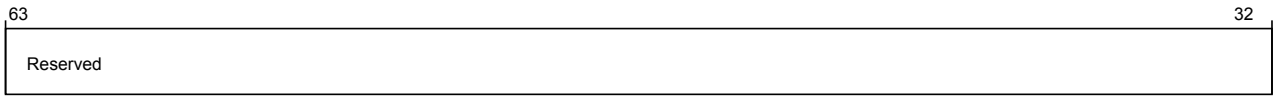

Figure 3-388 por_hnf_slcway_partition2_rni_vec (high)

The following table shows the por_hnf_slcway_partition2_rni_vec higher register bit assignments.

Table 3-402 por_hnf_slcway_partition2_rni_vec (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

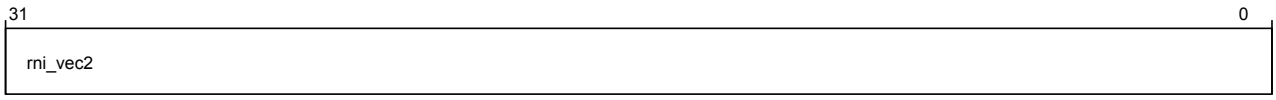

Figure 3-389 por_hnf_slcway_partition2_rni_vec (low)

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The following table shows the por_hnf_slcway_partition2_rni_vec lower register bit assignments.

Table 3-403 por_hnf_slcway_partition2_rni_vec (low)

Bits	Field name	Description	Type	Reset
31:0	rni_vec2	Bit vector mask; identifies which logical IDs of the RN-I/RN-D can allocate	RW	32'hFFFFFFFF

por_hnf_slcway_partition3_rni_vec

Functions as the control register for RN-Is that can allocate to partition 3 (ways 12, 13, 14, and 15).

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC80

Register reset 64'b1111111111111111111111111111111

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.slc_lock_ways

The following image shows the higher register bit assignments.

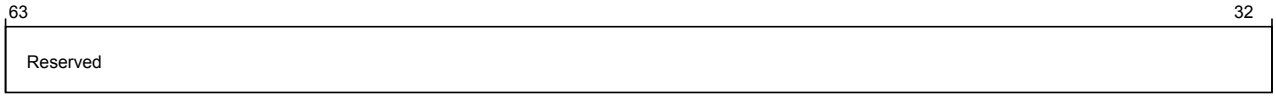

Figure 3-390 por_hnf_slcway_partition3_rni_vec (high)

The following table shows the por_hnf_slcway_partition3_rni_vec higher register bit assignments.

Table 3-404 por_hnf_slcway_partition3_rni_vec (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

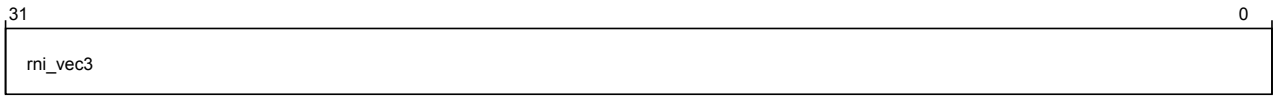

Figure 3-391 por_hnf_slcway_partition3_rni_vec (low)

The following table shows the por_hnf_slcway_partition3_rni_vec lower register bit assignments.

Table 3-405 por_hnf_slcway_partition3_rni_vec (low)

Bits	Field name	Description	Type	Reset
31:0	rni_vec3	Bit vector mask; identifies which logical IDs of the RN-I/RN-D can allocate	RW	32'hFFFFFFFF

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por_hnf_slcway_partition0_rnd_vec

Functions as the control register for RN-Ds that can allocate to partition 0 (ways 0, 1, 2, and 3).

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC88

Register reset 64'b11111111111111111111111111111111

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.slc_lock_ways

The following image shows the higher register bit assignments.

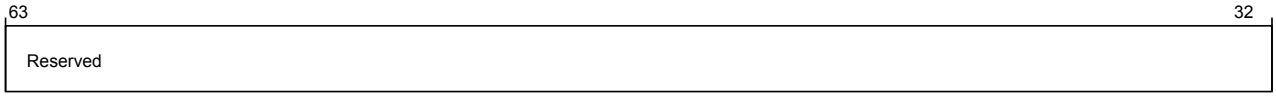

Figure 3-392 por_hnf_slcway_partition0_rnd_vec (high)

The following table shows the por_hnf_slcway_partition0_rnd_vec higher register bit assignments.

Table 3-406 por_hnf_slcway_partition0_rnd_vec (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

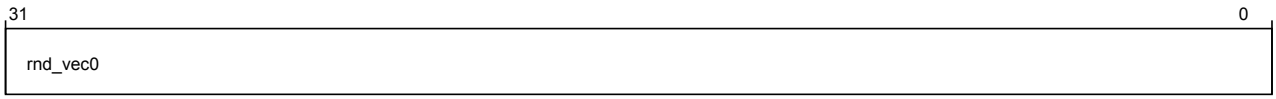

Figure 3-393 por_hnf_slcway_partition0_rnd_vec (low)

The following table shows the por_hnf_slcway_partition0_rnd_vec lower register bit assignments.

Table 3-407 por_hnf_slcway_partition0_rnd_vec (low)

Bits	Field name	Description	Type	Reset
31:0	rnd_vec0	Bit vector mask; identifies which logical IDs of the RN-I/RN-D can allocate	RW	32'hFFFFFFFF

por_hnf_slcway_partition1_rnd_vec

Functions as the control register for RN-Ds that can allocate to partition 1 (ways 4, 5, 6, and 7).

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC90

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Register reset 64'b1111111111111111111111111111111

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.slc_lock_ways

The following image shows the higher register bit assignments.

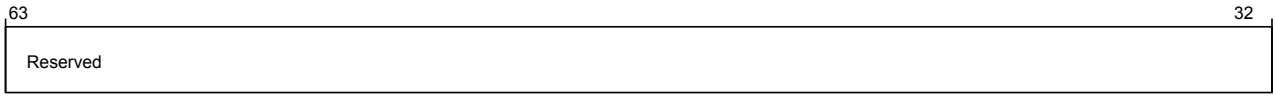

Figure 3-394 por_hnf_slcway_partition1_rnd_vec (high)

The following table shows the por_hnf_slcway_partition1_rnd_vec higher register bit assignments.

Table 3-408 por_hnf_slcway_partition1_rnd_vec (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

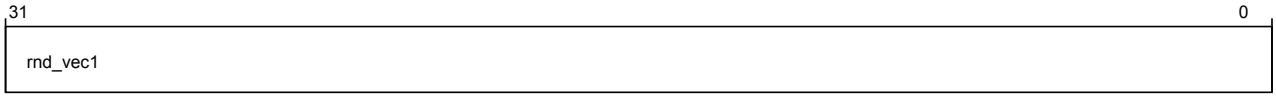

Figure 3-395 por_hnf_slcway_partition1_rnd_vec (low)

The following table shows the por_hnf_slcway_partition1_rnd_vec lower register bit assignments.

Table 3-409 por_hnf_slcway_partition1_rnd_vec (low)

Bits	Field name	Description	Type	Reset
31:0	rnd_vec1	Bit vector mask; identifies which logical IDs of the RN-I/RN-D can allocate	RW	32'hFFFFFFFF

por_hnf_slcway_partition2_rnd_vec

Functions as the control register for RN-Ds that can allocate to partition 2 (ways 8, 9, 10, and 11).

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC98

Register reset 64'b1111111111111111111111111111111

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.slc_lock_ways

The following image shows the higher register bit assignments.

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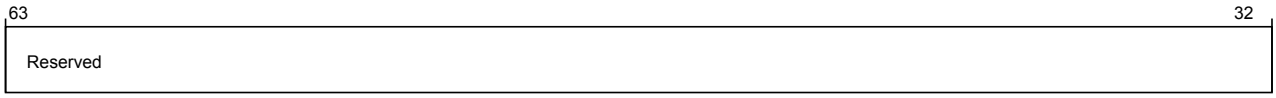

Figure 3-396 por_hnf_slcway_partition2_rnd_vec (high)

The following table shows the por_hnf_slcway_partition2_rnd_vec higher register bit assignments.

Table 3-410 por_hnf_slcway_partition2_rnd_vec (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

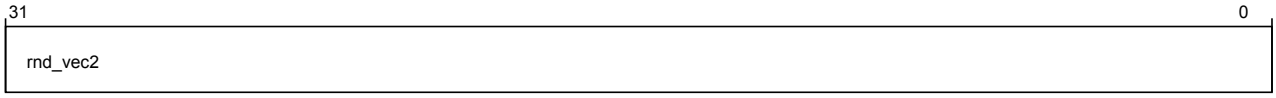

Figure 3-397 por_hnf_slcway_partition2_rnd_vec (low)

The following table shows the por_hnf_slcway_partition2_rnd_vec lower register bit assignments.

Table 3-411 por_hnf_slcway_partition2_rnd_vec (low)

Bits	Field name	Description	Type	Reset
31:0	rnd_vec2	Bit vector mask; identifies which logical IDs of the RN-I/RN-D can allocate	RW	32'hFFFFFFFF

por_hnf_slcway_partition3_rnd_vec

Functions as the control register for RN-Ds that can allocate to partition 3 (ways 12, 13, 14, and 15).

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hCA0

Register reset 64'b1111111111111111111111111111111

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.slc_lock_ways

The following image shows the higher register bit assignments.

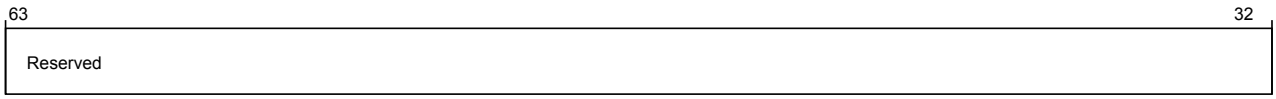

Figure 3-398 por_hnf_slcway_partition3_rnd_vec (high)

The following table shows the por_hnf_slcway_partition3_rnd_vec higher register bit assignments.

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Table 3-412 por_hnf_slcway_partition3_rnd_vec (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

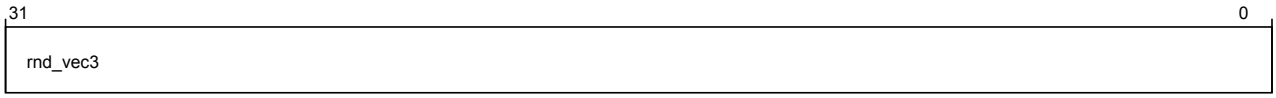

Figure 3-399 por_hnf_slcway_partition3_rnd_vec (low)

The following table shows the por_hnf_slcway_partition3_rnd_vec lower register bit assignments.

Table 3-413 por_hnf_slcway_partition3_rnd_vec (low)

Bits	Field name	Description	Type	Reset
31:0	rnd_vec3	Bit vector mask; identifies which logical IDs of the RN-I/RN-D can allocate	RW	32'hFFFFFFFF

por_hnf_rn_region_lock

Functions as the enable register for source-based SLC way allocation.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hCA8

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.slc_lock_ways

The following image shows the higher register bit assignments.

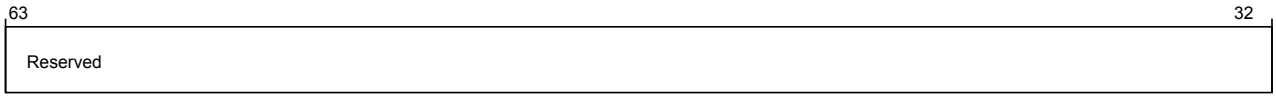

Figure 3-400 por_hnf_rn_region_lock (high)

The following table shows the por_hnf_rn_region_lock higher register bit assignments.

Table 3-414 por_hnf_rn_region_lock (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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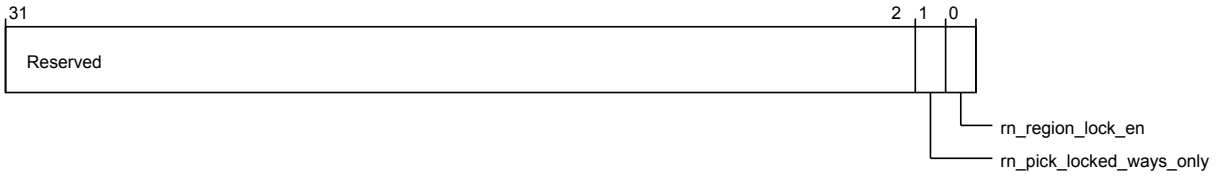

Figure 3-401 por_hnf_rn_region_lock (low)

The following table shows the por_hnf_rn_region_lock lower register bit assignments.

Table 3-415 por_hnf_rn_region_lock (low)

Bits	Field name	Description	Type	Reset
31:2	Reserved	Reserved	RO	-
1	rn_pick_locked_ways_only	Specifies which ways the programmed RNs can allocate new cache lines to 1'b0: Programmed RN will choose all ways including locked 1'b1: Programmed RN will only allocate in locked ways	RW	1'b0
0	rn_region_lock_en	Enables SRC-based region locking 1'b0: SRC based way locking is disabled 1'b1: SRC based way locking is enabled	RW	1'b0

por_hnf_sam_control

Configures HN-F SAM. All top_address_bit fields must be between bits 47 and 28 of the address. top_address_bit2 > top_address_bit1 > top_address_bit0. Must be configured to match corresponding por_rnsam_sys_cache_grp_sn_sam_cfgN register in the RN SAM.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD00

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

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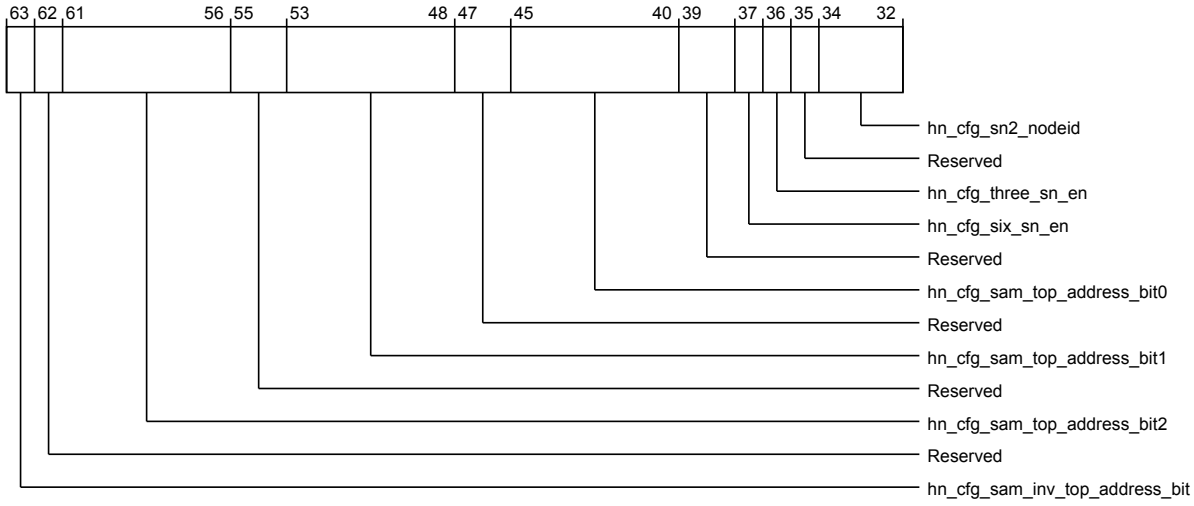

Figure 3-402 por_hnf_sam_control (high)

The following table shows the por_hnf_sam_control higher register bit assignments.

Table 3-416 por_hnf_sam_control (high)

Bits	Field name	Description	Type	Reset
63	hn_cfg_sam_inv_top_address_bit	Inverts the top address bit (hn_cfg_sam_top_address_bit1 if 3-SN, hn_cfg_sam_top_address_bit2 if 6-SN) **Note** Can only be used when the address map does not have unique address bit combinations.	RW	1'h0
62	Reserved	Reserved	RO	-
61:56	hn_cfg_sam_top_address_bit2	Bit position of top_address_bit2; used for address hashing in 6-SN configuration	RW	6'h00
55:54	Reserved	Reserved	RO	-
53:48	hn_cfg_sam_top_address_bit1	Bit position of top_address_bit1; used for address hashing in 3-SN/6-SN configuration	RW	6'h00
47:46	Reserved	Reserved	RO	-
45:40	hn_cfg_sam_top_address_bit0	Bit position of top_address_bit0; used for address hashing in 3-SN/6-SN configuration	RW	6'h00
39:38	Reserved	Reserved	RO	-
37	hn_cfg_six_sn_en	Enables 6-SN configuration	RW	1'b0
36	hn_cfg_three_sn_en	Enables 3-SN configuration	RW	1'b0
35	Reserved	Reserved	RO	-
34:32	hn_cfg_sn2_nodeid	SN 2 node ID	RW	11'h0

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The following image shows the lower register bit assignments.

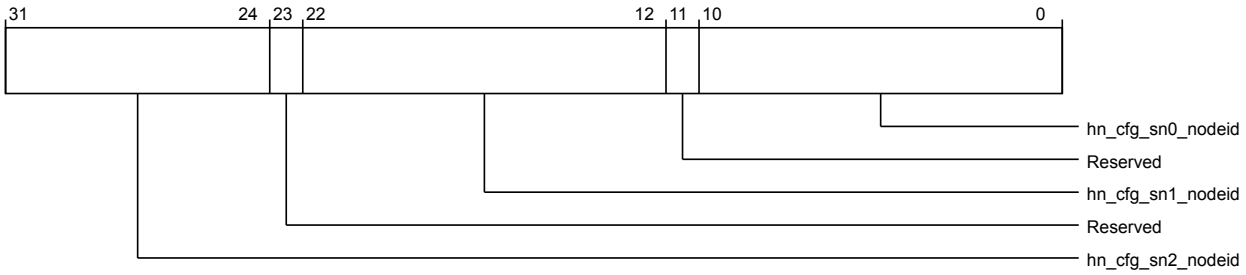

Figure 3-403 por_hnf_sam_control (low)

The following table shows the por_hnf_sam_control lower register bit assignments.

Table 3-417 por_hnf_sam_control (low)

Bits	Field name	Description	Type	Reset
31:24	hn_cfg_sn2_nodeid	SN 2 node ID	RW	11'h0
23	Reserved	Reserved	RO	-
22:12	hn_cfg_sn1_nodeid	SN 1 node ID	RW	11'h0
11	Reserved	Reserved	RO	-
10:0	hn_cfg_sn0_nodeid	SN 0 node ID	RW	11'h0

por_hnf_sam_memregion0

Configures range-based memory region 0 in HN-F SAM.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD08

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

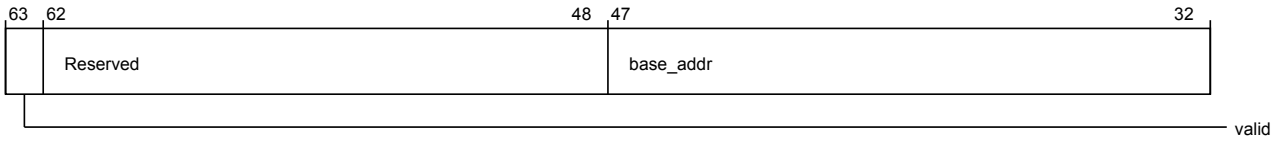

Figure 3-404 por_hnf_sam_memregion0 (high)

The following table shows the por_hnf_sam_memregion0 higher register bit assignments.

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Table 3-418 por_hnf_sam_memregion0 (high)

Bits	Field name	Description	Type	Reset
63	valid	Memory region 0 valid 1'b0: Not valid 1'b1: Valid for memory region comparison	RW	1'h0
62:48	Reserved	Reserved	RO	-
47:32	base_addr	Base address of memory region 0 CONSTRAINT: Must be an integer multiple of region size.	RW	22'h0

The following image shows the lower register bit assignments.

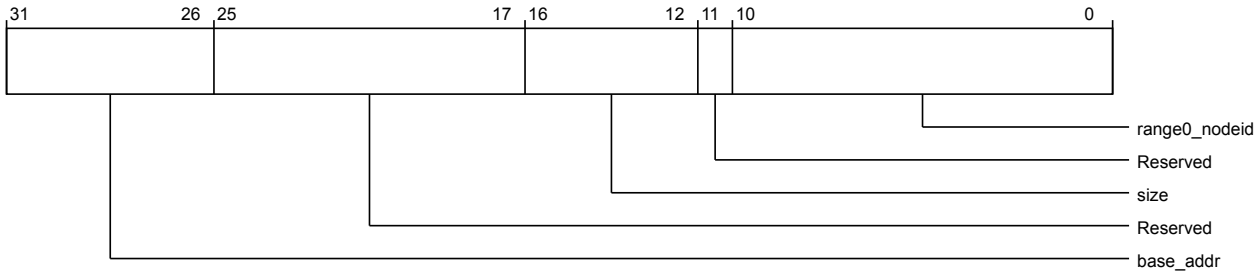

Figure 3-405 por_hnf_sam_memregion0 (low)

The following table shows the por_hnf_sam_memregion0 lower register bit assignments.

Table 3-419 por_hnf_sam_memregion0 (low)

Bits	Field name	Description	Type	Reset
31:26	base_addr	Base address of memory region 0 CONSTRAINT: Must be an integer multiple of region size.	RW	22'h0
25:17	Reserved	Reserved	RO	-
16:12	size	Memory region 0 size CONSTRAINT: Memory region must be a power of two, from minimum size supported to maximum memory size (2^address width).	RW	5'h0
11	Reserved	Reserved	RO	-
10:0	range0_nodeid	Memory region 0 target node ID	RW	11'h0

por_hnf_sam_memregion1

Configures range-based memory region 1 in HN-F SAM.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hD10

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

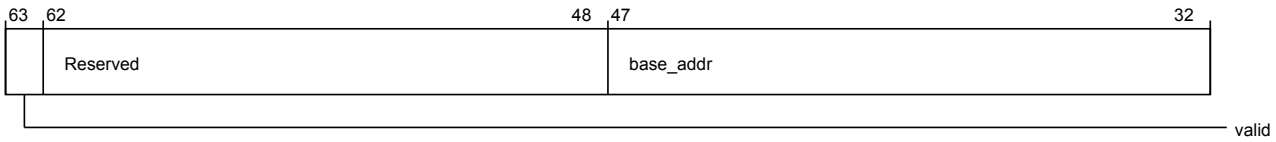

Figure 3-406 por_hnf_sam_memregion1 (high)

The following table shows the por_hnf_sam_memregion1 higher register bit assignments.

Table 3-420 por_hnf_sam_memregion1 (high)

Bits	Field name	Description	Type	Reset
63	valid	Memory region 1 valid 1'b0: Not valid 1'b1: Valid for memory region comparison	RW	1'h0
62:48	Reserved	Reserved	RO	-
47:32	base_addr	Base address of memory region 1 CONSTRAINT: Must be an integer multiple of region size.	RW	22'h0

The following image shows the lower register bit assignments.

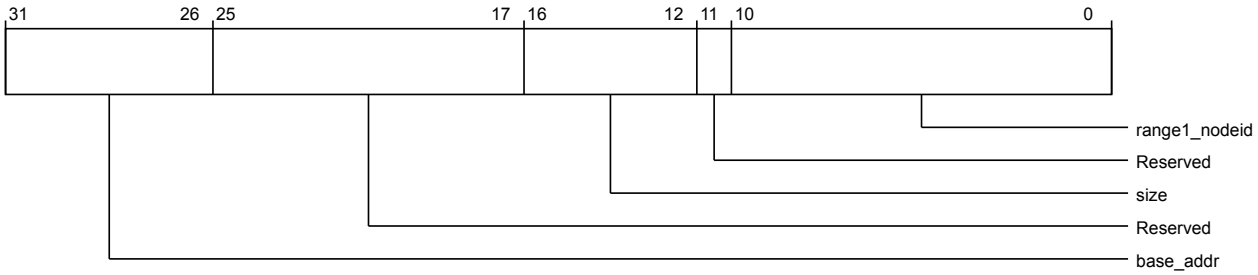

Figure 3-407 por_hnf_sam_memregion1 (low)

The following table shows the por_hnf_sam_memregion1 lower register bit assignments.

Table 3-421 por_hnf_sam_memregion1 (low)

Bits	Field name	Description	Type	Reset
31:26	base_addr	Base address of memory region 1 CONSTRAINT: Must be an integer multiple of region size.	RW	22'h0
25:17	Reserved	Reserved	RO	-

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Table 3-421 por_hnf_sam_memregion1 (low) (continued)

Bits	Field name	Description	Type	Reset
16:12	size	Memory region 1 size CONSTRAINT: Memory region must be a power of two, from minimum size supported to maximum memory size (2^address width).	RW	5'h0
11	Reserved	Reserved	RO	-
10:0	range1_nodeid	Memory region 1 target node ID	RW	11'h0

por_hnf_sam_sn_properties

Configures properties for all six SN targets and two range-based SN targets.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD18

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

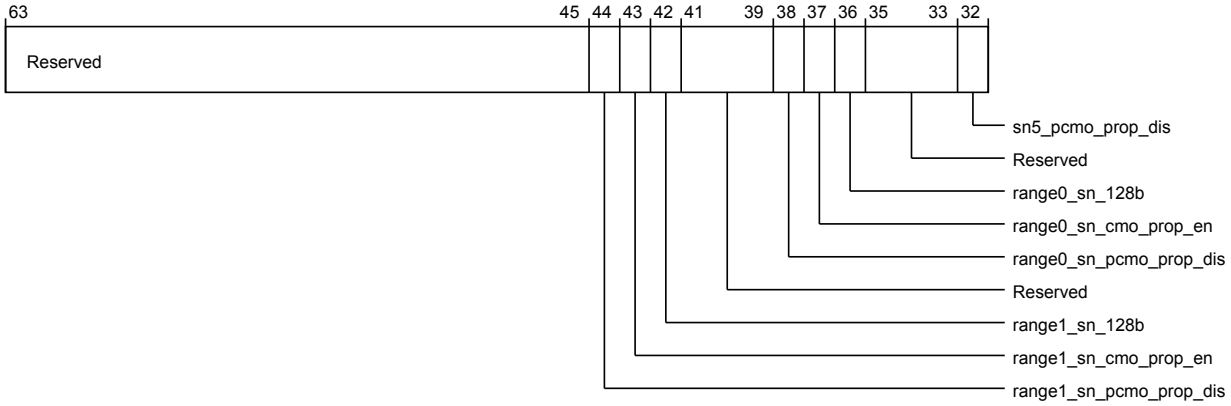

Figure 3-408 por_hnf_sam_sn_properties (high)

The following table shows the por_hnf_sam_sn_properties higher register bit assignments.

Table 3-422 por_hnf_sam_sn_properties (high)

Bits	Field name	Description	Type	Reset
63:45	Reserved	Reserved	RO	-
44	range1_sn_pcmo_prop_dis	Disables PCMO (persistent CMO) propagation for range 1 SN when set	RW	1'b0
43	range1_sn_cmo_prop_en	Enables CMO propagation for range 1 SN	RW	1'b0

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Table 3-422 por_hnf_sam_sn_properties (high) (continued)

Bits	Field name	Description	Type	Reset
42	range1_sn_128b	Data width of range 1 SN 1'b1: 128 bits 1'b0: 256 bits	RW	1'b0
41:39	Reserved	Reserved	RO	-
38	range0_sn_pcmo_prop_dis	Disables PCMO (persistent CMO) propagation for range 0 SN when set	RW	1'b0
37	range0_sn_cmo_prop_en	Enables CMO propagation for range 0 SN	RW	1'b0
36	range0_sn_128b	Data width of range 0 SN 1'b1: 128 bits 1'b0: 256 bits	RW	1'b0
35:33	Reserved	Reserved	RO	-
32	sn5_pcmo_prop_dis	Disables PCMO propagation for SN 5 when set	RW	1'b0

The following image shows the lower register bit assignments.

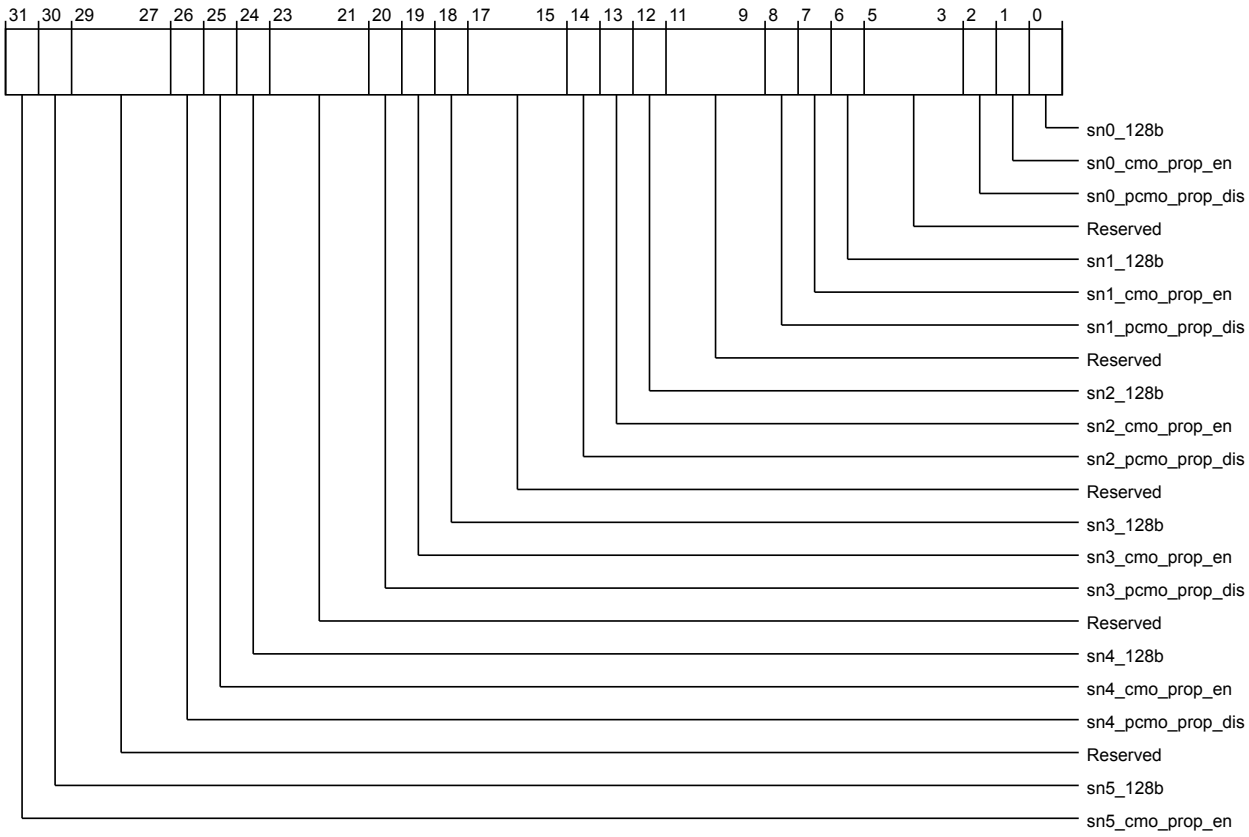

Figure 3-409 por_hnf_sam_sn_properties (low)

The following table shows the por_hnf_sam_sn_properties lower register bit assignments.

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Table 3-423 por_hnf_sam_sn_properties (low)

Bits	Field name	Description	Type	Reset
31	sn5_cmo_prop_en	Enables CMO propagation for SN 5 when set	RW	1'b0
30	sn5_128b	Data width of SN 5 1'b1: 128 bits 1'b0: 256 bits	RW	1'b0
29:27	Reserved	Reserved	RO	-
26	sn4_pcmo_prop_dis	Disables PCMO propagation for SN 4 when set	RW	1'b0
25	sn4_cmo_prop_en	Enables CMO propagation for SN 4 when set	RW	1'b0
24	sn4_128b	Data width of SN 4 1'b1: 128 bits 1'b0: 256 bits	RW	1'b0
23:21	Reserved	Reserved	RO	-
20	sn3_pcmo_prop_dis	Disables PCMO propagation for SN 3 when set	RW	1'b0
19	sn3_cmo_prop_en	Enables CMO propagation for SN 3 when set	RW	1'b0
18	sn3_128b	Data width of SN 3 1'b1: 128 bits 1'b0: 256 bits	RW	1'b0
17:15	Reserved	Reserved	RO	-
14	sn2_pcmo_prop_dis	Disables PCMO propagation for SN 2 when set	RW	1'b0
13	sn2_cmo_prop_en	Enables CMO propagation for SN 2 when set	RW	1'b0
12	sn2_128b	Data width of SN 2 1'b1: 128 bits 1'b0: 256 bits	RW	1'b0
11:9	Reserved	Reserved	RO	-
8	sn1_pcmo_prop_dis	Disables PCMO propagation for SN 1 when set	RW	1'b0
7	sn1_cmo_prop_en	Enables CMO propagation for SN 1 when set	RW	1'b0
6	sn1_128b	Data width of SN 1 1'b1: 128 bits 1'b0: 256 bits	RW	1'b0
5:3	Reserved	Reserved	RO	-
2	sn0_pcmo_prop_dis	Disables PCMO propagation for SN 0 when set	RW	1'b0

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Table 3-423 por_hnf_sam_sn_properties (low) (continued)

Bits	Field name	Description	Type	Reset
1	sn0_cmo_prop_en	Enables CMO propagation for SN 0 when set	RW	1'b0
0	sn0_128b	Data width of SN 0 1'b1: 128 bits 1'b0: 256 bits	RW	1'b0

por_hnf_sam_6sn_nodeid

Configures node IDs for slave nodes 3 to 5 in 6-SN configuration mode.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD20

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

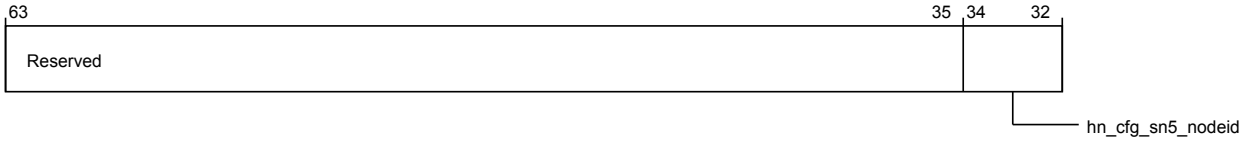

Figure 3-410 por_hnf_sam_6sn_nodeid (high)

The following table shows the por_hnf_sam_6sn_nodeid higher register bit assignments.

Table 3-424 por_hnf_sam_6sn_nodeid (high)

Bits	Field name	Description	Type	Reset
63:35	Reserved	Reserved	RO	-
34:32	hn_cfg_sn5_nodeid	SN 5 node ID	RW	11'h0

The following image shows the lower register bit assignments.

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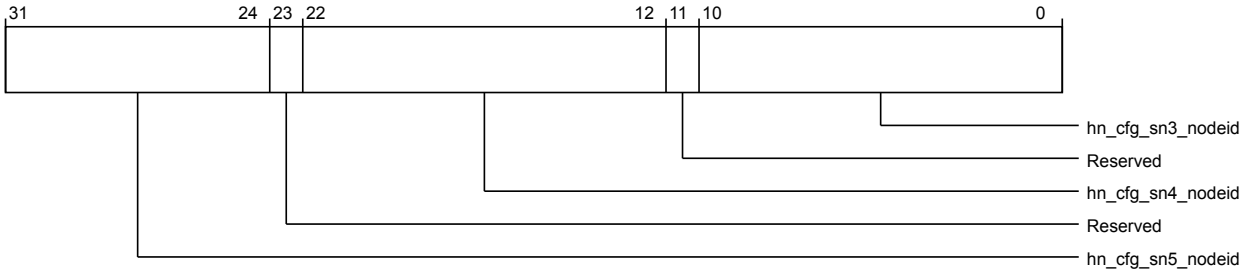

Figure 3-411 por_hnf_sam_6sn_nodeid (low)

The following table shows the por_hnf_sam_6sn_nodeid lower register bit assignments.

Table 3-425 por_hnf_sam_6sn_nodeid (low)

Bits	Field name	Description	Type	Reset
31:24	hn_cfg_sn5_nodeid	SN 5 node ID	RW	11'h0
23	Reserved	Reserved	RO	-
22:12	hn_cfg_sn4_nodeid	SN 4 node ID	RW	11'h0
11	Reserved	Reserved	RO	-
10:0	hn_cfg_sn3_nodeid	SN 3 node ID	RW	11'h0

por_hnf_rn_phys_id0

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD28

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

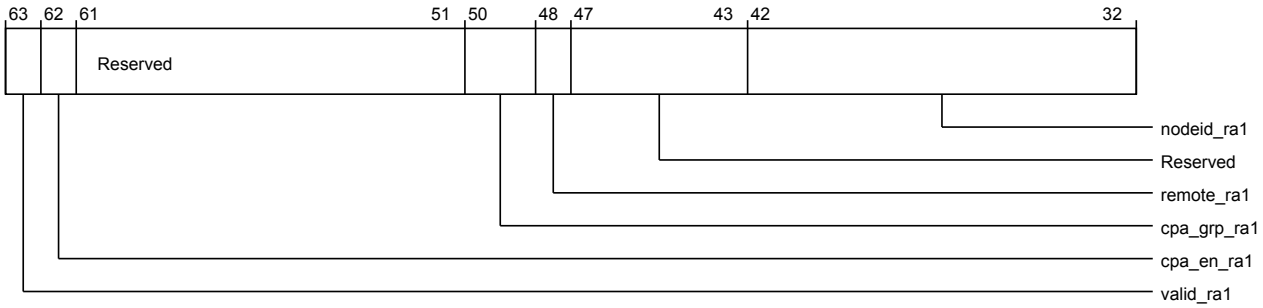

Figure 3-412 por_hnf_rn_phys_id0 (high)

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The following table shows the por_hnf_rn_phys_id0 higher register bit assignments.

Table 3-426 por_hnf_rn_phys_id0 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra1	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra1	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra1	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra1	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra1	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

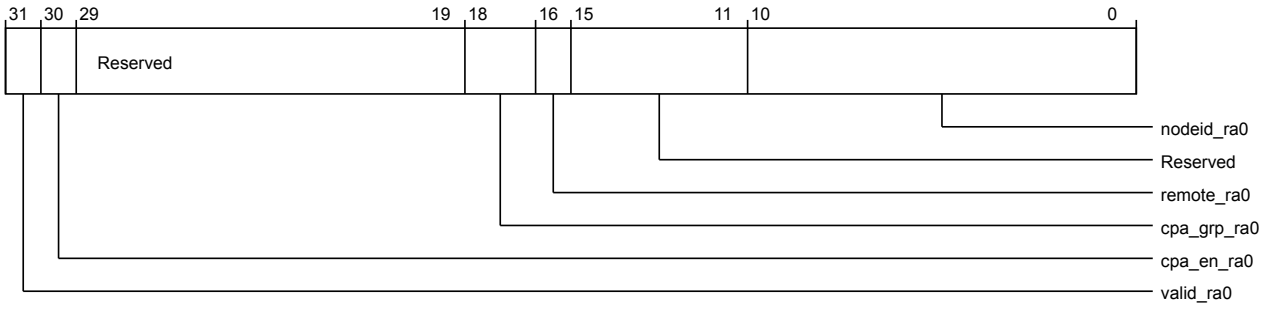

Figure 3-413 por_hnf_rn_phys_id0 (low)

The following table shows the por_hnf_rn_phys_id0 lower register bit assignments.

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Table 3-427 por_hnf_rn_phys_id0 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra0	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra0	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra0	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra0	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra0	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id1

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hD30
Register reset 64'b0
Usage constraints Only accessible by secure accesses.
Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

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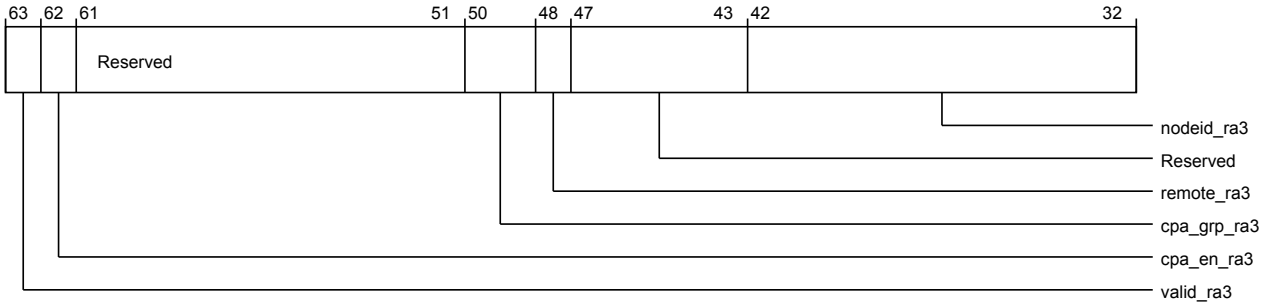

Figure 3-414 por_hnf_rn_phys_id1 (high)

The following table shows the por_hnf_rn_phys_id1 higher register bit assignments.

Table 3-428 por_hnf_rn_phys_id1 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra3	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra3	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra3	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra3	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra3	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

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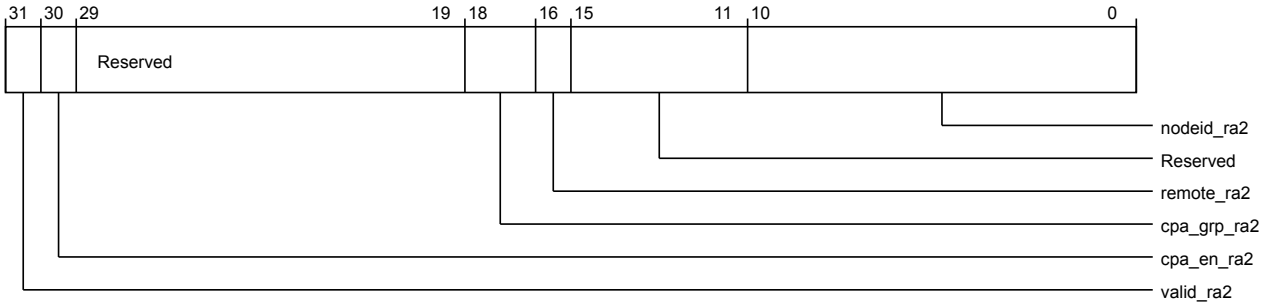

Figure 3-415 por_hnf_rn_phys_id1 (low)

The following table shows the por_hnf_rn_phys_id1 lower register bit assignments.

Table 3-429 por_hnf_rn_phys_id1 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra2	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra2	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra2	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra2	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra2	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id2

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hD38

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

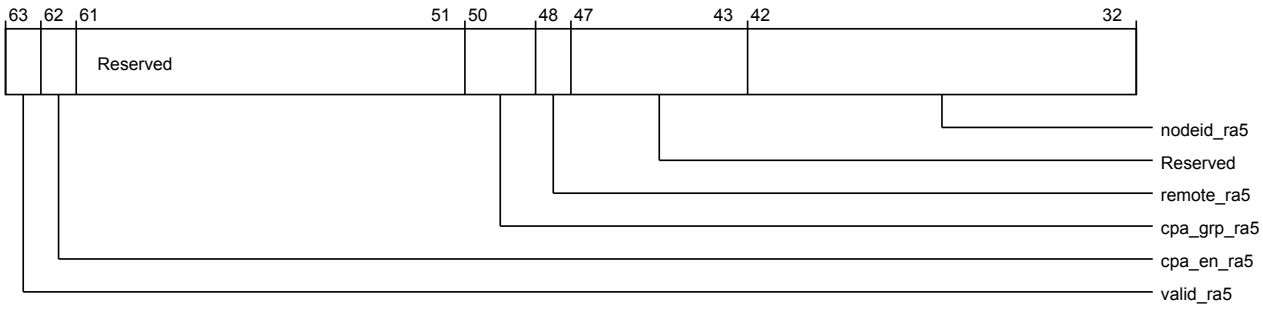

Figure 3-416 por_hnf_rn_phys_id2 (high)

The following table shows the por_hnf_rn_phys_id2 higher register bit assignments.

Table 3-430 por_hnf_rn_phys_id2 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra5	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra5	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra5	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra5	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra5	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

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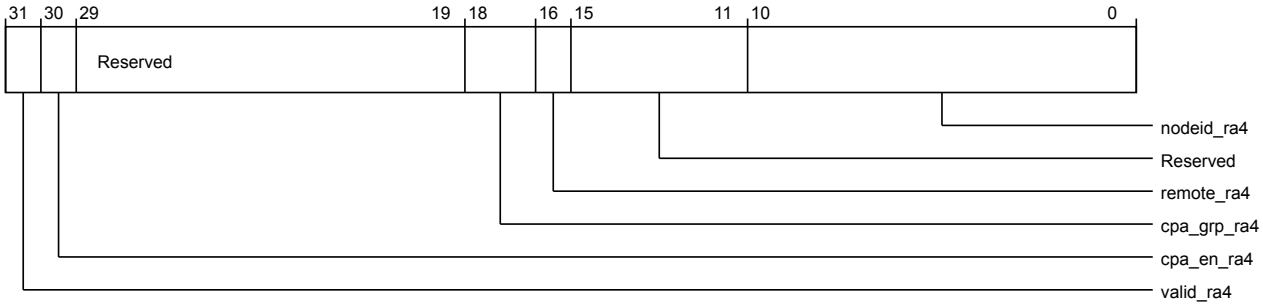

Figure 3-417 por_hnf_rn_phys_id2 (low)

The following table shows the por_hnf_rn_phys_id2 lower register bit assignments.

Table 3-431 por_hnf_rn_phys_id2 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra4	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra4	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra4	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra4	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra4	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id3

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hD40

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

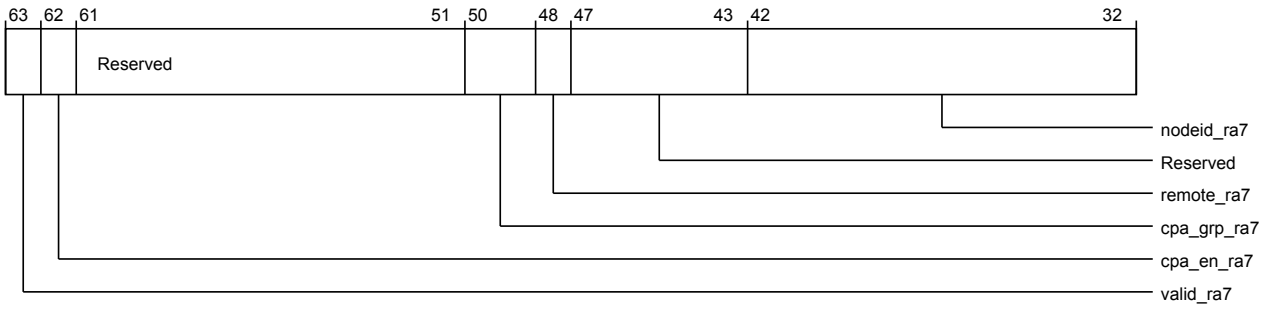

Figure 3-418 por_hnf_rn_phys_id3 (high)

The following table shows the por_hnf_rn_phys_id3 higher register bit assignments.

Table 3-432 por_hnf_rn_phys_id3 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra7	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra7	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra7	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra7	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra7	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

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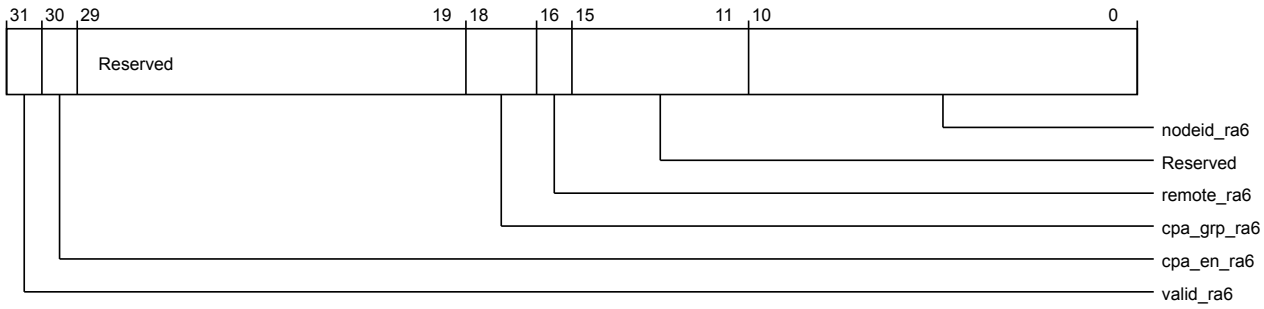

Figure 3-419 por_hnf_rn_phys_id3 (low)

The following table shows the por_hnf_rn_phys_id3 lower register bit assignments.

Table 3-433 por_hnf_rn_phys_id3 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra6	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra6	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra6	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra6	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra6	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id4

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hD48

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

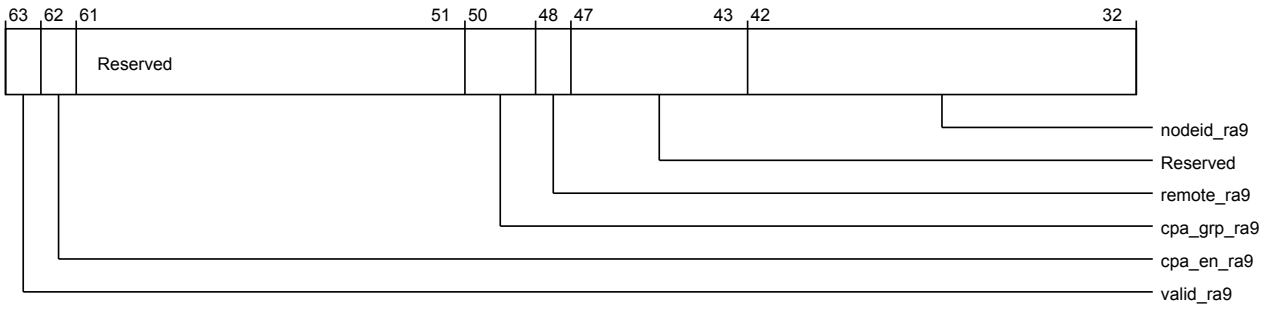

Figure 3-420 por_hnf_rn_phys_id4 (high)

The following table shows the por_hnf_rn_phys_id4 higher register bit assignments.

Table 3-434 por_hnf_rn_phys_id4 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra9	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra9	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra9	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra9	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra9	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

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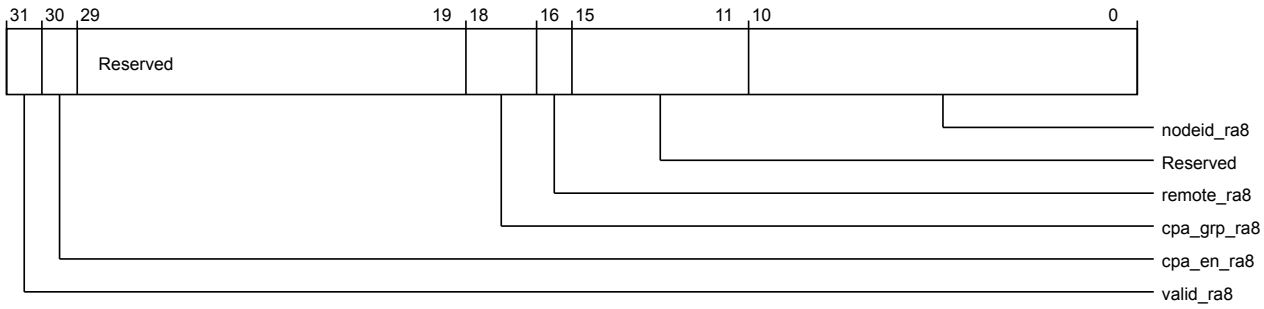

Figure 3-421 por_hnf_rn_phys_id4 (low)

The following table shows the por_hnf_rn_phys_id4 lower register bit assignments.

Table 3-435 por_hnf_rn_phys_id4 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra8	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra8	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra8	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra8	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra8	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id5

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hD50

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

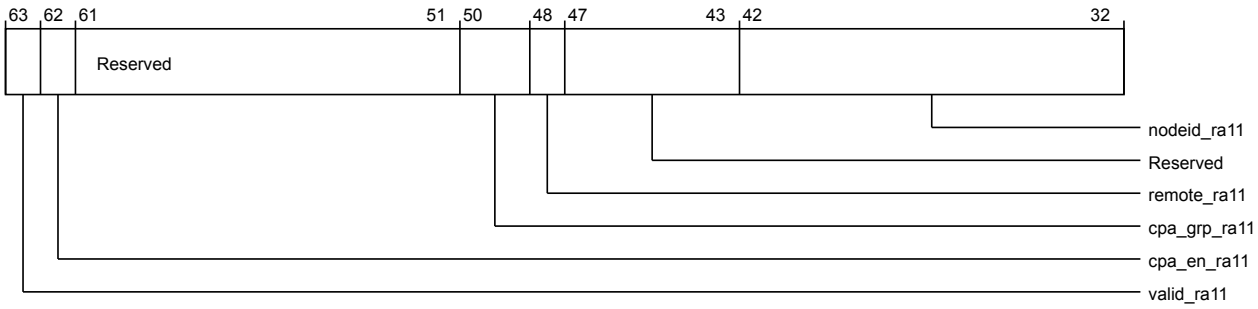

Figure 3-422 por_hnf_rn_phys_id5 (high)

The following table shows the por_hnf_rn_phys_id5 higher register bit assignments.

Table 3-436 por_hnf_rn_phys_id5 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra11	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra11	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra11	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra11	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra11	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

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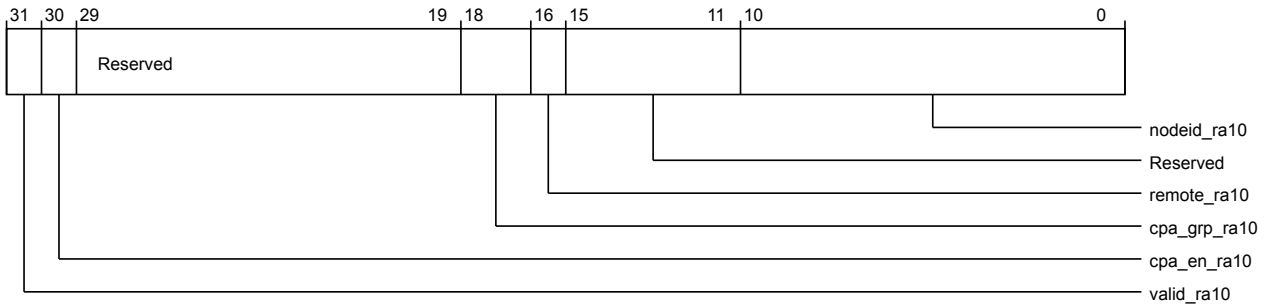

Figure 3-423 por_hnf_rn_phys_id5 (low)

The following table shows the por_hnf_rn_phys_id5 lower register bit assignments.

Table 3-437 por_hnf_rn_phys_id5 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra10	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra10	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra10	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra10	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra10	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id6

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hD58

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

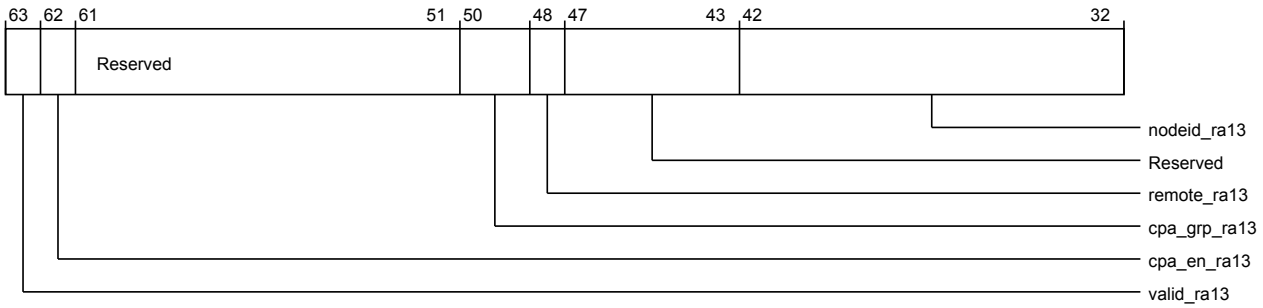

Figure 3-424 por_hnf_rn_phys_id6 (high)

The following table shows the por_hnf_rn_phys_id6 higher register bit assignments.

Table 3-438 por_hnf_rn_phys_id6 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra13	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra13	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra13	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra13	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra13	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

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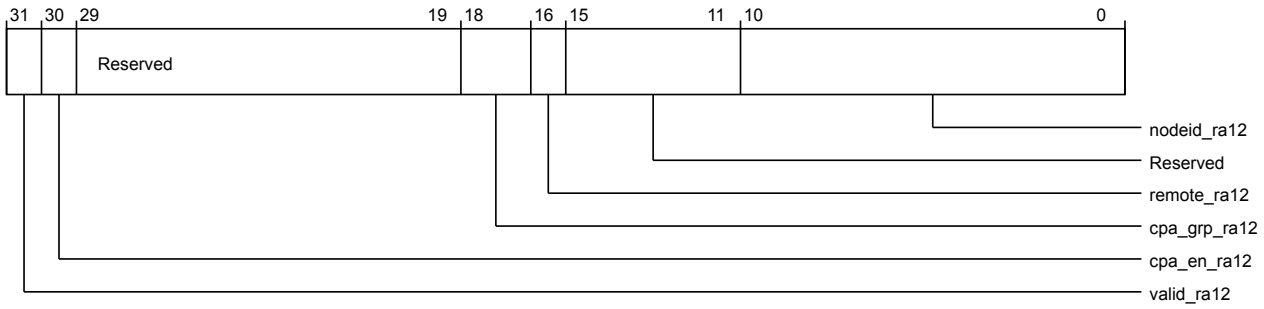

Figure 3-425 por_hnf_rn_phys_id6 (low)

The following table shows the por_hnf_rn_phys_id6 lower register bit assignments.

Table 3-439 por_hnf_rn_phys_id6 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra12	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra12	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra12	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra12	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra12	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id7

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hD60

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

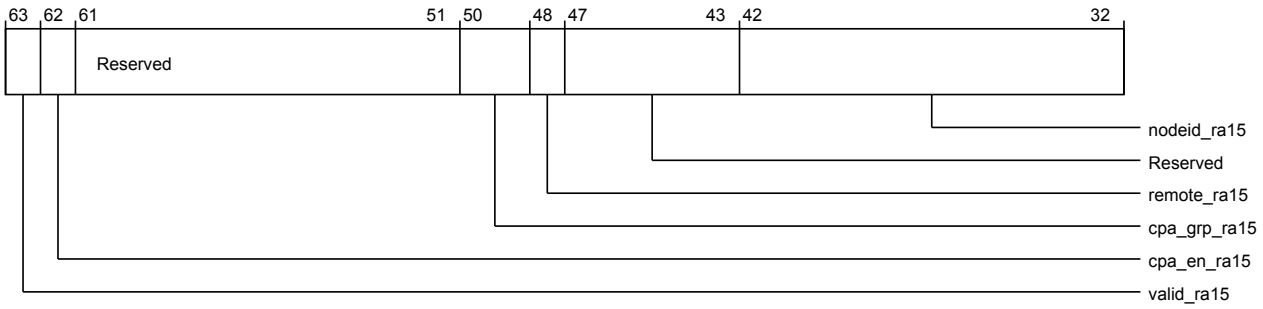

Figure 3-426 por_hnf_rn_phys_id7 (high)

The following table shows the por_hnf_rn_phys_id7 higher register bit assignments.

Table 3-440 por_hnf_rn_phys_id7 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra15	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra15	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra15	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra15	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra15	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

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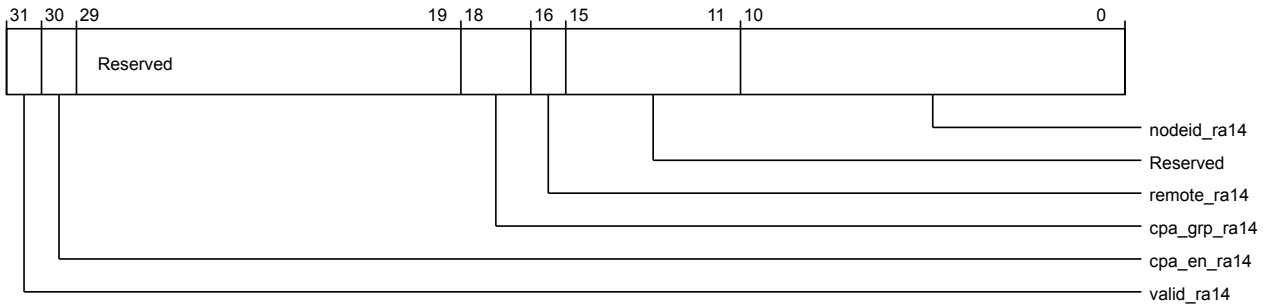

Figure 3-427 por_hnf_rn_phys_id7 (low)

The following table shows the por_hnf_rn_phys_id7 lower register bit assignments.

Table 3-441 por_hnf_rn_phys_id7 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra14	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra14	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra14	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra14	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra14	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id8

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hD68

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

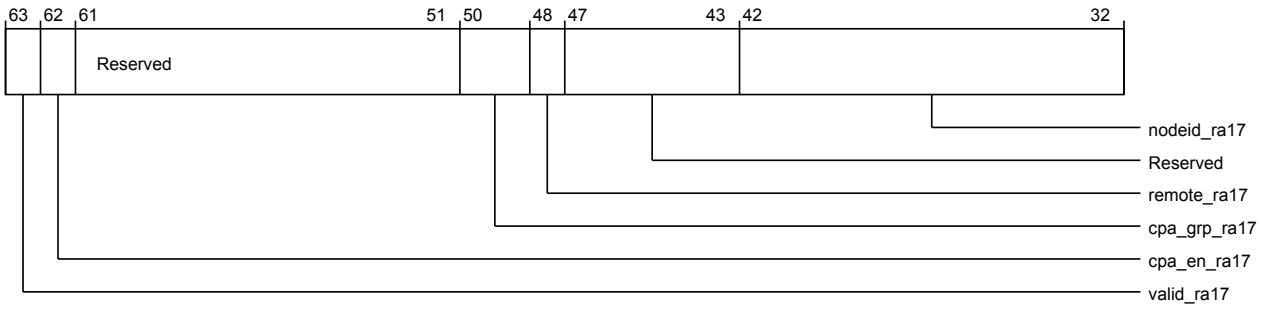

Figure 3-428 por_hnf_rn_phys_id8 (high)

The following table shows the por_hnf_rn_phys_id8 higher register bit assignments.

Table 3-442 por_hnf_rn_phys_id8 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra17	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra17	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra17	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra17	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra17	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

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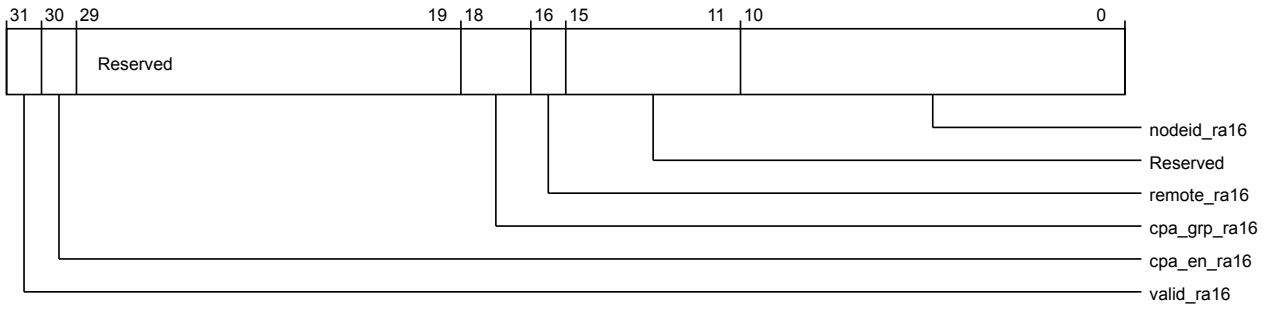

Figure 3-429 por_hnf_rn_phys_id8 (low)

The following table shows the por_hnf_rn_phys_id8 lower register bit assignments.

Table 3-443 por_hnf_rn_phys_id8 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra16	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra16	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra16	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra16	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra16	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id9

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hD70

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

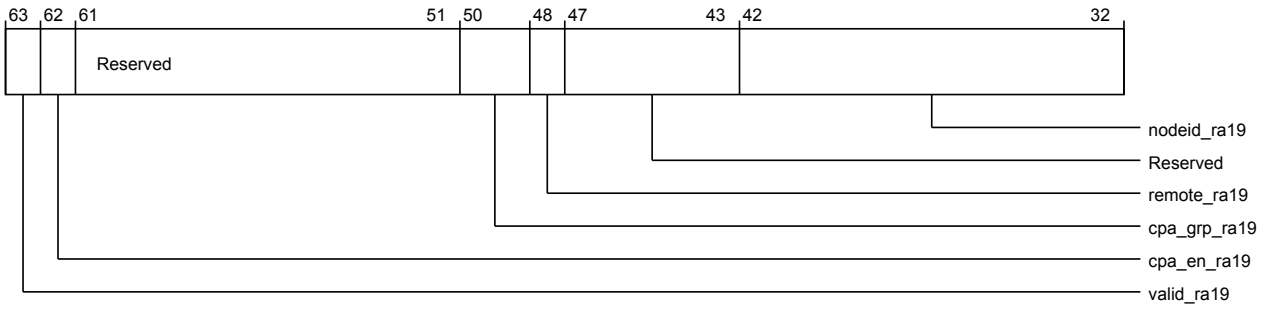

Figure 3-430 por_hnf_rn_phys_id9 (high)

The following table shows the por_hnf_rn_phys_id9 higher register bit assignments.

Table 3-444 por_hnf_rn_phys_id9 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra19	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra19	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra19	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra19	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra19	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

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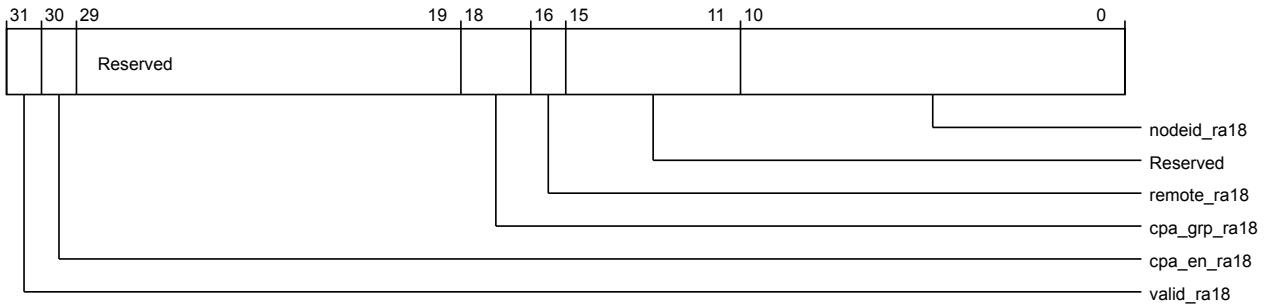

Figure 3-431 por_hnf_rn_phys_id9 (low)

The following table shows the por_hnf_rn_phys_id9 lower register bit assignments.

Table 3-445 por_hnf_rn_phys_id9 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra18	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra18	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra18	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra18	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra18	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id10

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hD78

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

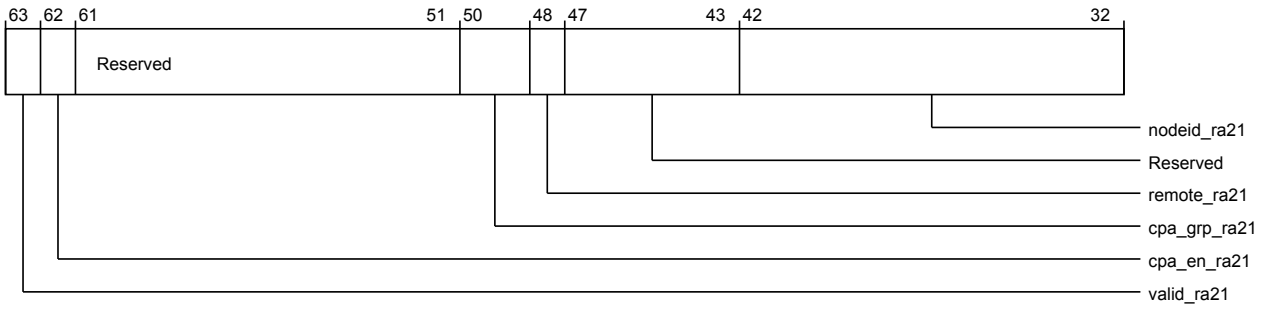

Figure 3-432 por_hnf_rn_phys_id10 (high)

The following table shows the por_hnf_rn_phys_id10 higher register bit assignments.

Table 3-446 por_hnf_rn_phys_id10 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra21	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra21	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra21	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra21	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra21	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

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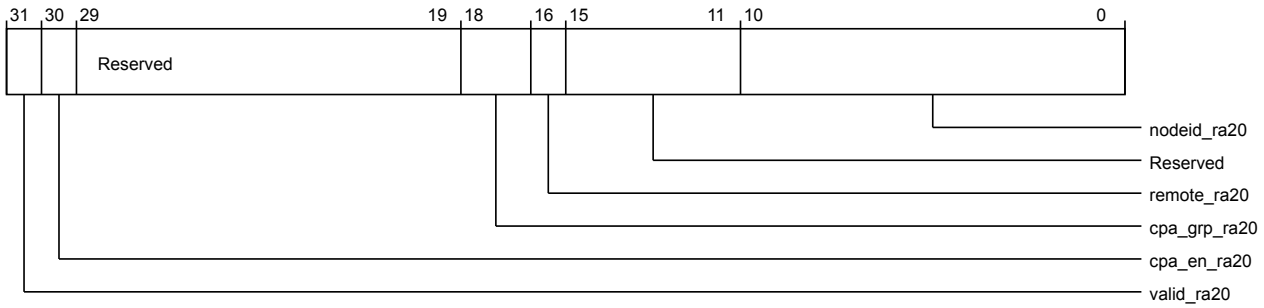

Figure 3-433 por_hnf_rn_phys_id10 (low)

The following table shows the por_hnf_rn_phys_id10 lower register bit assignments.

Table 3-447 por_hnf_rn_phys_id10 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra20	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra20	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra20	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra20	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra20	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id11

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hD80

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

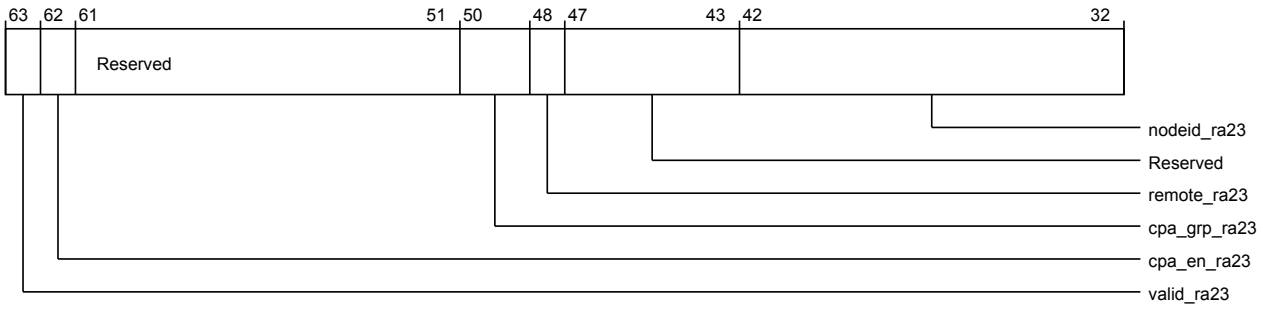

Figure 3-434 por_hnf_rn_phys_id11 (high)

The following table shows the por_hnf_rn_phys_id11 higher register bit assignments.

Table 3-448 por_hnf_rn_phys_id11 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra23	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra23	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra23	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra23	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra23	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

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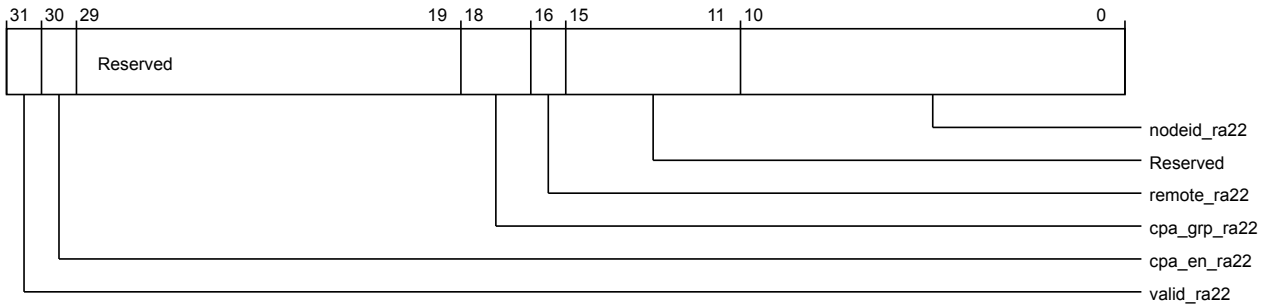

Figure 3-435 por_hnf_rn_phys_id11 (low)

The following table shows the por_hnf_rn_phys_id11 lower register bit assignments.

Table 3-449 por_hnf_rn_phys_id11 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra22	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra22	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra22	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra22	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra22	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id12

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hD88

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

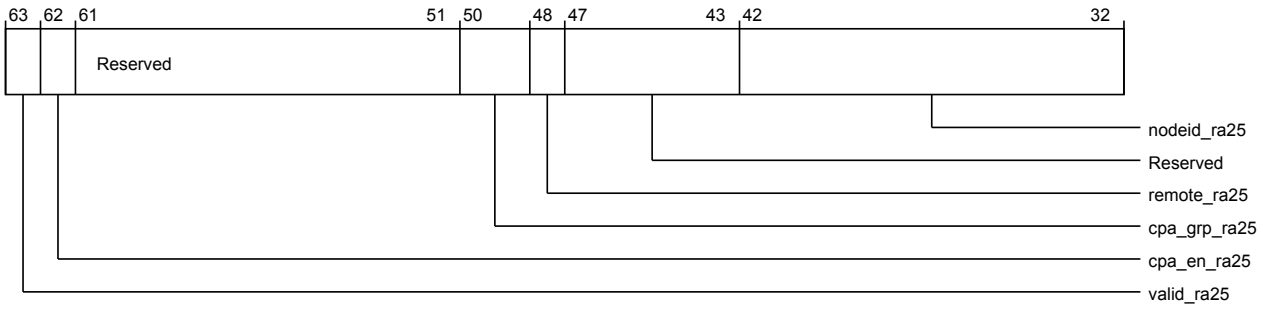

Figure 3-436 por_hnf_rn_phys_id12 (high)

The following table shows the por_hnf_rn_phys_id12 higher register bit assignments.

Table 3-450 por_hnf_rn_phys_id12 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra25	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra25	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra25	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra25	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra25	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

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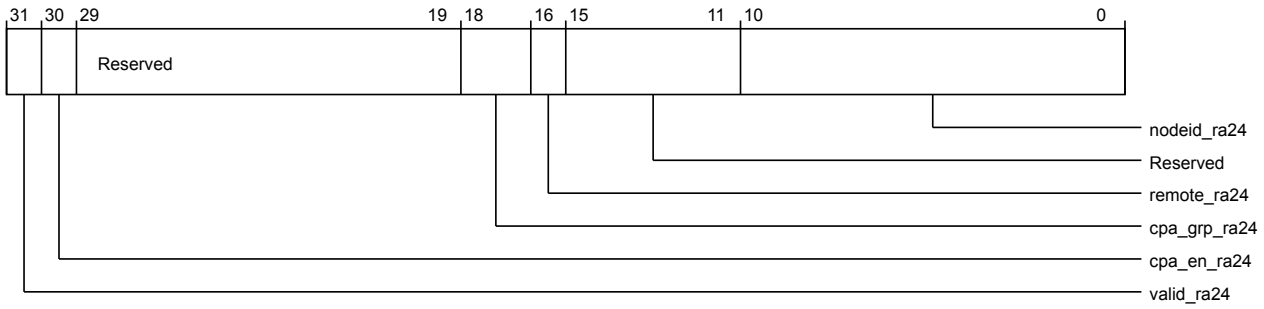

Figure 3-437 por_hnf_rn_phys_id12 (low)

The following table shows the por_hnf_rn_phys_id12 lower register bit assignments.

Table 3-451 por_hnf_rn_phys_id12 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra24	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra24	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra24	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra24	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra24	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id13

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hD90

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

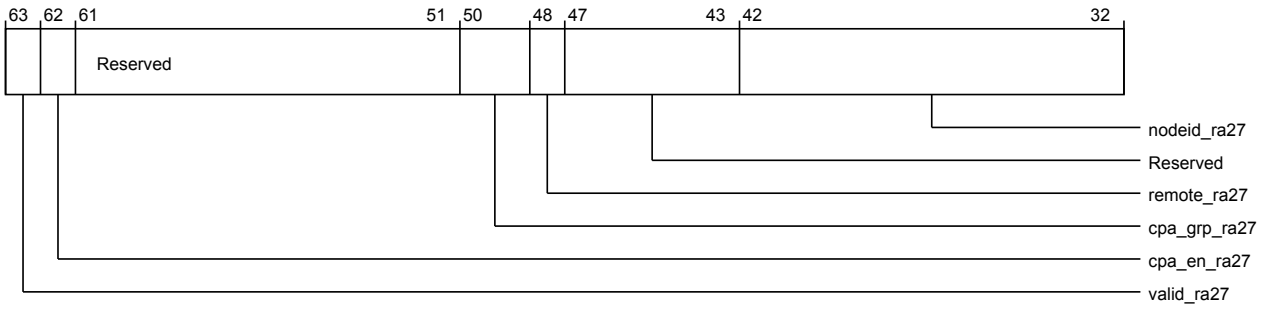

Figure 3-438 por_hnf_rn_phys_id13 (high)

The following table shows the por_hnf_rn_phys_id13 higher register bit assignments.

Table 3-452 por_hnf_rn_phys_id13 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra27	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra27	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra27	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra27	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra27	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

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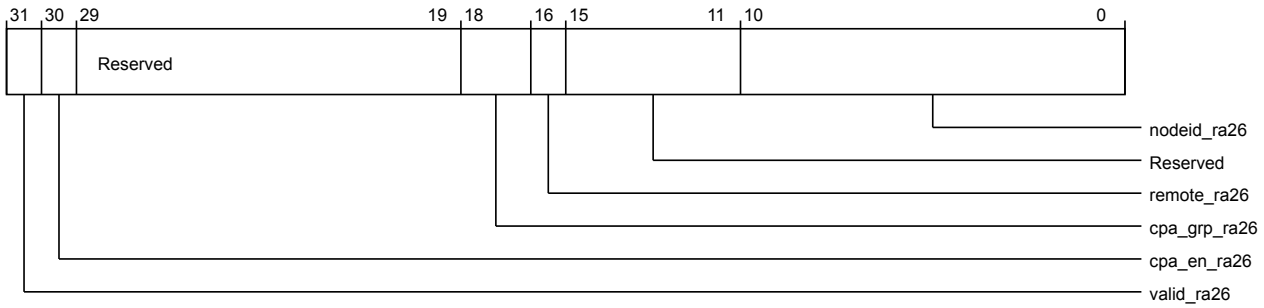

Figure 3-439 por_hnf_rn_phys_id13 (low)

The following table shows the por_hnf_rn_phys_id13 lower register bit assignments.

Table 3-453 por_hnf_rn_phys_id13 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra26	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra26	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra26	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra26	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra26	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id14

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hD98

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

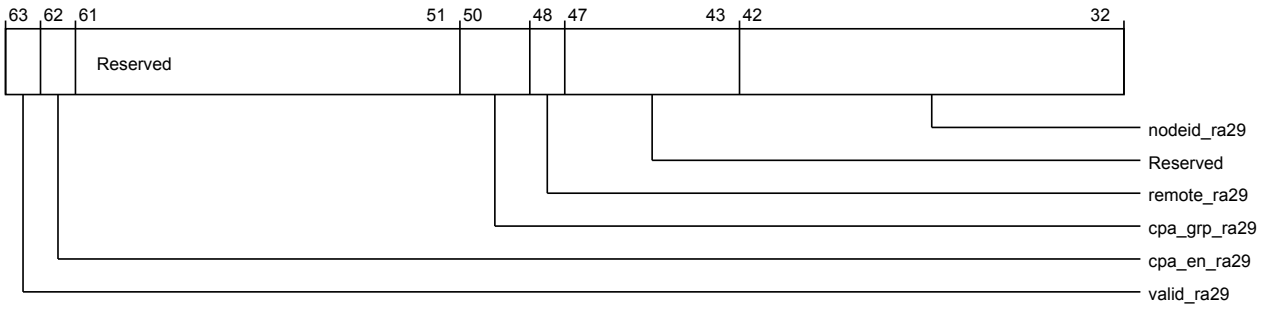

Figure 3-440 por_hnf_rn_phys_id14 (high)

The following table shows the por_hnf_rn_phys_id14 higher register bit assignments.

Table 3-454 por_hnf_rn_phys_id14 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra29	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra29	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra29	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra29	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra29	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

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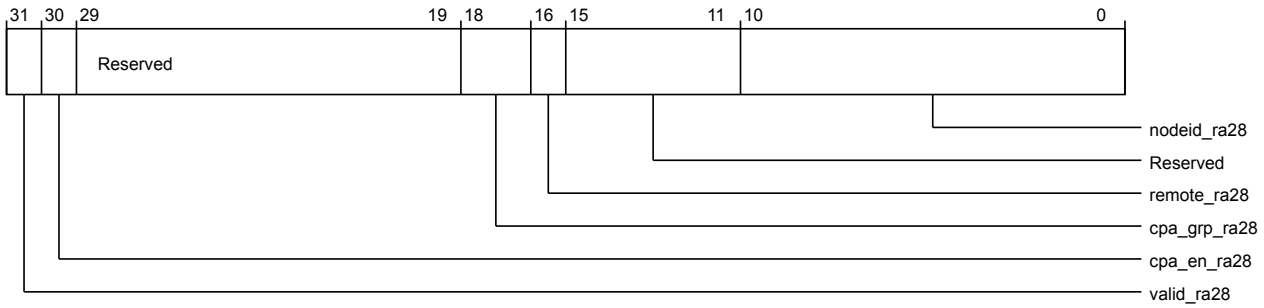

Figure 3-441 por_hnf_rn_phys_id14 (low)

The following table shows the por_hnf_rn_phys_id14 lower register bit assignments.

Table 3-455 por_hnf_rn_phys_id14 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra28	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra28	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra28	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra28	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra28	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id15

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hDA0

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

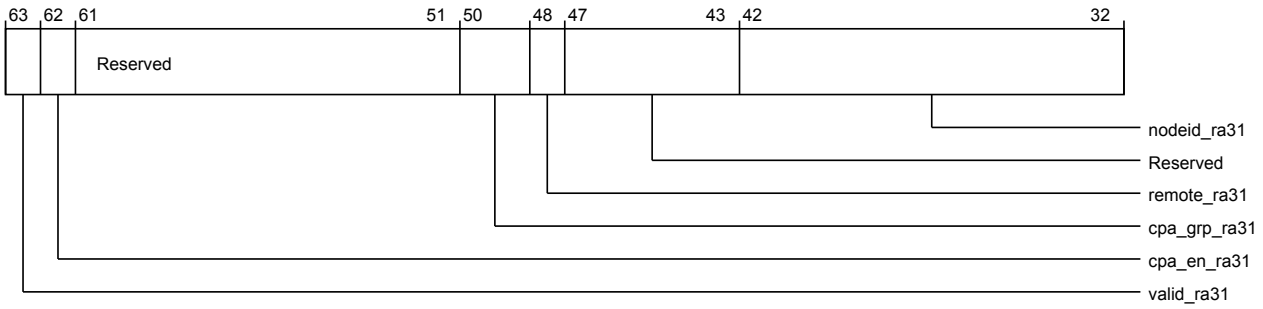

Figure 3-442 por_hnf_rn_phys_id15 (high)

The following table shows the por_hnf_rn_phys_id15 higher register bit assignments.

Table 3-456 por_hnf_rn_phys_id15 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra31	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra31	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra31	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra31	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra31	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

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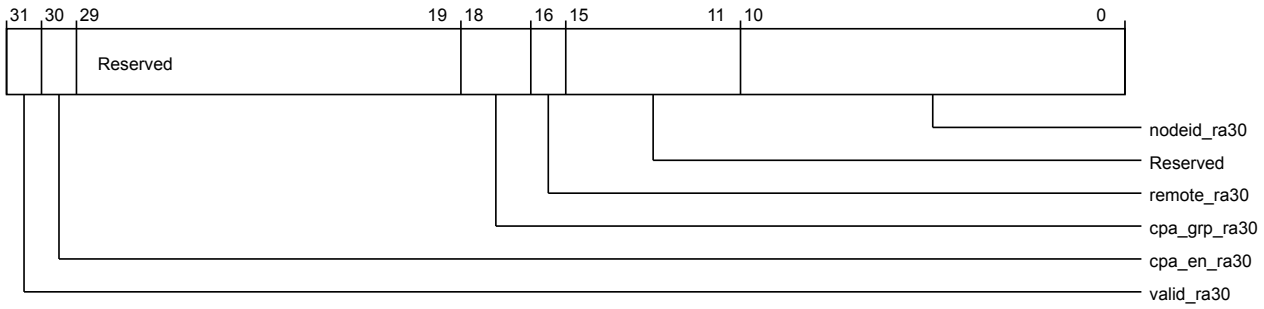

Figure 3-443 por_hnf_rn_phys_id15 (low)

The following table shows the por_hnf_rn_phys_id15 lower register bit assignments.

Table 3-457 por_hnf_rn_phys_id15 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra30	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra30	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra30	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra30	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra30	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id16

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hDA8

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

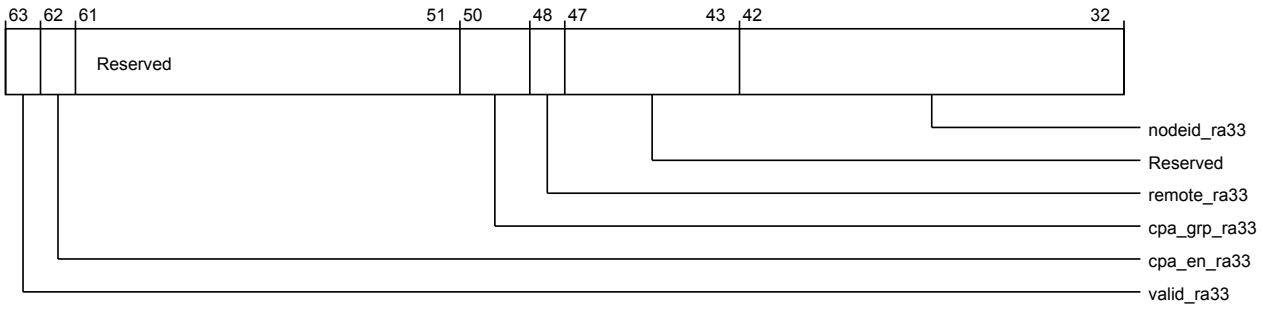

Figure 3-444 por_hnf_rn_phys_id16 (high)

The following table shows the por_hnf_rn_phys_id16 higher register bit assignments.

Table 3-458 por_hnf_rn_phys_id16 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra33	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra33	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra33	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra33	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra33	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

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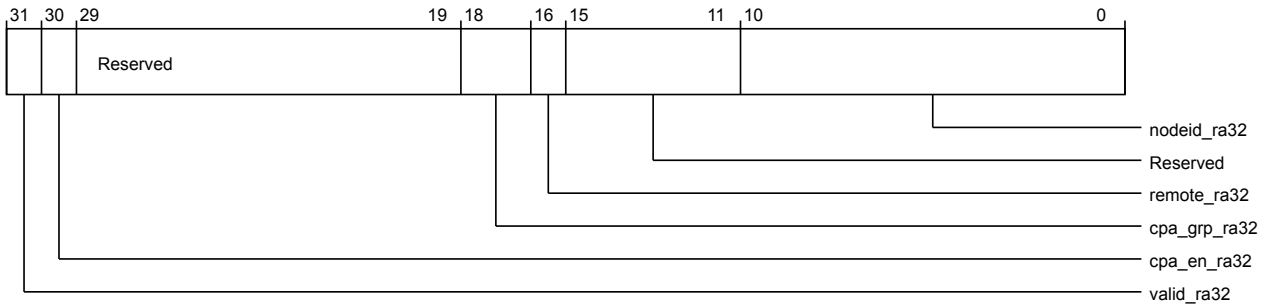

Figure 3-445 por_hnf_rn_phys_id16 (low)

The following table shows the por_hnf_rn_phys_id16 lower register bit assignments.

Table 3-459 por_hnf_rn_phys_id16 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra32	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra32	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra32	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra32	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra32	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id17

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hDB0

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

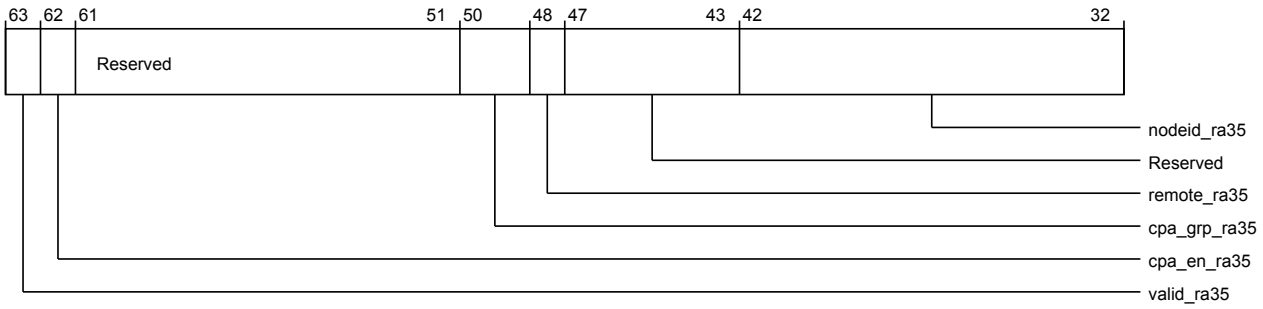

Figure 3-446 por_hnf_rn_phys_id17 (high)

The following table shows the por_hnf_rn_phys_id17 higher register bit assignments.

Table 3-460 por_hnf_rn_phys_id17 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra35	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra35	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra35	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra35	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra35	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

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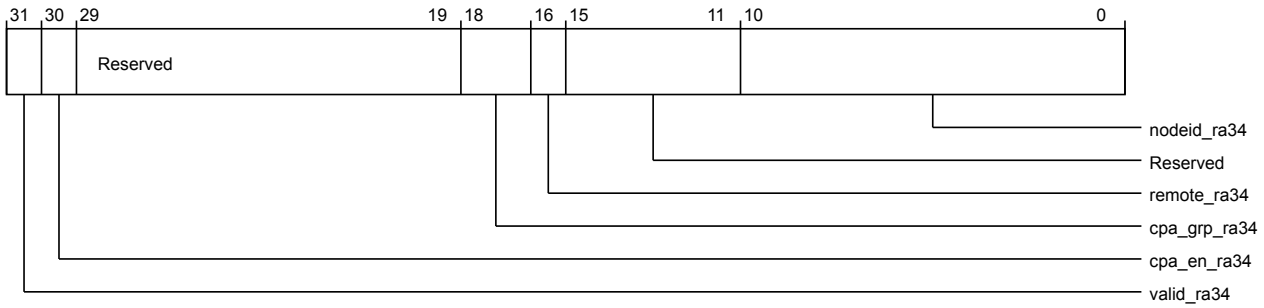

Figure 3-447 por_hnf_rn_phys_id17 (low)

The following table shows the por_hnf_rn_phys_id17 lower register bit assignments.

Table 3-461 por_hnf_rn_phys_id17 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra34	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra34	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra34	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra34	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra34	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id18

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hDB8

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

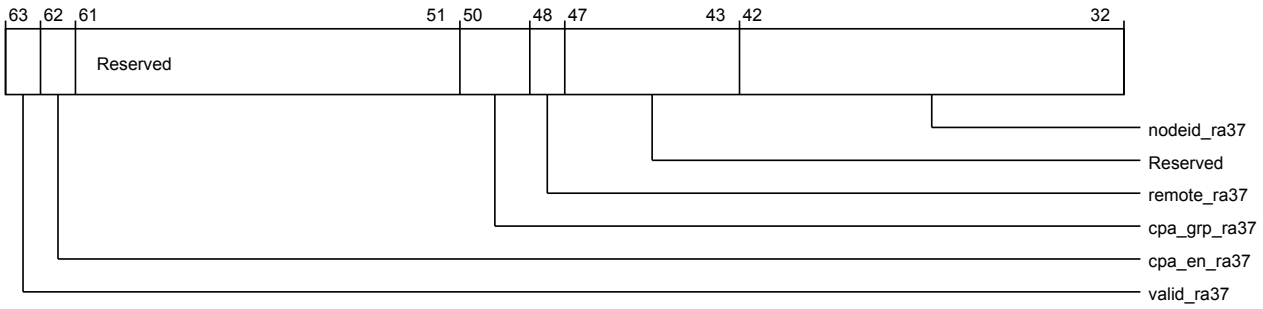

Figure 3-448 por_hnf_rn_phys_id18 (high)

The following table shows the por_hnf_rn_phys_id18 higher register bit assignments.

Table 3-462 por_hnf_rn_phys_id18 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra37	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra37	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra37	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra37	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra37	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

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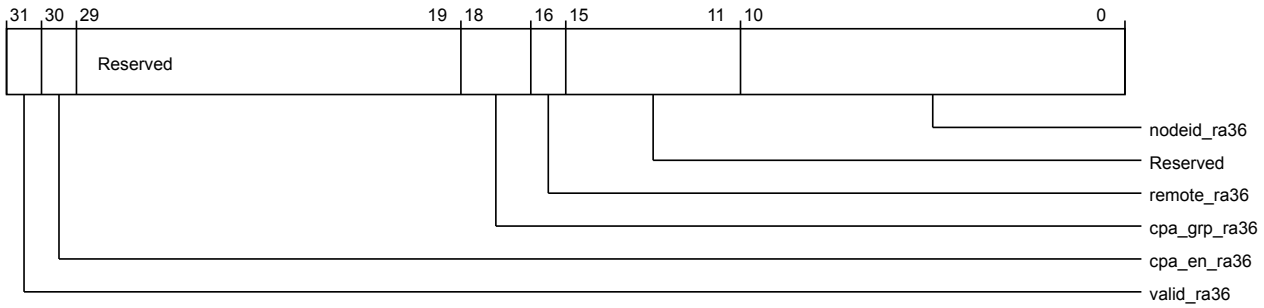

Figure 3-449 por_hnf_rn_phys_id18 (low)

The following table shows the por_hnf_rn_phys_id18 lower register bit assignments.

Table 3-463 por_hnf_rn_phys_id18 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra36	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra36	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra36	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra36	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra36	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id19

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hDC0

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

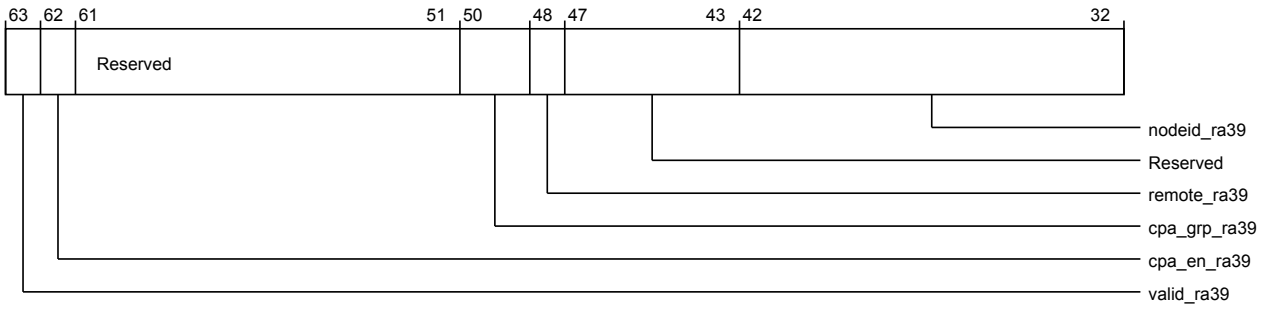

Figure 3-450 por_hnf_rn_phys_id19 (high)

The following table shows the por_hnf_rn_phys_id19 higher register bit assignments.

Table 3-464 por_hnf_rn_phys_id19 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra39	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra39	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra39	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra39	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra39	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

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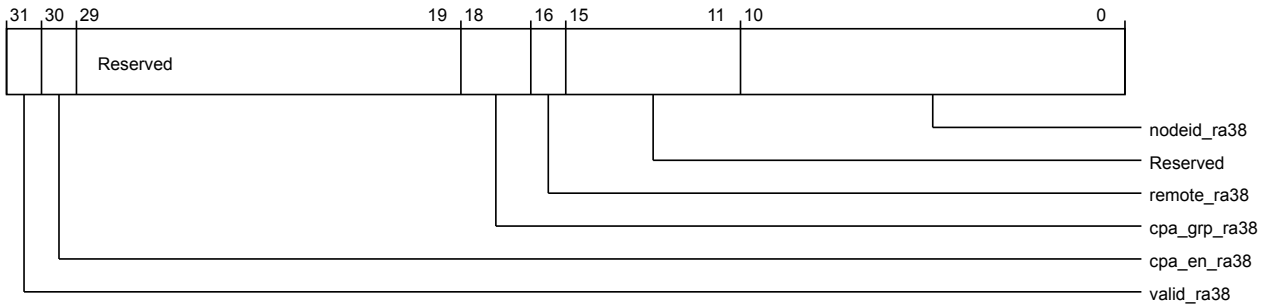

Figure 3-451 por_hnf_rn_phys_id19 (low)

The following table shows the por_hnf_rn_phys_id19 lower register bit assignments.

Table 3-465 por_hnf_rn_phys_id19 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra38	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra38	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra38	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra38	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra38	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id20

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hDC8

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

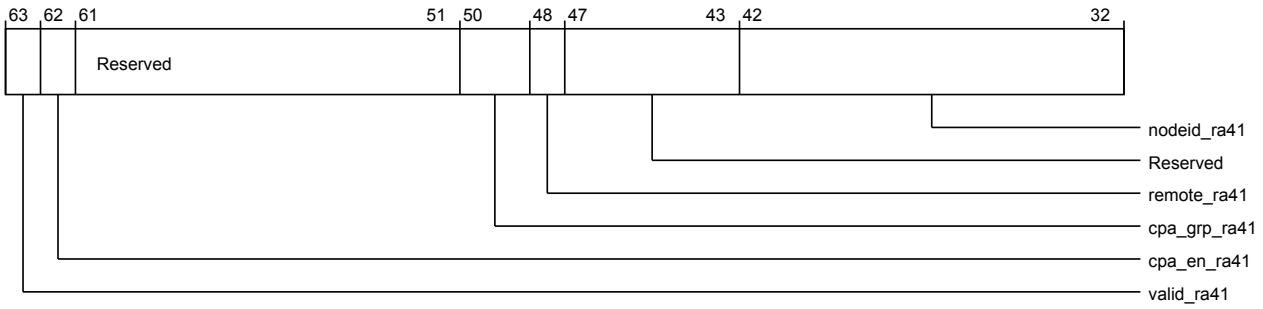

Figure 3-452 por_hnf_rn_phys_id20 (high)

The following table shows the por_hnf_rn_phys_id20 higher register bit assignments.

Table 3-466 por_hnf_rn_phys_id20 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra41	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra41	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra41	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra41	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra41	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

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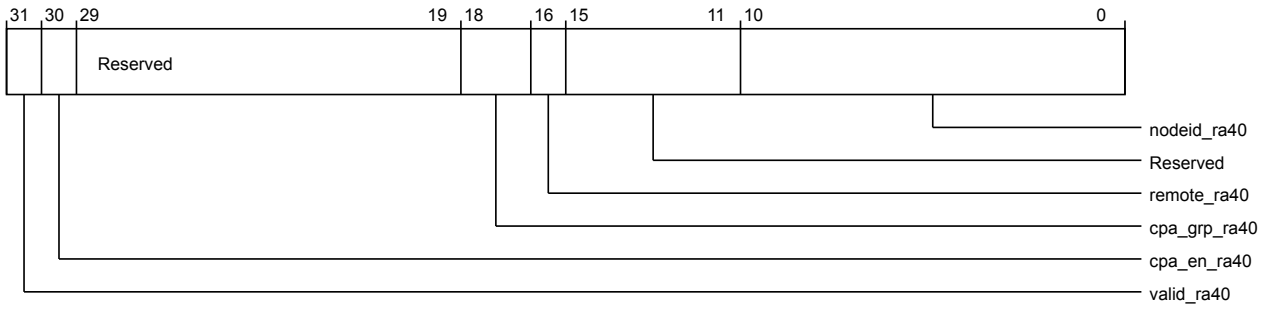

Figure 3-453 por_hnf_rn_phys_id20 (low)

The following table shows the por_hnf_rn_phys_id20 lower register bit assignments.

Table 3-467 por_hnf_rn_phys_id20 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra40	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra40	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra40	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra40	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra40	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id21

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hDD0

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

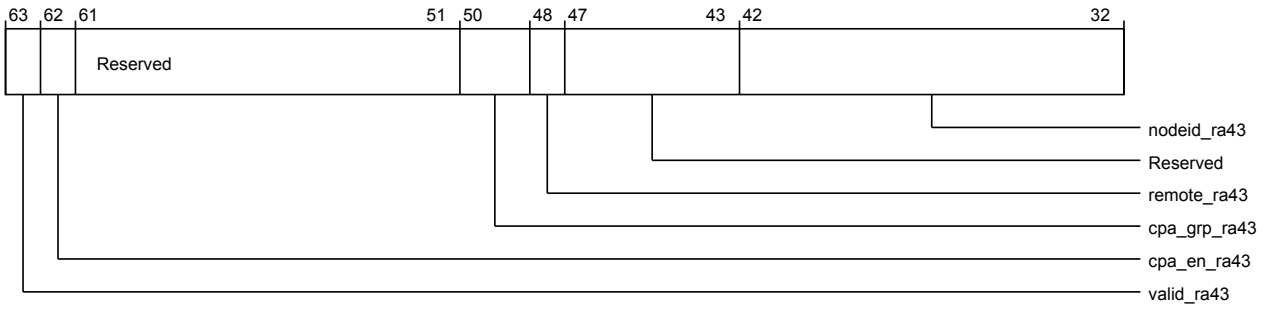

Figure 3-454 por_hnf_rn_phys_id21 (high)

The following table shows the por_hnf_rn_phys_id21 higher register bit assignments.

Table 3-468 por_hnf_rn_phys_id21 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra43	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra43	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra43	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra43	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra43	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

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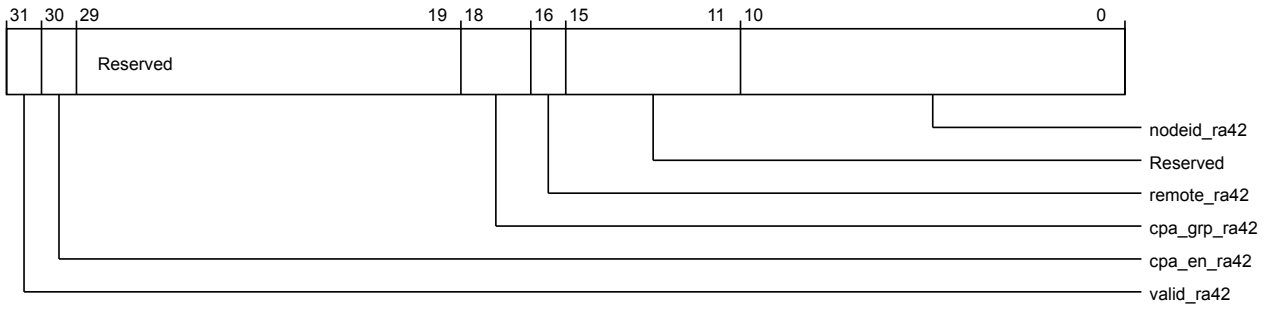

Figure 3-455 por_hnf_rn_phys_id21 (low)

The following table shows the por_hnf_rn_phys_id21 lower register bit assignments.

Table 3-469 por_hnf_rn_phys_id21 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra42	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra42	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra42	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra42	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra42	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id22

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hDD8

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

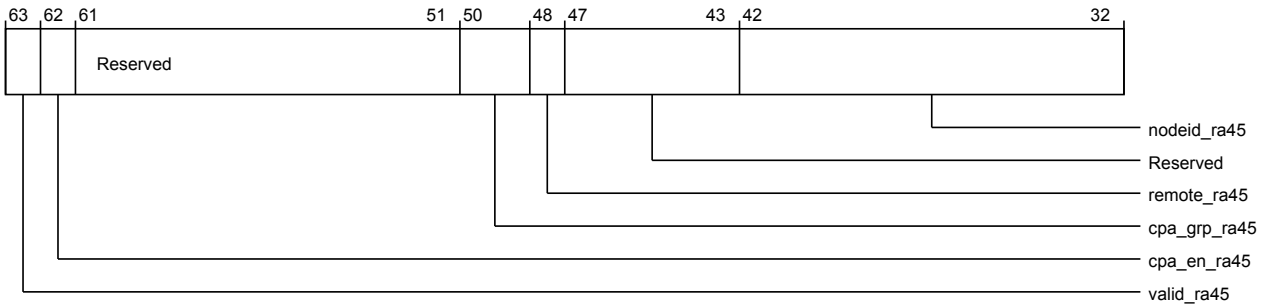

Figure 3-456 por_hnf_rn_phys_id22 (high)

The following table shows the por_hnf_rn_phys_id22 higher register bit assignments.

Table 3-470 por_hnf_rn_phys_id22 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra45	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra45	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra45	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra45	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra45	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

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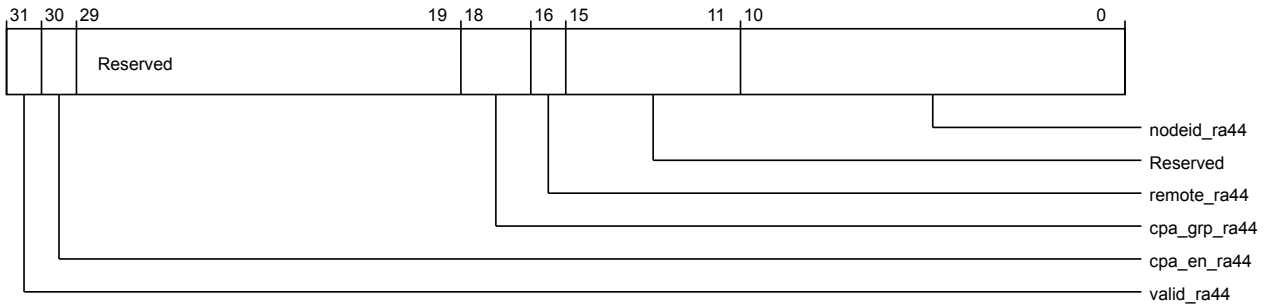

Figure 3-457 por_hnf_rn_phys_id22 (low)

The following table shows the por_hnf_rn_phys_id22 lower register bit assignments.

Table 3-471 por_hnf_rn_phys_id22 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra44	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra44	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra44	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra44	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra44	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id23

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hDE0

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

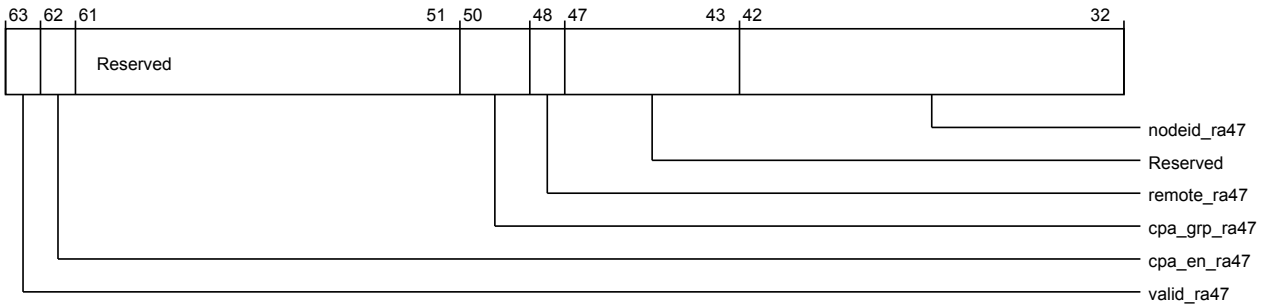

Figure 3-458 por_hnf_rn_phys_id23 (high)

The following table shows the por_hnf_rn_phys_id23 higher register bit assignments.

Table 3-472 por_hnf_rn_phys_id23 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra47	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra47	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra47	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra47	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra47	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

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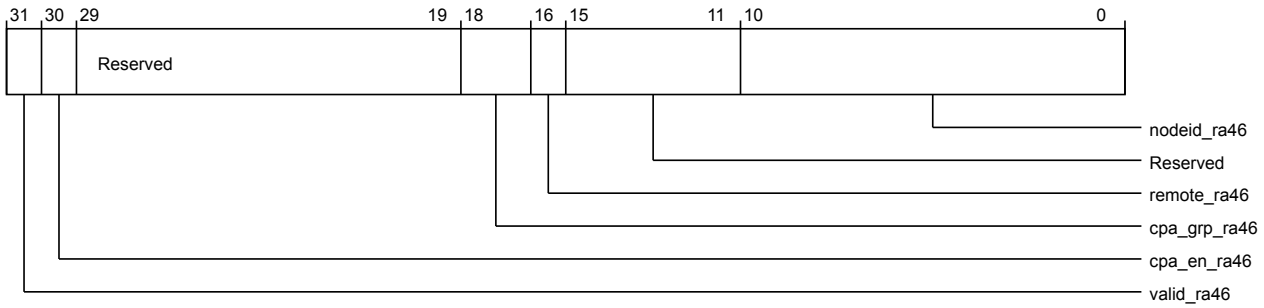

Figure 3-459 por_hnf_rn_phys_id23 (low)

The following table shows the por_hnf_rn_phys_id23 lower register bit assignments.

Table 3-473 por_hnf_rn_phys_id23 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra46	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra46	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra46	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra46	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra46	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id24

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hDE8

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

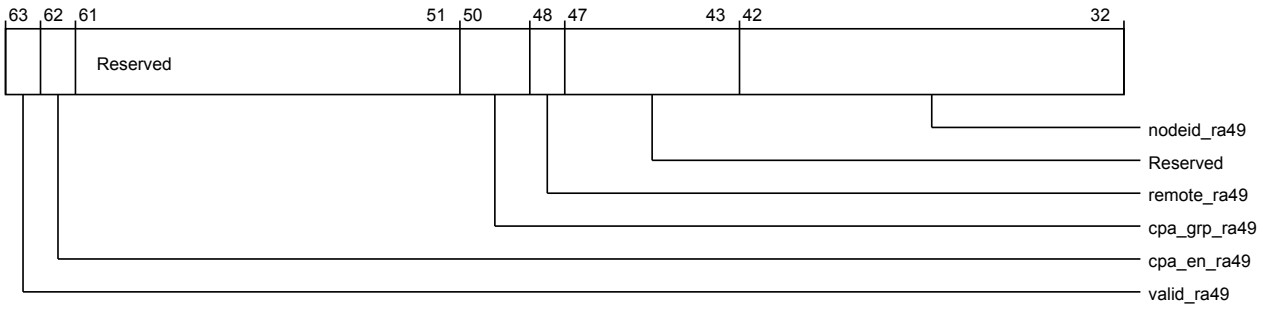

Figure 3-460 por_hnf_rn_phys_id24 (high)

The following table shows the por_hnf_rn_phys_id24 higher register bit assignments.

Table 3-474 por_hnf_rn_phys_id24 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra49	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra49	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra49	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra49	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra49	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

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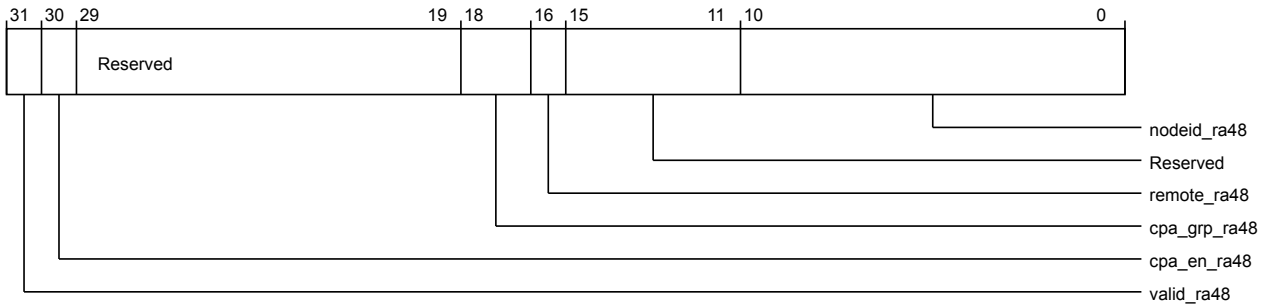

Figure 3-461 por_hnf_rn_phys_id24 (low)

The following table shows the por_hnf_rn_phys_id24 lower register bit assignments.

Table 3-475 por_hnf_rn_phys_id24 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra48	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra48	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra48	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra48	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra48	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id25

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hDF0

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

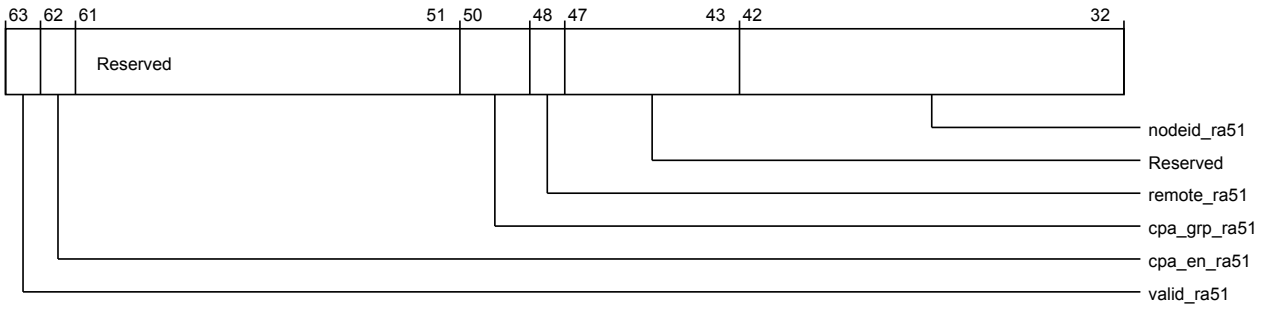

Figure 3-462 por_hnf_rn_phys_id25 (high)

The following table shows the por_hnf_rn_phys_id25 higher register bit assignments.

Table 3-476 por_hnf_rn_phys_id25 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra51	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra51	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra51	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra51	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra51	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

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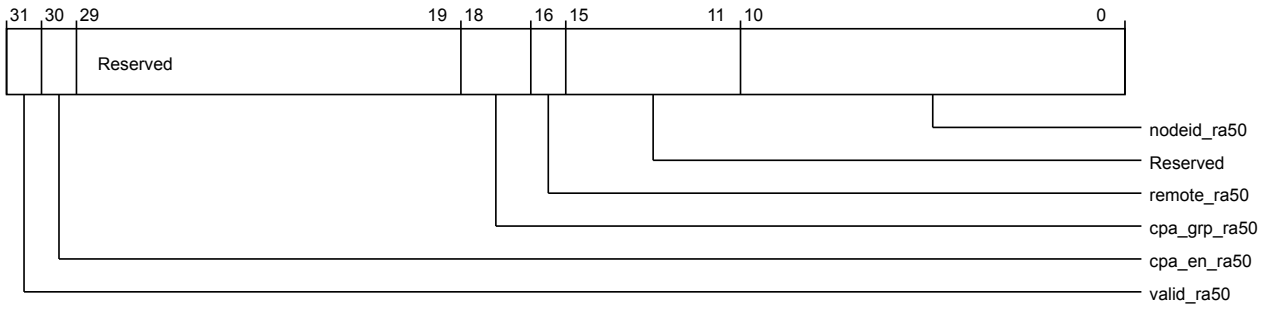

Figure 3-463 por_hnf_rn_phys_id25 (low)

The following table shows the por_hnf_rn_phys_id25 lower register bit assignments.

Table 3-477 por_hnf_rn_phys_id25 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra50	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra50	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra50	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra50	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra50	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id26

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hDF8

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

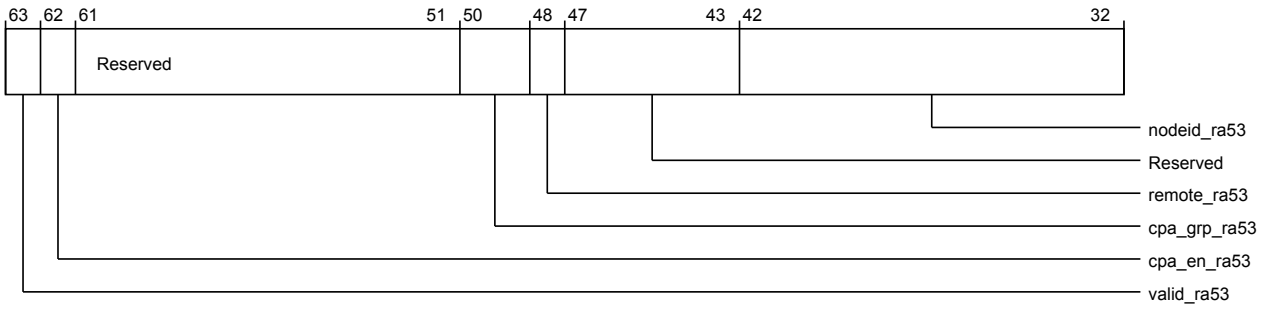

Figure 3-464 por_hnf_rn_phys_id26 (high)

The following table shows the por_hnf_rn_phys_id26 higher register bit assignments.

Table 3-478 por_hnf_rn_phys_id26 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra53	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra53	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra53	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra53	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra53	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

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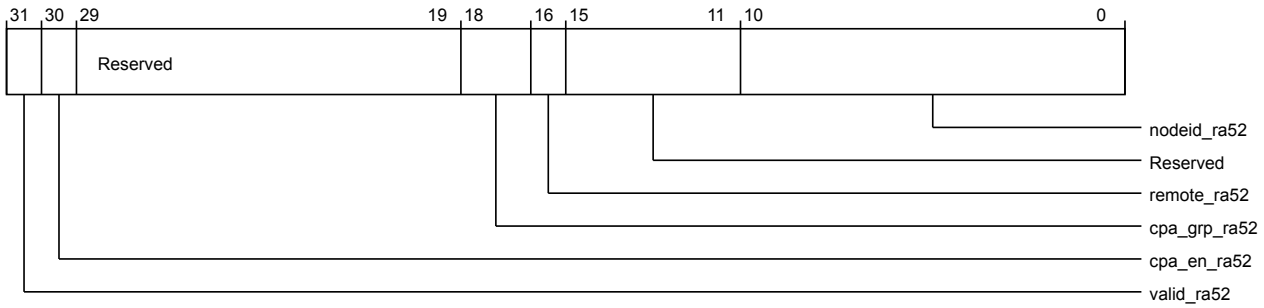

Figure 3-465 por_hnf_rn_phys_id26 (low)

The following table shows the por_hnf_rn_phys_id26 lower register bit assignments.

Table 3-479 por_hnf_rn_phys_id26 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra52	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra52	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra52	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra52	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra52	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id27

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hE00

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

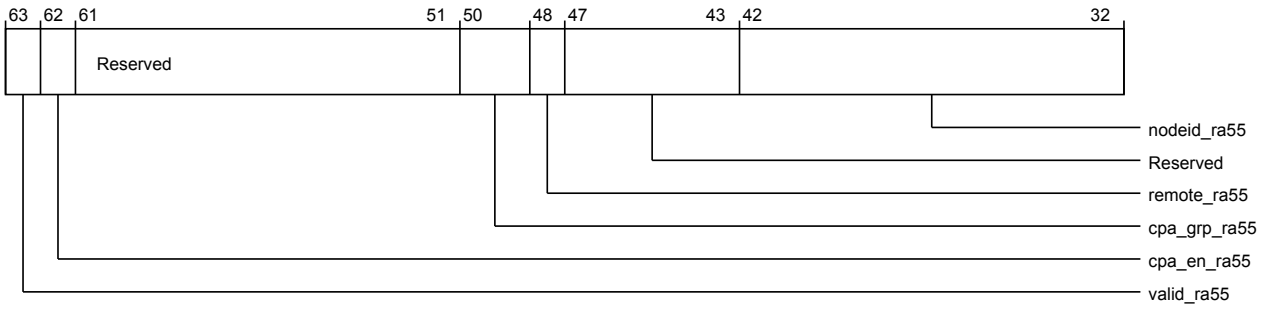

Figure 3-466 por_hnf_rn_phys_id27 (high)

The following table shows the por_hnf_rn_phys_id27 higher register bit assignments.

Table 3-480 por_hnf_rn_phys_id27 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra55	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra55	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra55	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra55	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra55	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

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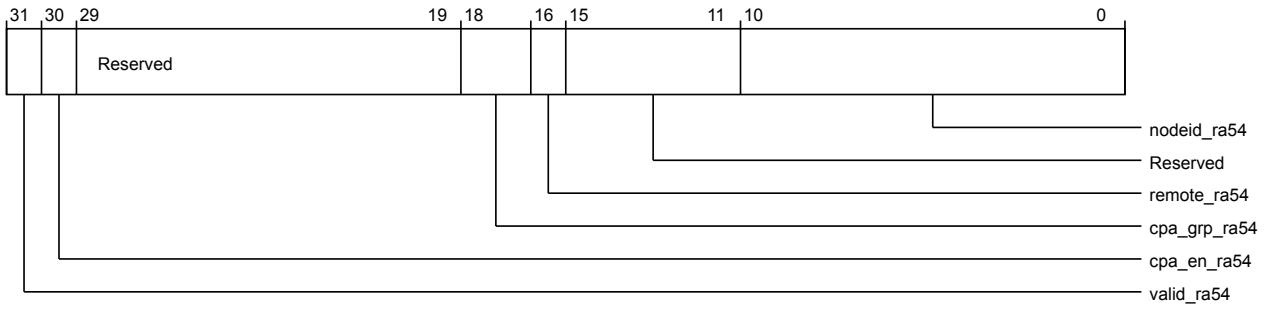

Figure 3-467 por_hnf_rn_phys_id27 (low)

The following table shows the por_hnf_rn_phys_id27 lower register bit assignments.

Table 3-481 por_hnf_rn_phys_id27 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra54	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra54	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra54	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra54	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra54	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id28

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hE08

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

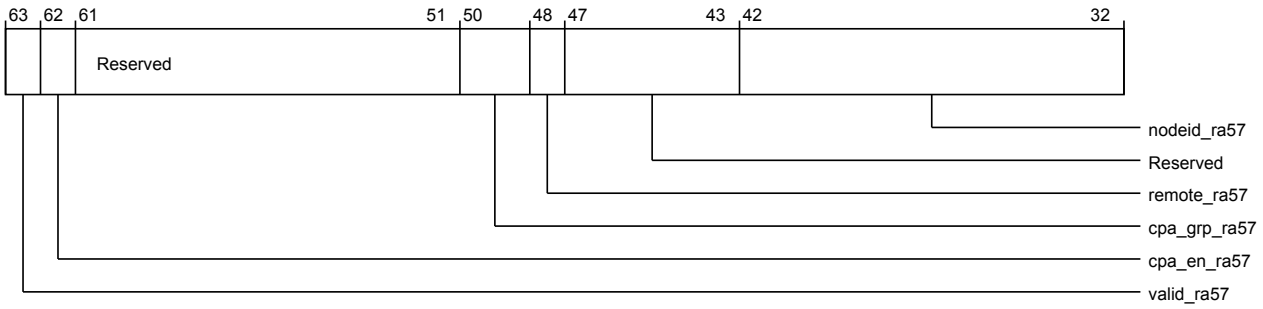

Figure 3-468 por_hnf_rn_phys_id28 (high)

The following table shows the por_hnf_rn_phys_id28 higher register bit assignments.

Table 3-482 por_hnf_rn_phys_id28 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra57	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra57	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra57	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra57	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra57	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

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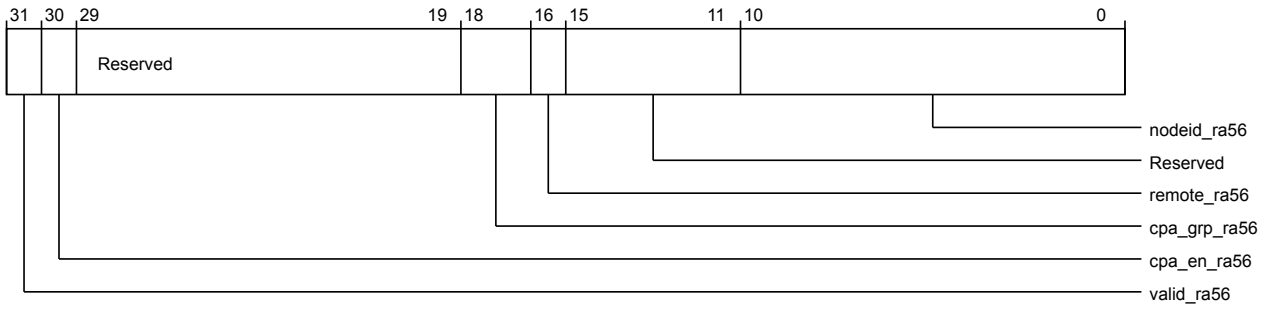

Figure 3-469 por_hnf_rn_phys_id28 (low)

The following table shows the por_hnf_rn_phys_id28 lower register bit assignments.

Table 3-483 por_hnf_rn_phys_id28 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra56	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra56	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra56	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra56	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra56	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id29

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hE10

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

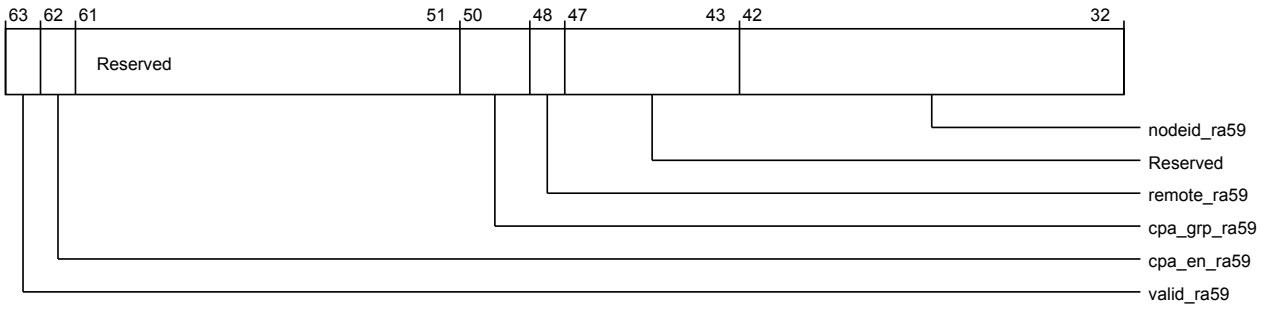

Figure 3-470 por_hnf_rn_phys_id29 (high)

The following table shows the por_hnf_rn_phys_id29 higher register bit assignments.

Table 3-484 por_hnf_rn_phys_id29 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra59	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra59	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra59	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra59	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra59	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

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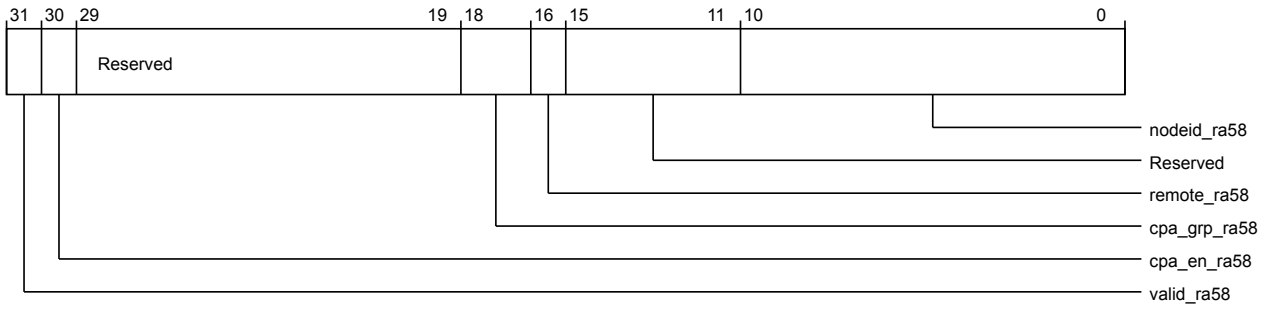

Figure 3-471 por_hnf_rn_phys_id29 (low)

The following table shows the por_hnf_rn_phys_id29 lower register bit assignments.

Table 3-485 por_hnf_rn_phys_id29 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra58	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra58	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra58	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra58	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra58	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id30

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hE18

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

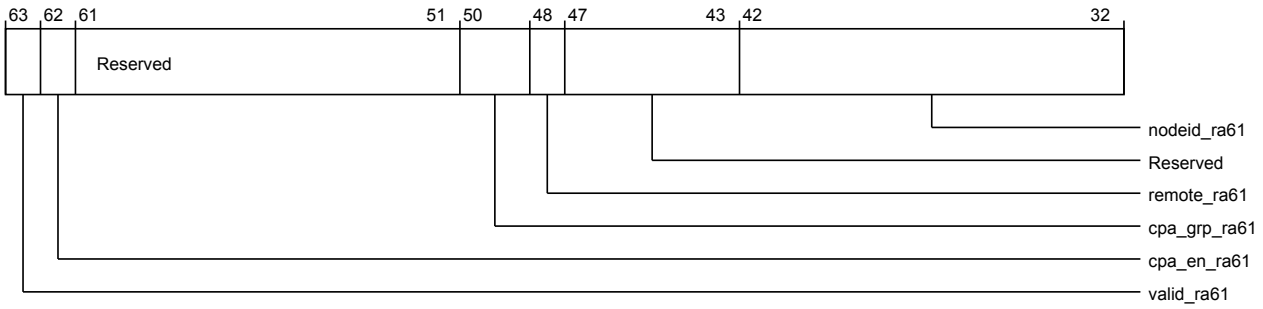

Figure 3-472 por_hnf_rn_phys_id30 (high)

The following table shows the por_hnf_rn_phys_id30 higher register bit assignments.

Table 3-486 por_hnf_rn_phys_id30 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra61	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra61	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra61	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra61	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra61	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

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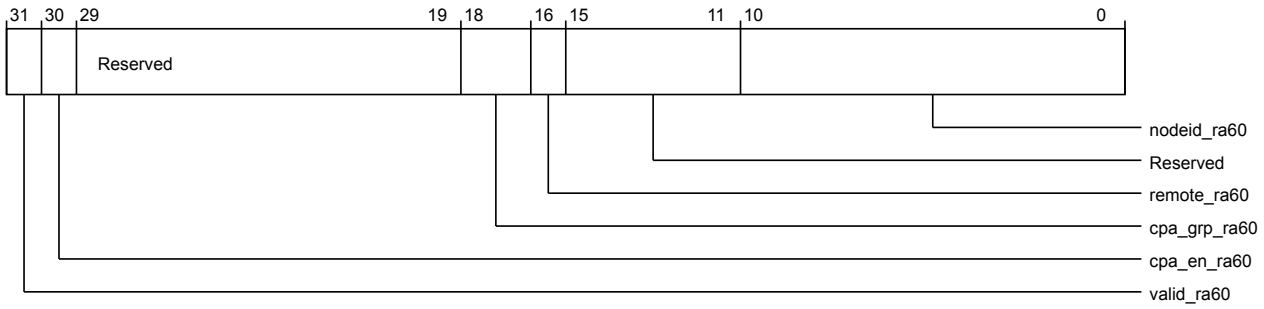

Figure 3-473 por_hnf_rn_phys_id30 (low)

The following table shows the por_hnf_rn_phys_id30 lower register bit assignments.

Table 3-487 por_hnf_rn_phys_id30 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra60	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra60	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra60	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra60	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra60	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id31

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hE20

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

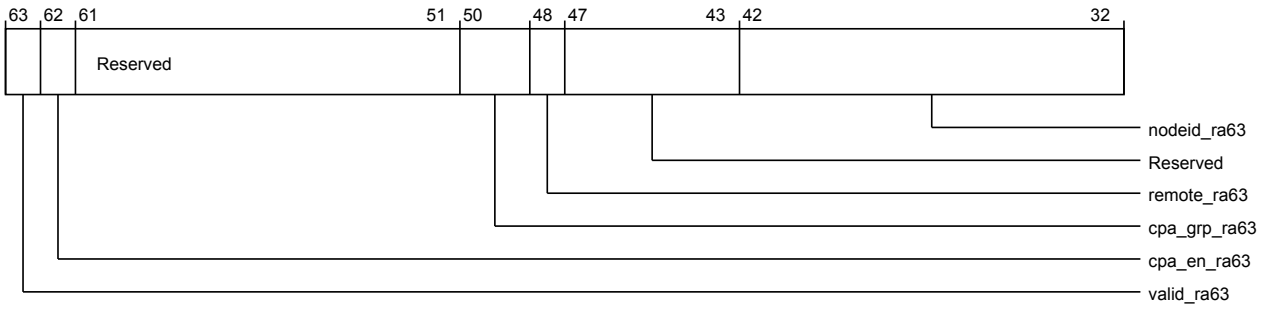

Figure 3-474 por_hnf_rn_phys_id31 (high)

The following table shows the por_hnf_rn_phys_id31 higher register bit assignments.

Table 3-488 por_hnf_rn_phys_id31 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra63	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra63	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra63	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra63	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra63	Specifies the node ID	RW	11'h0

The following image shows the lower register bit assignments.

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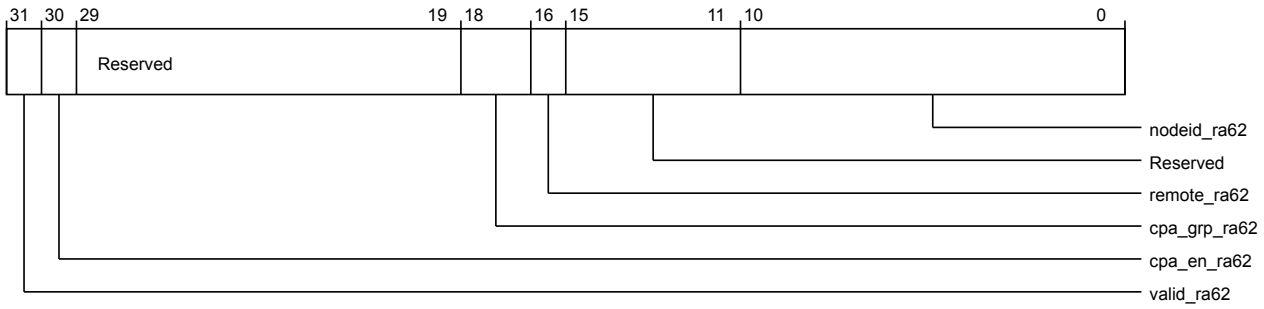

Figure 3-475 por_hnf_rn_phys_id31 (low)

The following table shows the por_hnf_rn_phys_id31 lower register bit assignments.

Table 3-489 por_hnf_rn_phys_id31 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra62	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra62	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra62	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra62	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra62	Specifies the node ID	RW	11'h0

por_hnf_sf_cxg_blocked_ways

Specifies the SF ways that are blocked for remote chip to use in CML mode.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hF00

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

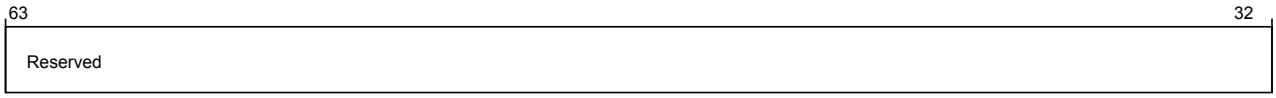

Figure 3-476 por_hnf_sf_cxg_blocked_ways (high)

The following table shows the por_hnf_sf_cxg_blocked_ways higher register bit assignments.

Table 3-490 por_hnf_sf_cxg_blocked_ways (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

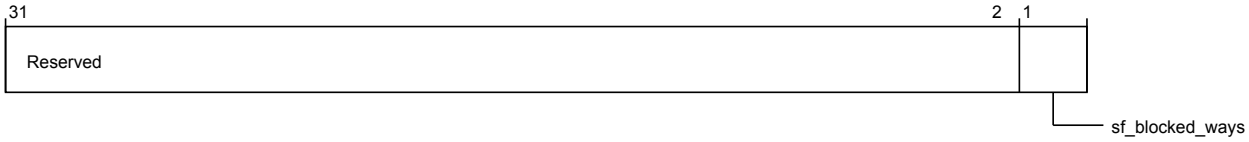

Figure 3-477 por_hnf_sf_cxg_blocked_ways (low)

The following table shows the por_hnf_sf_cxg_blocked_ways lower register bit assignments.

Table 3-491 por_hnf_sf_cxg_blocked_ways (low)

Bits	Field name	Description	Type	Reset
31:2	Reserved	Reserved	RO	-
1:0	sf_blocked_ways	Number of SF ways blocked for remote chips to use in CML mode (0, 4, 8, or 12) 2'b00: No ways are blocked; all 16 SF ways could be used by local or remote RN-Fs 2'b01: Lower 4 ways are blocked from remote RN-Fs; ways 3:0 for local RN-Fs only; ways 15:4 for local and remote RN-Fs 2'b10: Lower 8 ways are blocked from remote RN-Fs; ways 7:0 for local RN-Fs only; ways 15:8 for local and remote RN-Fs 2'b11: Lower 12 ways are blocked from remote RN-Fs; ways 11:0 for local RN-Fs only; ways 15:12 for local and remote RN-Fs	RW	2'b00

por_hnf_cml_port_aggr_grp0_add_mask

Configures the CCIX port aggregation address mask for group 0.

Its characteristics are:

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Type RW

Register width (Bits) 64

Address offset 14'hF10

Register reset 64'b1

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

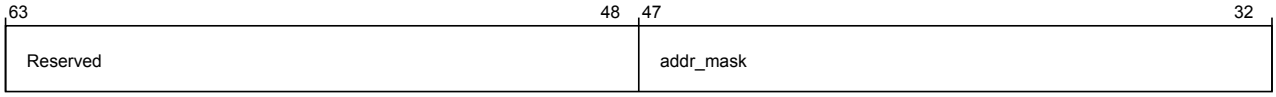

Figure 3-478 por_hnf_cml_port_aggr_grp0_add_mask (high)

The following table shows the por_hnf_cml_port_aggr_grp0_add_mask higher register bit assignments.

Table 3-492 por_hnf_cml_port_aggr_grp0_add_mask (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	addr_mask	Address mask to be applied before hashing	RW	42'b1

The following image shows the lower register bit assignments.

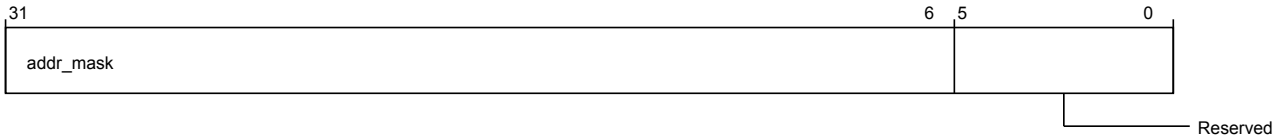

Figure 3-479 por_hnf_cml_port_aggr_grp0_add_mask (low)

The following table shows the por_hnf_cml_port_aggr_grp0_add_mask lower register bit assignments.

Table 3-493 por_hnf_cml_port_aggr_grp0_add_mask (low)

Bits	Field name	Description	Type	Reset
31:6	addr_mask	Address mask to be applied before hashing	RW	42'b1
5:0	Reserved	Reserved	RO	-

por_hnf_cml_port_aggr_grp1_add_mask

Configures the CCIX port aggregation address mask for group 1.

Its characteristics are:

Type RW

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Register width (Bits) 64

Address offset 14'hF18

Register reset 64'b1

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

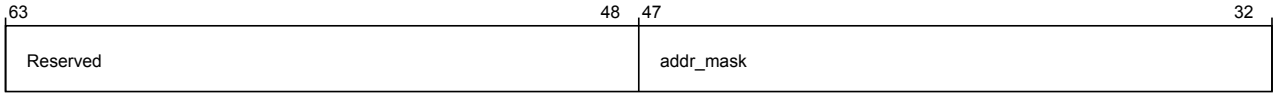

Figure 3-480 por_hnf_cml_port_aggr_grp1_add_mask (high)

The following table shows the por_hnf_cml_port_aggr_grp1_add_mask higher register bit assignments.

Table 3-494 por_hnf_cml_port_aggr_grp1_add_mask (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	addr_mask	Address mask to be applied before hashing	RW	42'b1

The following image shows the lower register bit assignments.

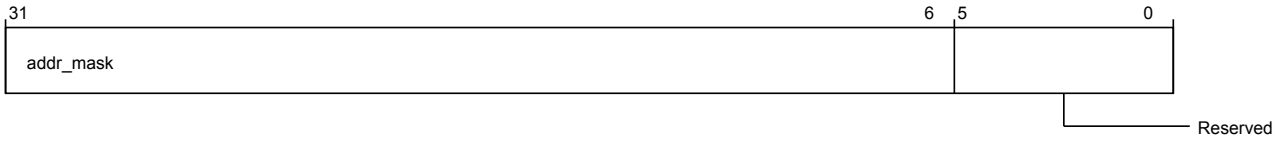

Figure 3-481 por_hnf_cml_port_aggr_grp1_add_mask (low)

The following table shows the por_hnf_cml_port_aggr_grp1_add_mask lower register bit assignments.

Table 3-495 por_hnf_cml_port_aggr_grp1_add_mask (low)

Bits	Field name	Description	Type	Reset
31:6	addr_mask	Address mask to be applied before hashing	RW	42'b1
5:0	Reserved	Reserved	RO	-

por_hnf_cml_port_aggr_grp0_reg

Configures the CCIX port aggregation port IDs for group 0.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hF28

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

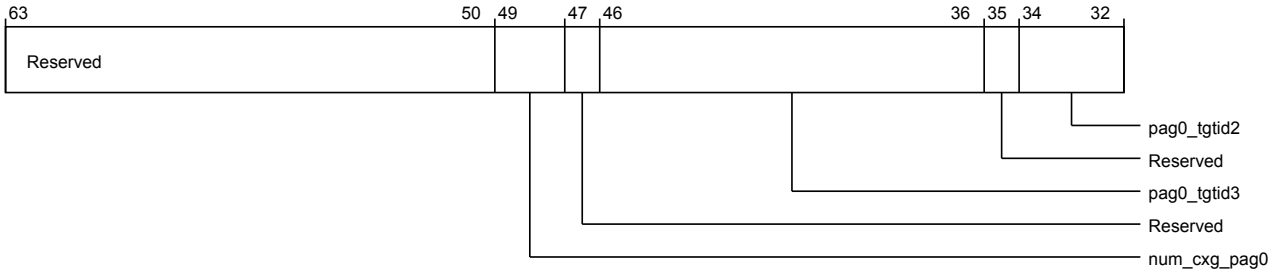

Figure 3-482 por_hnf_cml_port_aggr_grp0_reg (high)

The following table shows the por_hnf_cml_port_aggr_grp0_reg higher register bit assignments.

Table 3-496 por_hnf_cml_port_aggr_grp0_reg (high)

Bits	Field name	Description	Type	Reset
63:50	Reserved	Reserved	RO	-
49:48	num_cxg_pag0	Specifies the number of CXRAs in CPAG 2'b00: 1 port used 2'b01: 2 ports used 2'b10: 4 ports used 2'b11: Reserved	RW	2'b0
47	Reserved	Reserved	RO	-
46:36	pag0_tgtid3	Specifies the target ID for CPAG	RW	11'b0
35	Reserved	Reserved	RO	-
34:32	pag0_tgtid2	Specifies the target ID for CPAG	RW	11'b0

The following image shows the lower register bit assignments.

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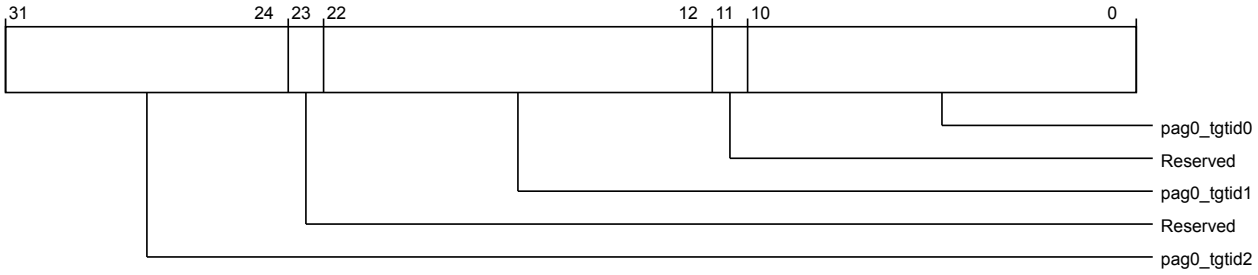

Figure 3-483 por_hnf_cml_port_aggr_grp0_reg (low)

The following table shows the por_hnf_cml_port_aggr_grp0_reg lower register bit assignments.

Table 3-497 por_hnf_cml_port_aggr_grp0_reg (low)

Bits	Field name	Description	Type	Reset
31:24	pag0_tgtid2	Specifies the target ID for CPAG	RW	11'b0
23	Reserved	Reserved	RO	-
22:12	pag0_tgtid1	Specifies the target ID for CPAG	RW	11'b0
11	Reserved	Reserved	RO	-
10:0	pag0_tgtid0	Specifies the target ID for CPAG	RW	11'b0

por_hnf_cml_port_aggr_grp1_reg

Configures the CCIX port aggregation port IDs for group 1.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hF30

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

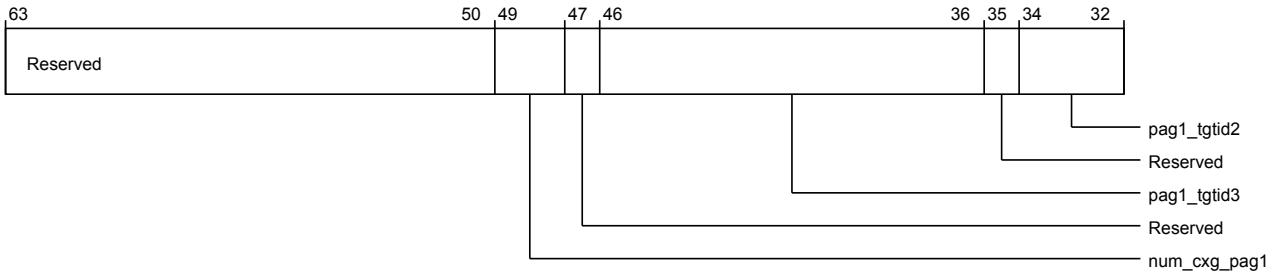

Figure 3-484 por_hnf_cml_port_aggr_grp1_reg (high)

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The following table shows the por_hnf_cml_port_aggr_grp1_reg higher register bit assignments.

Table 3-498 por_hnf_cml_port_aggr_grp1_reg (high)

Bits	Field name	Description	Type	Reset
63:50	Reserved	Reserved	RO	-
49:48	num_cxg_pag1	Specifies the number of CXRAs in CPAG	RW	2'b0
47	Reserved	Reserved	RO	-
46:36	pag1_tgtid3	Specifies the target ID for CPAG	RW	11'b0
35	Reserved	Reserved	RO	-
34:32	pag1_tgtid2	Specifies the target ID for CPAG	RW	11'b0

The following image shows the lower register bit assignments.

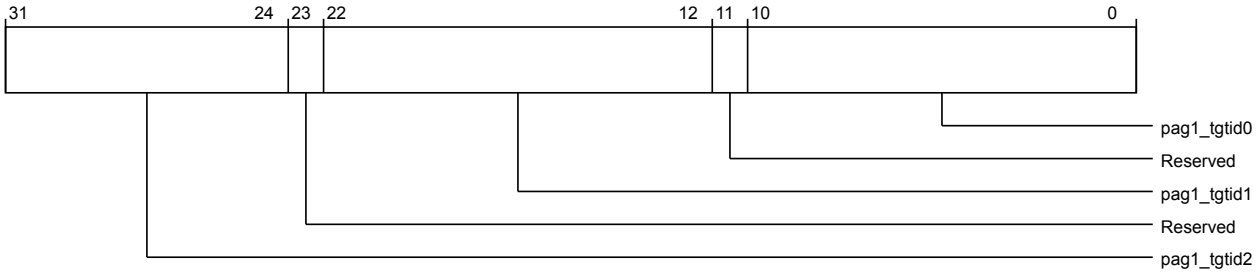

Figure 3-485 por_hnf_cml_port_aggr_grp1_reg (low)

The following table shows the por_hnf_cml_port_aggr_grp1_reg lower register bit assignments.

Table 3-499 por_hnf_cml_port_aggr_grp1_reg (low)

Bits	Field name	Description	Type	Reset
31:24	pag1_tgtid2	Specifies the target ID for CPAG	RW	11'b0
23	Reserved	Reserved	RO	-
22:12	pag1_tgtid1	Specifies the target ID for CPAG	RW	11'b0
11	Reserved	Reserved	RO	-
10:0	pag1_tgtid0	Specifies the target ID for CPAG	RW	11'b0

hn_sam_hash_addr_mask_reg

Configures the address mask that is applied before hashing the address bits.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hF40
Register reset 64'b1111111111111111111111111111111111111111111111111

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Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device. and This register can be modified only with prior written permission from Arm.

The following image shows the higher register bit assignments.

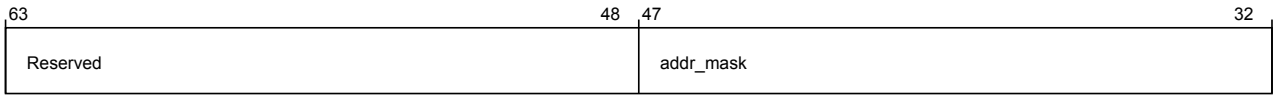

Figure 3-486 por_hnf_hn_sam_hash_addr_mask_reg (high)

The following table shows the hn_sam_hash_addr_mask_reg higher register bit assignments.

Table 3-500 por_hnf_hn_sam_hash_addr_mask_reg (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	addr_mask	Address mask applied before hashing	RW	42'h3FFFFFFFFF

The following image shows the lower register bit assignments.

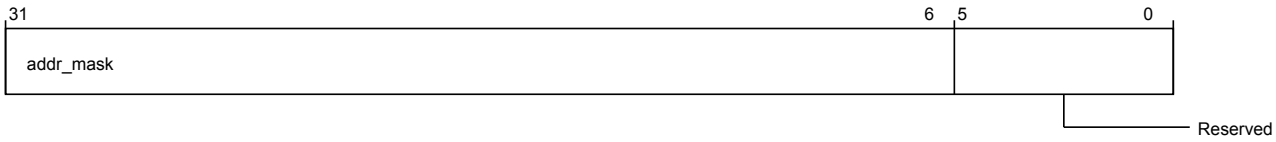

Figure 3-487 por_hnf_hn_sam_hash_addr_mask_reg (low)

The following table shows the hn_sam_hash_addr_mask_reg lower register bit assignments.

Table 3-501 por_hnf_hn_sam_hash_addr_mask_reg (low)

Bits	Field name	Description	Type	Reset
31:6	addr_mask	Address mask applied before hashing	RW	42'h3FFFFFFFFF
5:0	Reserved	Reserved	RO	-

hn_sam_region_cmp_addr_mask_reg

Configures the address mask that is applied before memory region compare.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hF48

Register reset 64'b1111111111111111111111

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Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device. and This register can be modified only with prior written permission from Arm.

The following image shows the higher register bit assignments.

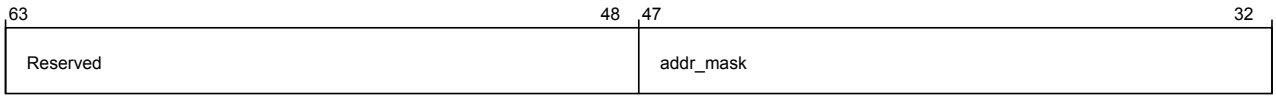

Figure 3-488 por_hnf_hn_sam_region_cmp_addr_mask_reg (high)

The following table shows the hn_sam_region_cmp_addr_mask_reg higher register bit assignments.

Table 3-502 por_hnf_hn_sam_region_cmp_addr_mask_reg (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	addr_mask	Address mask applied before memory region compare	RW	22'h3FFFF

The following image shows the lower register bit assignments.

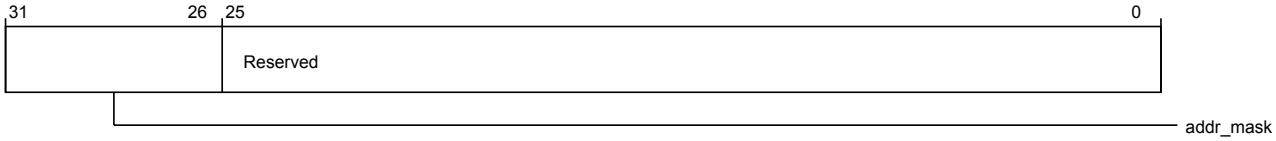

Figure 3-489 por_hnf_hn_sam_region_cmp_addr_mask_reg (low)

The following table shows the hn_sam_region_cmp_addr_mask_reg lower register bit assignments.

Table 3-503 por_hnf_hn_sam_region_cmp_addr_mask_reg (low)

Bits	Field name	Description	Type	Reset
31:26	addr_mask	Address mask applied before memory region compare	RW	22'h3FFFF
25:0	Reserved	Reserved	RO	-

por_hnf_abf_lo_addr

Lower address range for Address Based Flush (ABF) [47:0].

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hF50

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

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Secure group override por_hnf_secure_register_groups_override.ppu

The following image shows the higher register bit assignments.

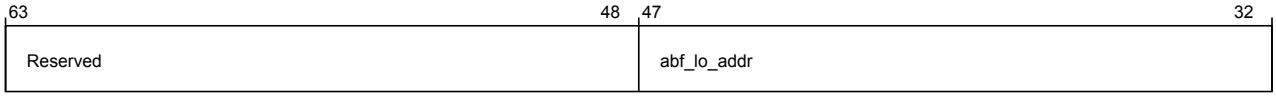

Figure 3-490 por_hnf_abf_lo_addr (high)

The following table shows the por_hnf_abf_lo_addr higher register bit assignments.

Table 3-504 por_hnf_abf_lo_addr (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	abf_lo_addr	Lower address range for ABF	RW	48'b0

The following image shows the lower register bit assignments.

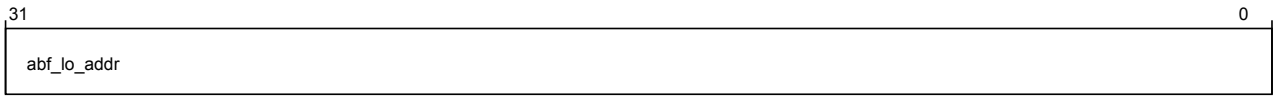

Figure 3-491 por_hnf_abf_lo_addr (low)

The following table shows the por_hnf_abf_lo_addr lower register bit assignments.

Table 3-505 por_hnf_abf_lo_addr (low)

Bits	Field name	Description	Type	Reset
31:0	abf_lo_addr	Lower address range for ABF	RW	48'b0

por_hnf_abf_hi_addr

Upper address range for Address Based Flush (ABF) [47:0].

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hF58

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_hnf_secure_register_groups_override.ppu

The following image shows the higher register bit assignments.

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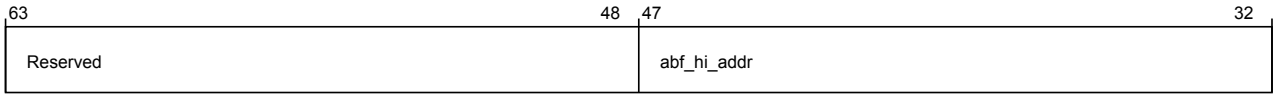

Figure 3-492 por_hnf_abf_hi_addr (high)

The following table shows the por_hnf_abf_hi_addr higher register bit assignments.

Table 3-506 por_hnf_abf_hi_addr (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	abf_hi_addr	Upper address range for ABF	RW	48'b0

The following image shows the lower register bit assignments.

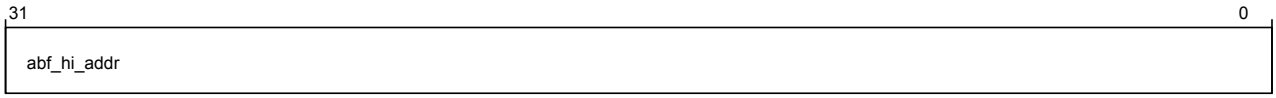

Figure 3-493 por_hnf_abf_hi_addr (low)

The following table shows the por_hnf_abf_hi_addr lower register bit assignments.

Table 3-507 por_hnf_abf_hi_addr (low)

Bits	Field name	Description	Type	Reset
31:0	abf_hi_addr	Upper address range for ABF	RW	48'b0

por_hnf_abf_pr

Functions as the Address Based Flush (ABF) policy register.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hF60

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_hnf_secure_register_groups_override.ppu

The following image shows the higher register bit assignments.

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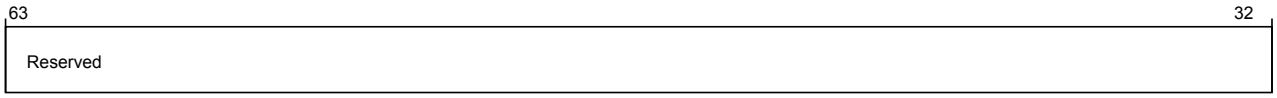

Figure 3-494 por_hnf_abf_pr (high)

The following table shows the por_hnf_abf_pr higher register bit assignments.

Table 3-508 por_hnf_abf_pr (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

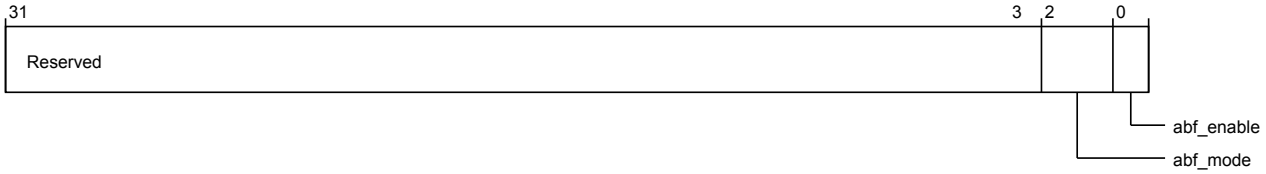

Figure 3-495 por_hnf_abf_pr (low)

The following table shows the por_hnf_abf_pr lower register bit assignments.

Table 3-509 por_hnf_abf_pr (low)

Bits	Field name	Description	Type	Reset
31:3	Reserved	Reserved	RO	-
2:1	abf_mode	ABF mode 2'b00: Clean Invalidate; WB dirty data and invalidate local copy 2'b01: Make Invalidate; invalidate without writing back dirty data 2'b10: Clean Shared; WB dirty data and can keep clean copy 2'b11: Reserved	RW	2'b00
0	abf_enable	Start Address Based Flushing based on high and low address ranges	RW	1'b0

por_hnf_abf_sr

Functions as the Address Based Flush (ABF) status register.

Its characteristics are:

Type RO

Register width (Bits) 64

Address offset 14'hF68

Register reset 64'b0

Usage constraints There are no usage constraints.

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The following image shows the higher register bit assignments.

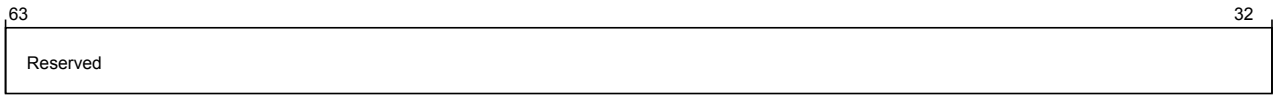

Figure 3-496 por_hnf_abf_sr (high)

The following table shows the por_hnf_abf_sr higher register bit assignments.

Table 3-510 por_hnf_abf_sr (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

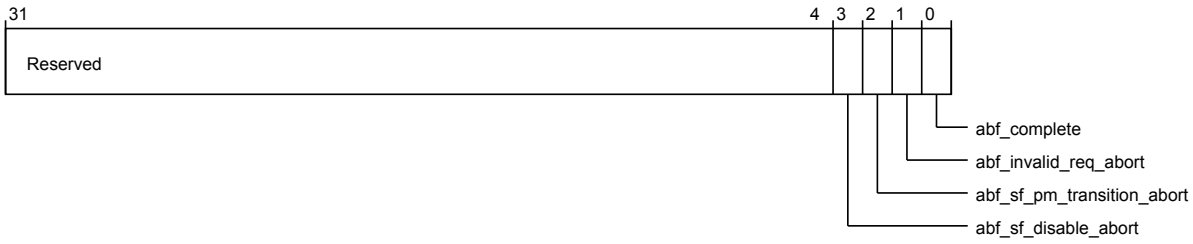

Figure 3-497 por_hnf_abf_sr (low)

The following table shows the por_hnf_abf_sr lower register bit assignments.

Table 3-511 por_hnf_abf_sr (low)

Bits	Field name	Description	Type	Reset
31:4	Reserved	Reserved	RO	-
3	abf_sf_disable_abort	ABF aborted due to SF not being enabled, either by configuration or double-bit ECC error	RO	1'b0
2	abf_sf_pm_transition_abort	ABF aborted due to PM transition while ABF in progress, or both PM and ABF requested at the same time	RO	1'b0
1	abf_invalid_req_abort	ABF request made while PM is not in FAM/HAM/SF_ONLY mode; request aborted in this case	RO	1'b0
0	abf_complete	ABF completed	RO	1'b0

por_hnf_rn_phys_id32

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW
Register width (Bits) 64

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Address offset 14'hE28

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

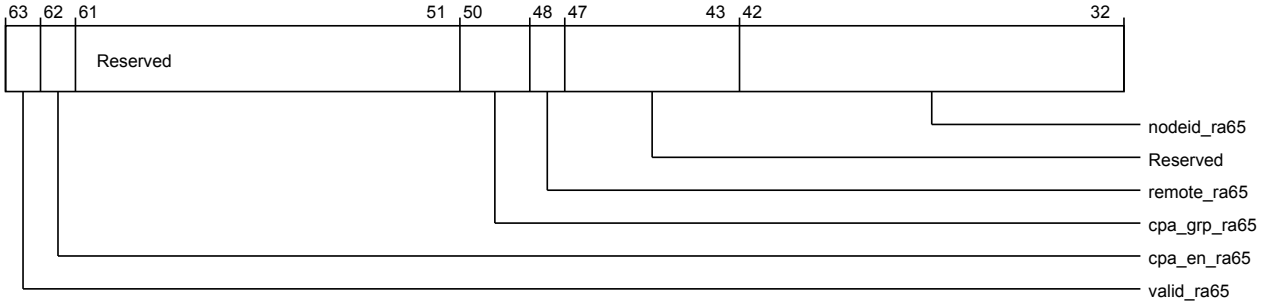

Figure 3-498 por_hnf_rn_phys_id32 (high)

The following table shows the por_hnf_rn_phys_id32 higher register bit assignments.

Table 3-512 por_hnf_rn_phys_id32 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra65	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra65	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra65	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra65	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra65	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

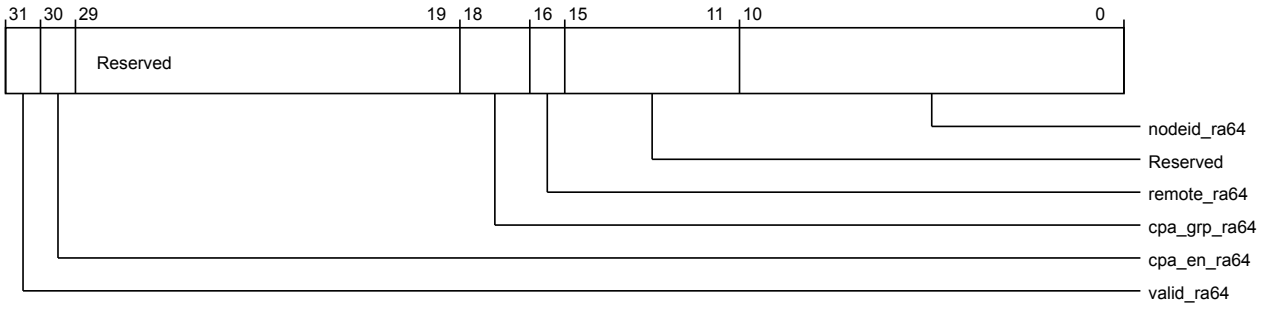

Figure 3-499 por_hnf_rn_phys_id32 (low)

The following table shows the por_hnf_rn_phys_id32 lower register bit assignments.

Table 3-513 por_hnf_rn_phys_id32 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra64	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra64	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra64	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra64	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra64	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id33

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hE30

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

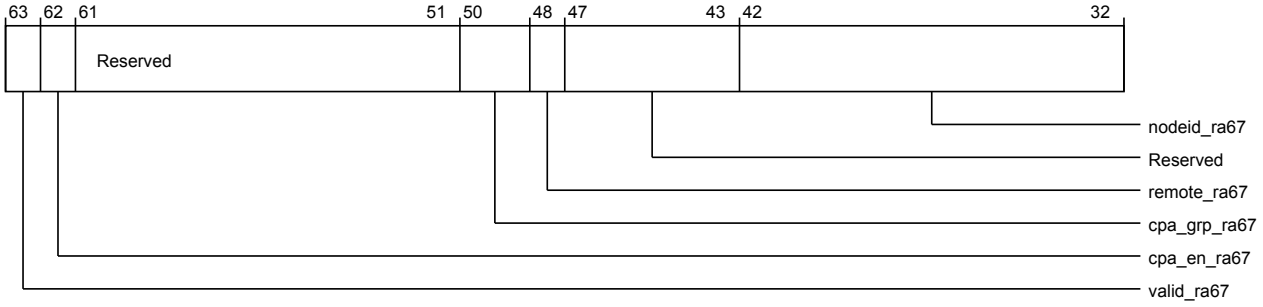

Figure 3-500 por_hnf_rn_phys_id33 (high)

The following table shows the por_hnf_rn_phys_id33 higher register bit assignments.

Table 3-514 por_hnf_rn_phys_id33 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra67	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra67	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra67	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra67	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra67	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

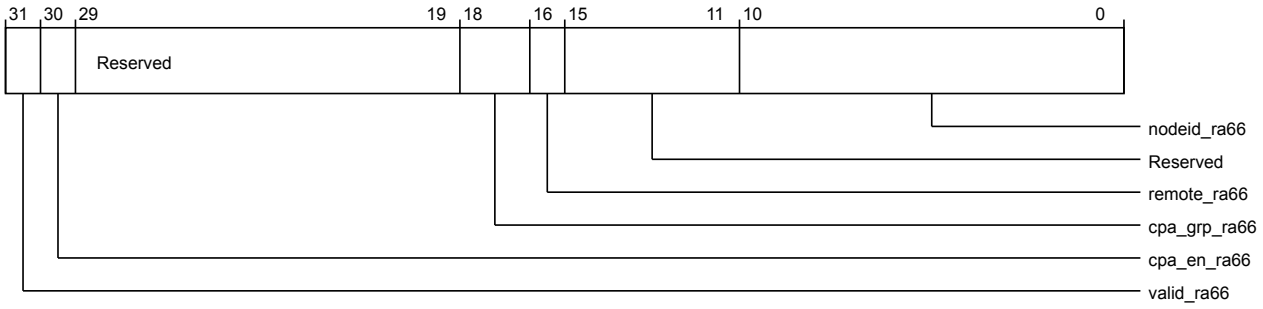

Figure 3-501 por_hnf_rn_phys_id33 (low)

The following table shows the por_hnf_rn_phys_id33 lower register bit assignments.

Table 3-515 por_hnf_rn_phys_id33 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra66	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra66	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra66	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra66	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra66	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id34

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hE38

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

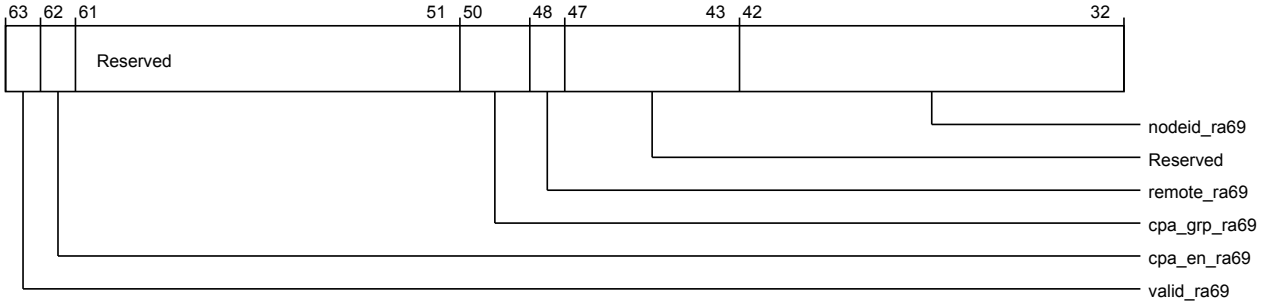

Figure 3-502 por_hnf_rn_phys_id34 (high)

The following table shows the por_hnf_rn_phys_id34 higher register bit assignments.

Table 3-516 por_hnf_rn_phys_id34 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra69	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra69	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra69	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra69	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra69	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

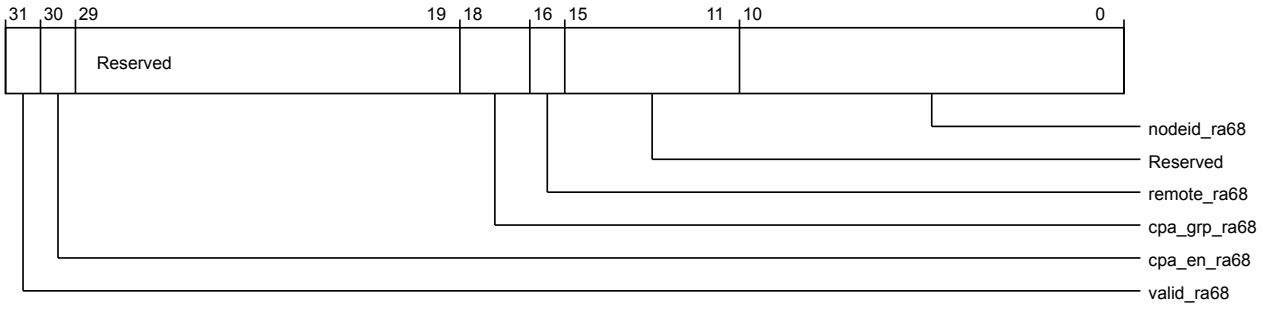

Figure 3-503 por_hnf_rn_phys_id34 (low)

The following table shows the por_hnf_rn_phys_id34 lower register bit assignments.

Table 3-517 por_hnf_rn_phys_id34 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra68	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra68	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra68	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra68	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra68	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id35

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hE40

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

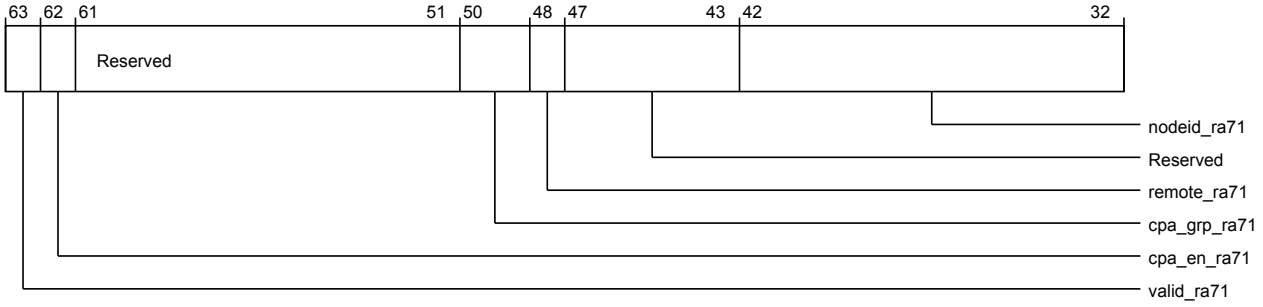

Figure 3-504 por_hnf_rn_phys_id35 (high)

The following table shows the por_hnf_rn_phys_id35 higher register bit assignments.

Table 3-518 por_hnf_rn_phys_id35 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra71	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra71	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra71	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra71	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra71	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

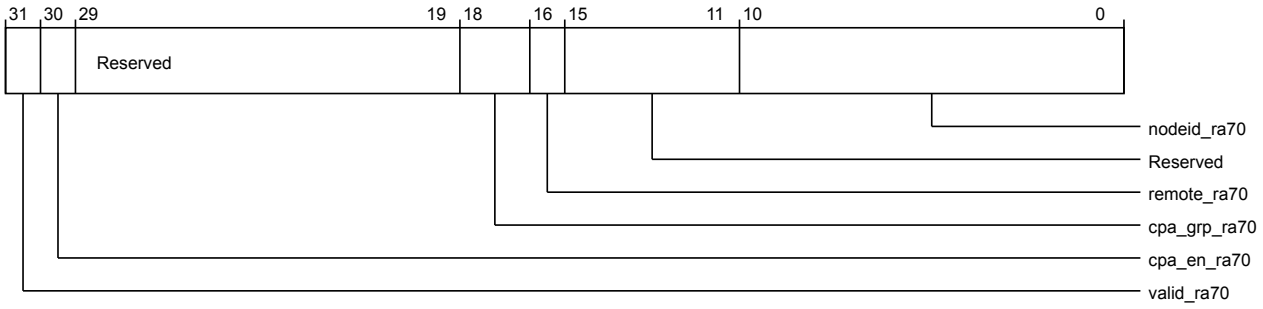

Figure 3-505 por_hnf_rn_phys_id35 (low)

The following table shows the por_hnf_rn_phys_id35 lower register bit assignments.

Table 3-519 por_hnf_rn_phys_id35 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra70	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra70	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra70	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra70	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra70	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id36

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hE48

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

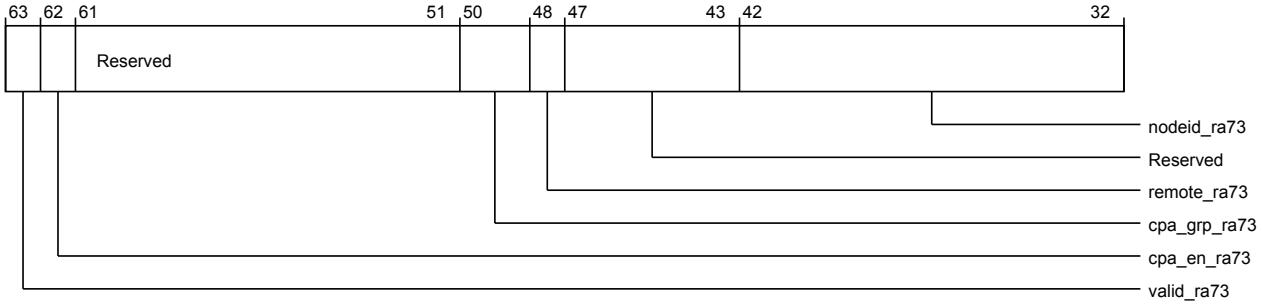

Figure 3-506 por_hnf_rn_phys_id36 (high)

The following table shows the por_hnf_rn_phys_id36 higher register bit assignments.

Table 3-520 por_hnf_rn_phys_id36 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra73	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra73	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra73	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra73	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra73	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

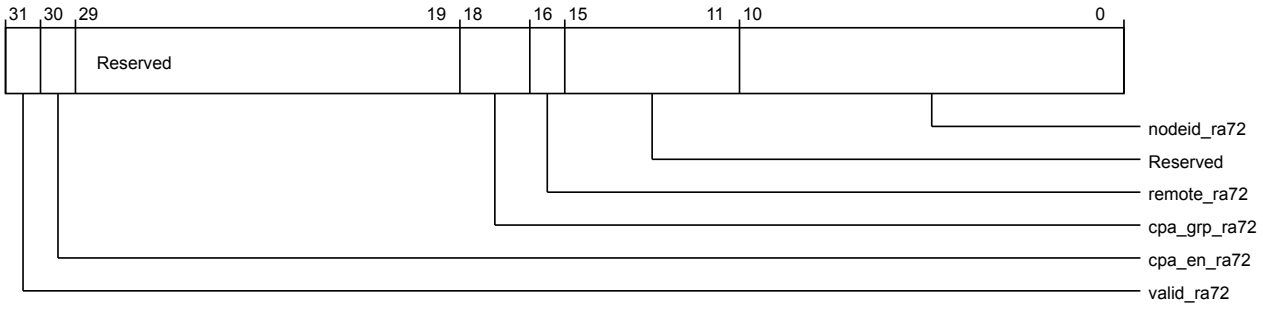

Figure 3-507 por_hnf_rn_phys_id36 (low)

The following table shows the por_hnf_rn_phys_id36 lower register bit assignments.

Table 3-521 por_hnf_rn_phys_id36 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra72	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra72	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra72	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra72	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra72	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id37

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hE50

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

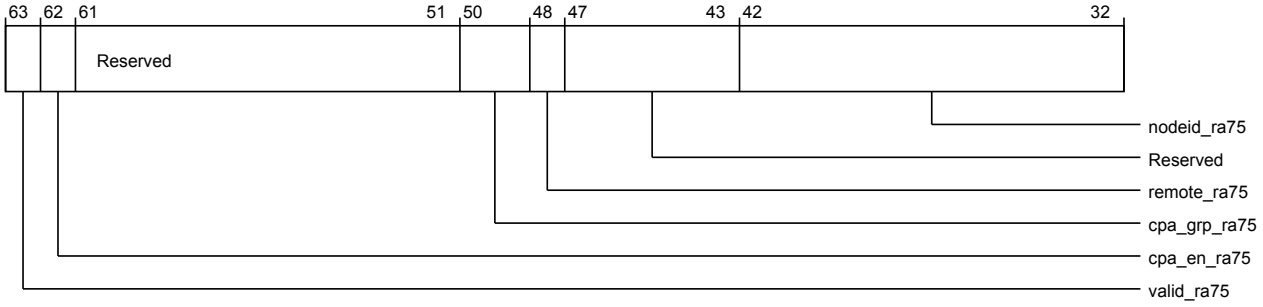

Figure 3-508 por_hnf_rn_phys_id37 (high)

The following table shows the por_hnf_rn_phys_id37 higher register bit assignments.

Table 3-522 por_hnf_rn_phys_id37 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra75	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra75	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra75	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra75	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra75	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

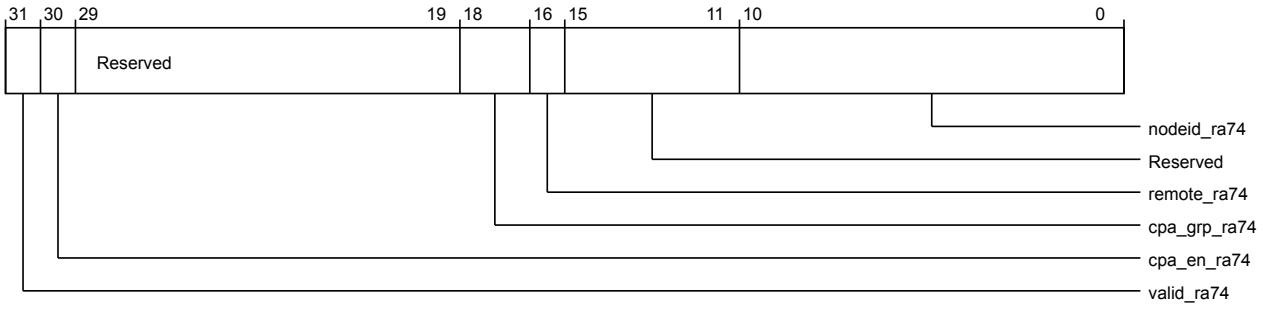

Figure 3-509 por_hnf_rn_phys_id37 (low)

The following table shows the por_hnf_rn_phys_id37 lower register bit assignments.

Table 3-523 por_hnf_rn_phys_id37 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra74	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra74	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra74	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra74	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra74	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id38

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hE58

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

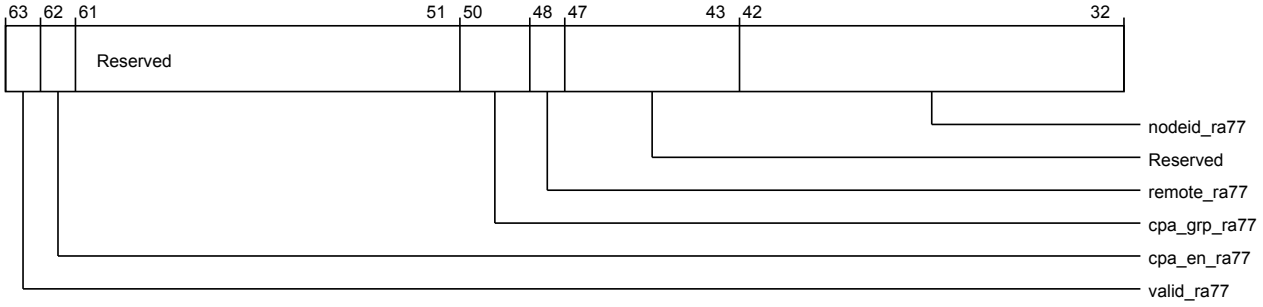

Figure 3-510 por_hnf_rn_phys_id38 (high)

The following table shows the por_hnf_rn_phys_id38 higher register bit assignments.

Table 3-524 por_hnf_rn_phys_id38 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra77	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra77	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra77	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra77	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra77	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

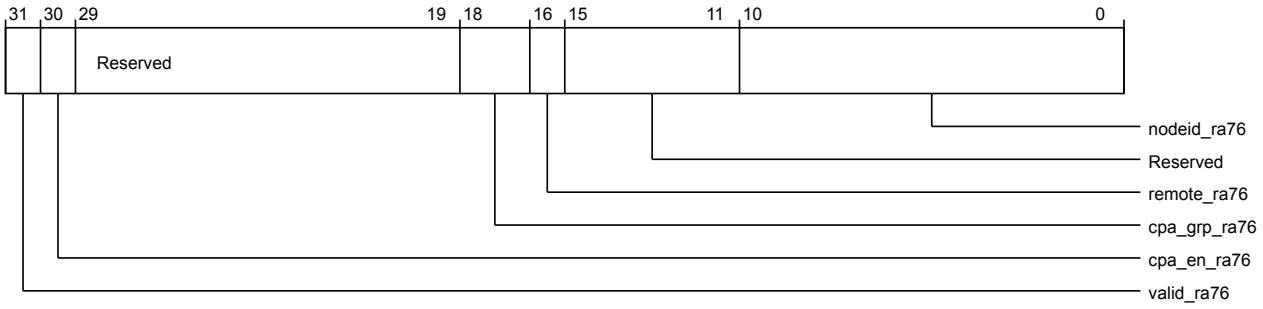

Figure 3-511 por_hnf_rn_phys_id38 (low)

The following table shows the por_hnf_rn_phys_id38 lower register bit assignments.

Table 3-525 por_hnf_rn_phys_id38 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra76	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra76	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra76	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra76	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra76	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id39

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hE60

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

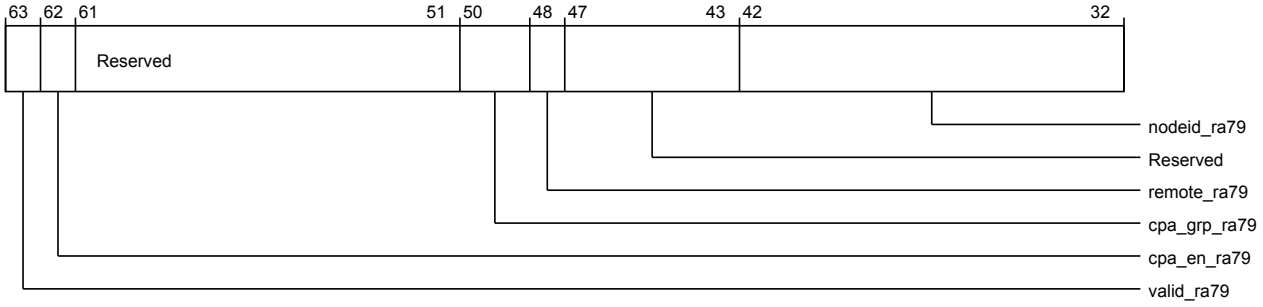

Figure 3-512 por_hnf_rn_phys_id39 (high)

The following table shows the por_hnf_rn_phys_id39 higher register bit assignments.

Table 3-526 por_hnf_rn_phys_id39 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra79	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra79	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra79	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra79	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra79	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

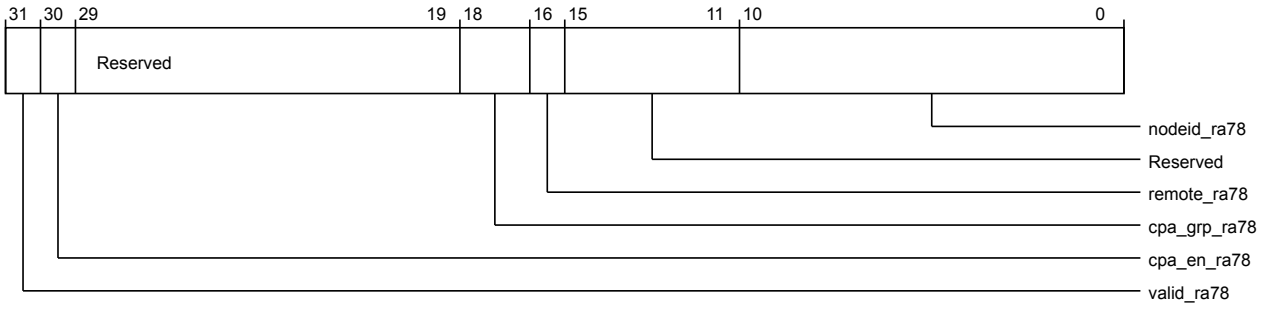

Figure 3-513 por_hnf_rn_phys_id39 (low)

The following table shows the por_hnf_rn_phys_id39 lower register bit assignments.

Table 3-527 por_hnf_rn_phys_id39 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra78	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra78	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra78	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra78	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra78	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id40

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hE68

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

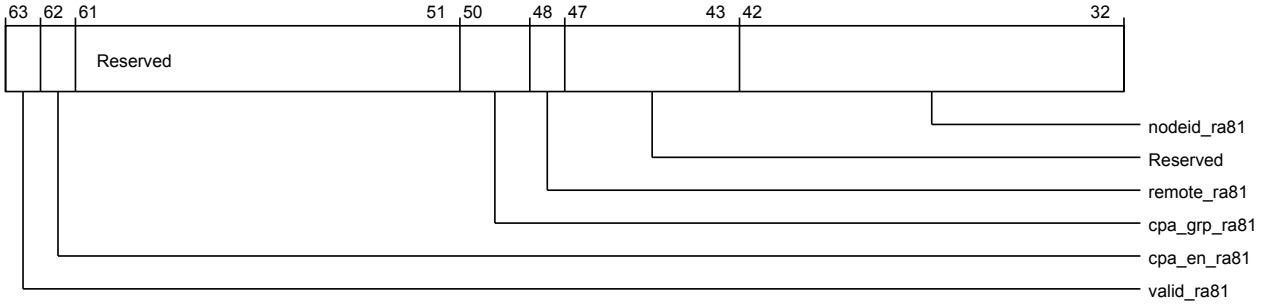

Figure 3-514 por_hnf_rn_phys_id40 (high)

The following table shows the por_hnf_rn_phys_id40 higher register bit assignments.

Table 3-528 por_hnf_rn_phys_id40 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra81	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra81	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra81	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra81	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra81	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

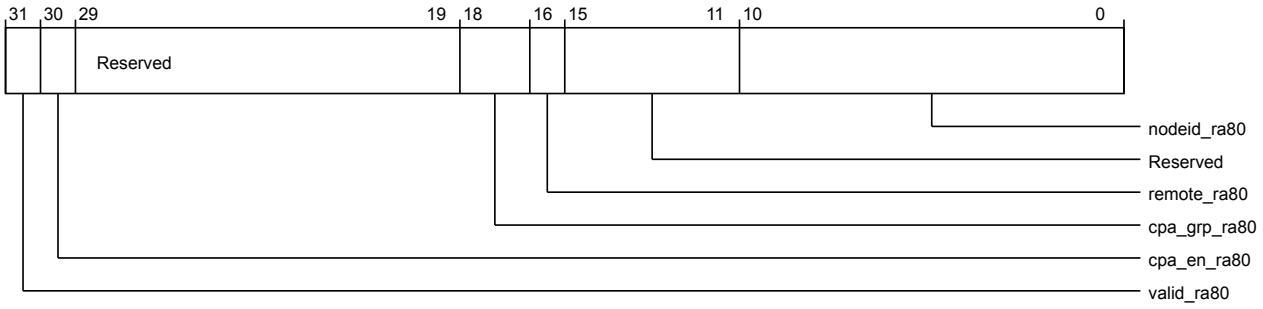

Figure 3-515 por_hnf_rn_phys_id40 (low)

The following table shows the por_hnf_rn_phys_id40 lower register bit assignments.

Table 3-529 por_hnf_rn_phys_id40 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra80	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra80	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra80	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra80	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra80	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id41

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hE70

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

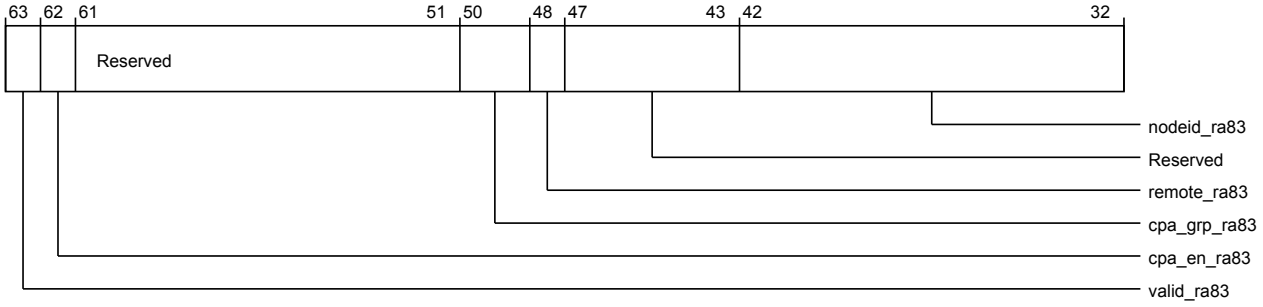

Figure 3-516 por_hnf_rn_phys_id41 (high)

The following table shows the por_hnf_rn_phys_id41 higher register bit assignments.

Table 3-530 por_hnf_rn_phys_id41 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra83	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra83	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra83	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra83	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra83	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

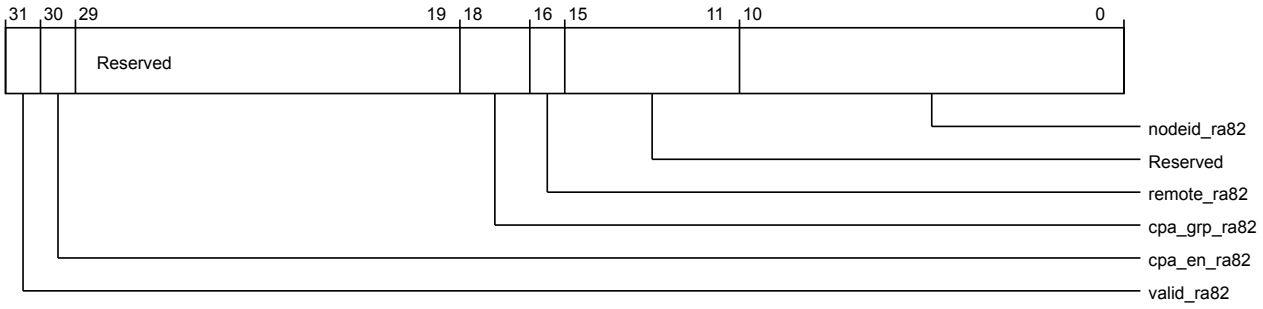

Figure 3-517 por_hnf_rn_phys_id41 (low)

The following table shows the por_hnf_rn_phys_id41 lower register bit assignments.

Table 3-531 por_hnf_rn_phys_id41 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra82	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra82	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra82	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra82	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra82	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id42

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hE78

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

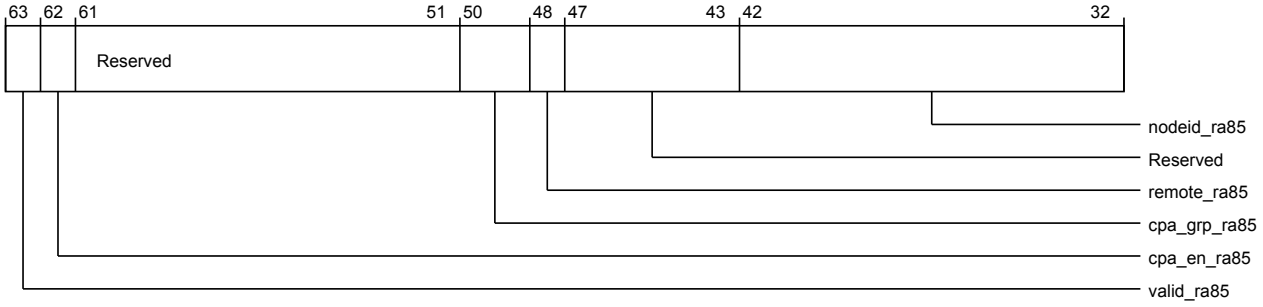

Figure 3-518 por_hnf_rn_phys_id42 (high)

The following table shows the por_hnf_rn_phys_id42 higher register bit assignments.

Table 3-532 por_hnf_rn_phys_id42 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra85	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra85	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra85	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra85	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra85	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

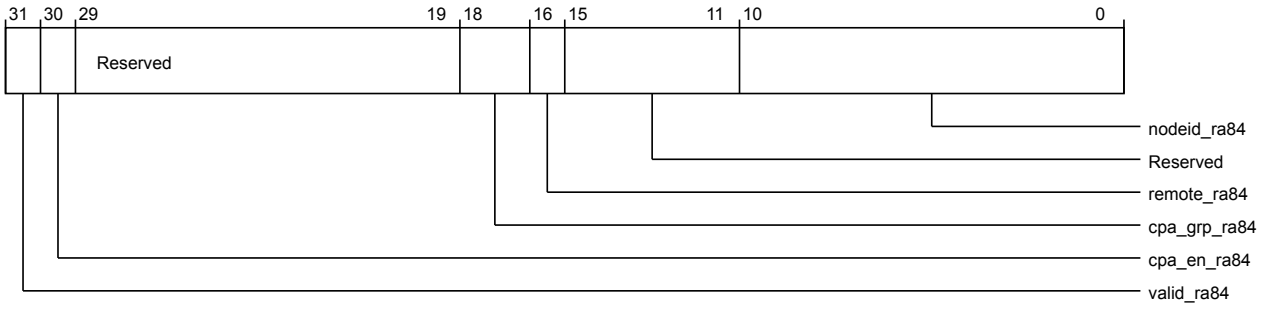

Figure 3-519 por_hnf_rn_phys_id42 (low)

The following table shows the por_hnf_rn_phys_id42 lower register bit assignments.

Table 3-533 por_hnf_rn_phys_id42 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra84	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra84	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra84	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra84	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra84	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id43

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hE80

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

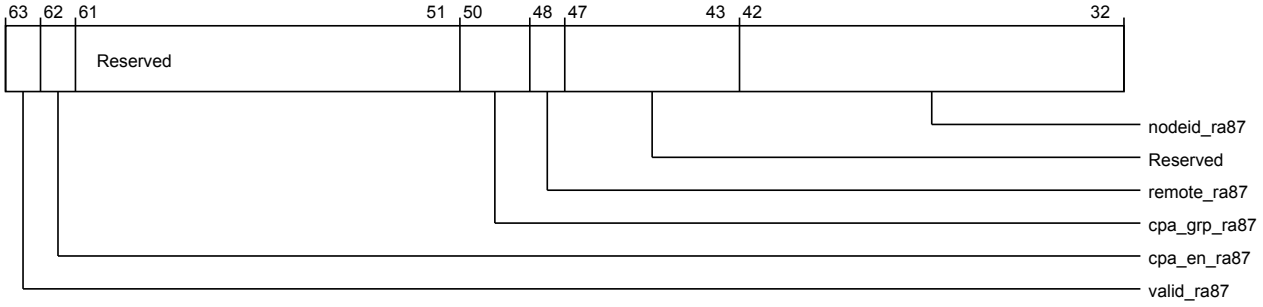

Figure 3-520 por_hnf_rn_phys_id43 (high)

The following table shows the por_hnf_rn_phys_id43 higher register bit assignments.

Table 3-534 por_hnf_rn_phys_id43 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra87	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra87	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra87	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra87	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra87	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

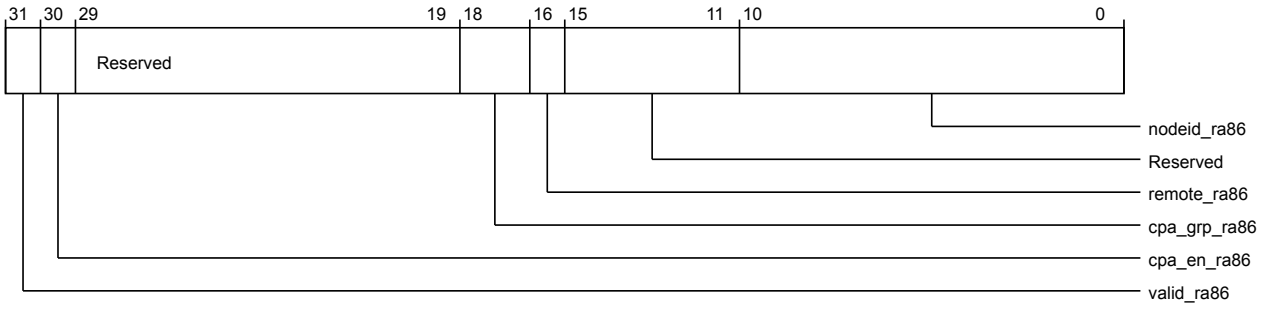

Figure 3-521 por_hnf_rn_phys_id43 (low)

The following table shows the por_hnf_rn_phys_id43 lower register bit assignments.

Table 3-535 por_hnf_rn_phys_id43 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra86	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra86	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra86	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra86	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra86	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id44

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hE88

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

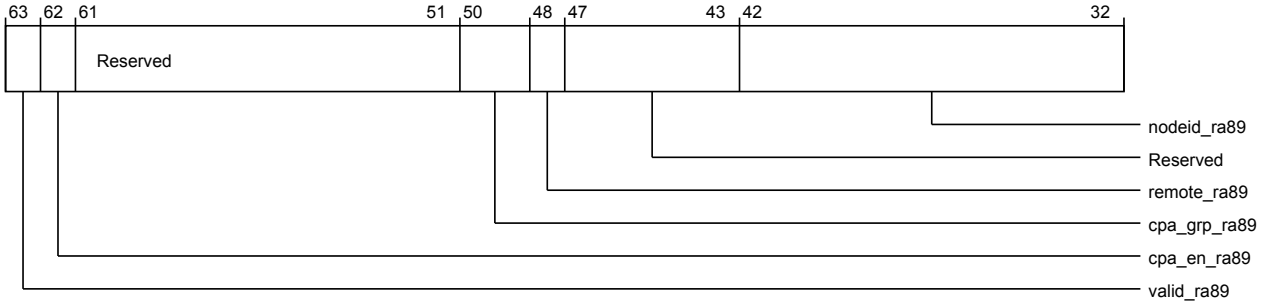

Figure 3-522 por_hnf_rn_phys_id44 (high)

The following table shows the por_hnf_rn_phys_id44 higher register bit assignments.

Table 3-536 por_hnf_rn_phys_id44 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra89	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra89	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra89	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra89	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra89	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

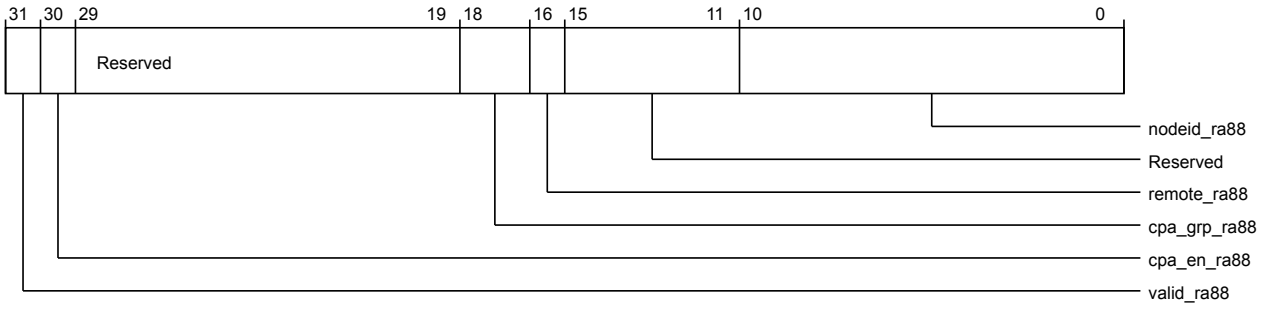

Figure 3-523 por_hnf_rn_phys_id44 (low)

The following table shows the por_hnf_rn_phys_id44 lower register bit assignments.

Table 3-537 por_hnf_rn_phys_id44 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra88	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra88	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra88	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra88	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra88	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id45

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hE90

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

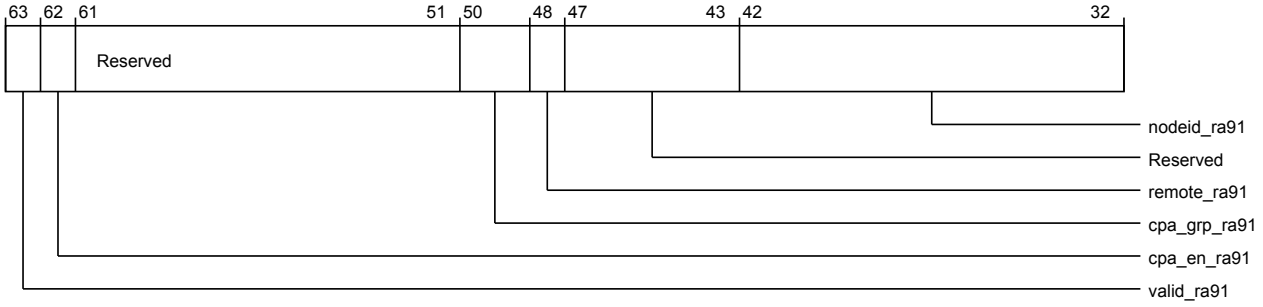

Figure 3-524 por_hnf_rn_phys_id45 (high)

The following table shows the por_hnf_rn_phys_id45 higher register bit assignments.

Table 3-538 por_hnf_rn_phys_id45 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra91	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra91	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra91	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra91	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra91	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

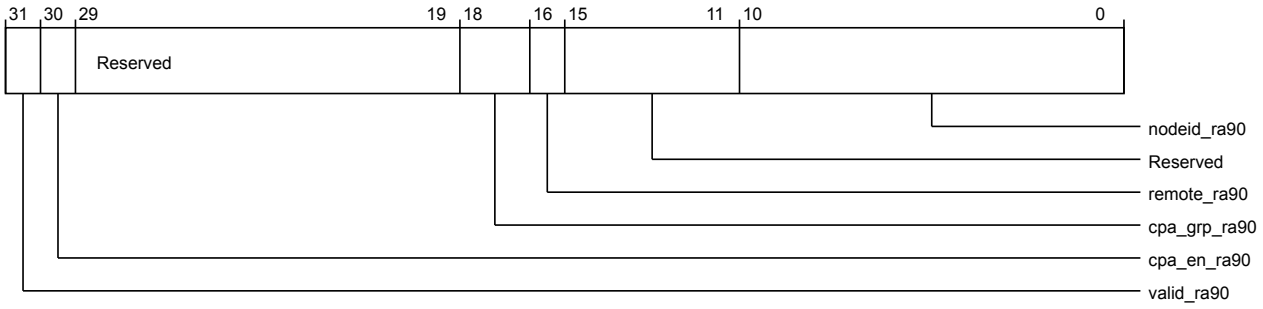

Figure 3-525 por_hnf_rn_phys_id45 (low)

The following table shows the por_hnf_rn_phys_id45 lower register bit assignments.

Table 3-539 por_hnf_rn_phys_id45 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra90	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra90	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra90	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra90	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra90	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id46

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hE98

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

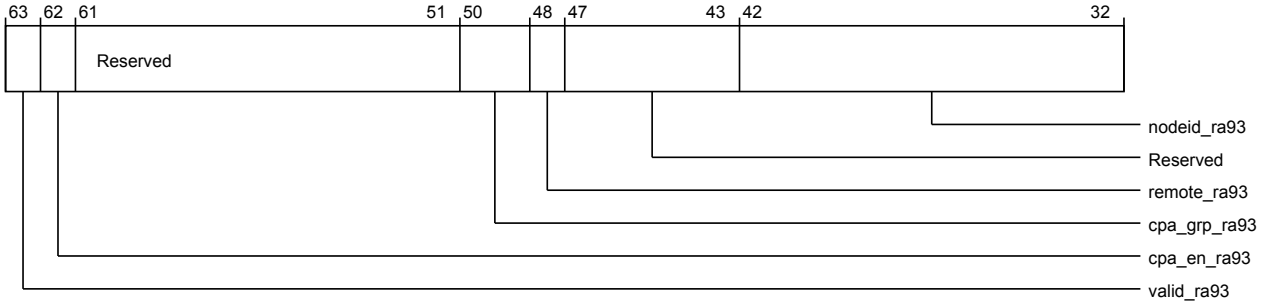

Figure 3-526 por_hnf_rn_phys_id46 (high)

The following table shows the por_hnf_rn_phys_id46 higher register bit assignments.

Table 3-540 por_hnf_rn_phys_id46 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra93	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra93	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra93	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra93	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra93	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

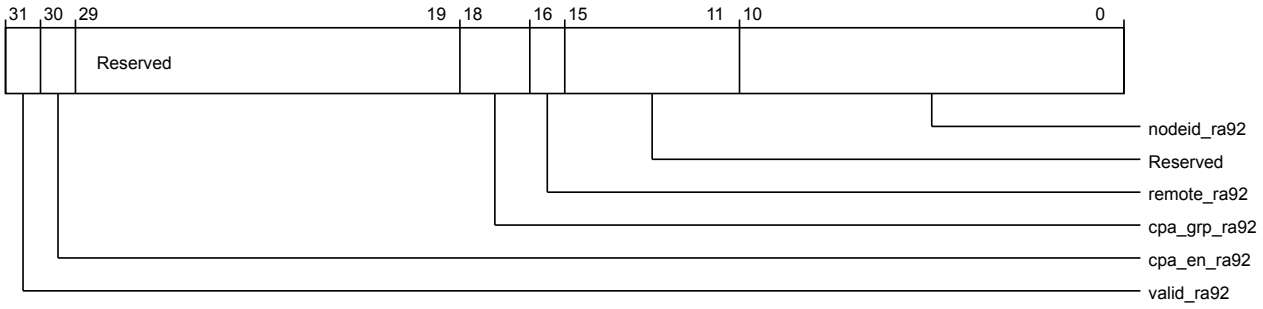

Figure 3-527 por_hnf_rn_phys_id46 (low)

The following table shows the por_hnf_rn_phys_id46 lower register bit assignments.

Table 3-541 por_hnf_rn_phys_id46 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra92	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra92	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra92	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra92	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra92	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id47

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hEA0

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

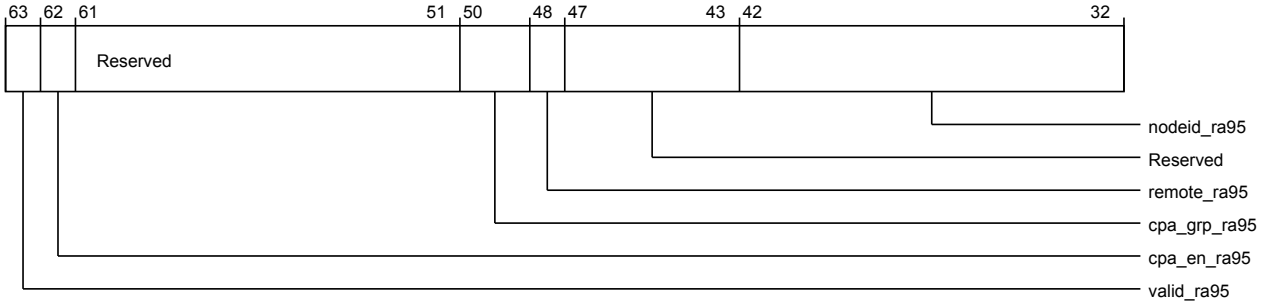

Figure 3-528 por_hnf_rn_phys_id47 (high)

The following table shows the por_hnf_rn_phys_id47 higher register bit assignments.

Table 3-542 por_hnf_rn_phys_id47 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra95	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra95	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra95	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra95	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra95	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

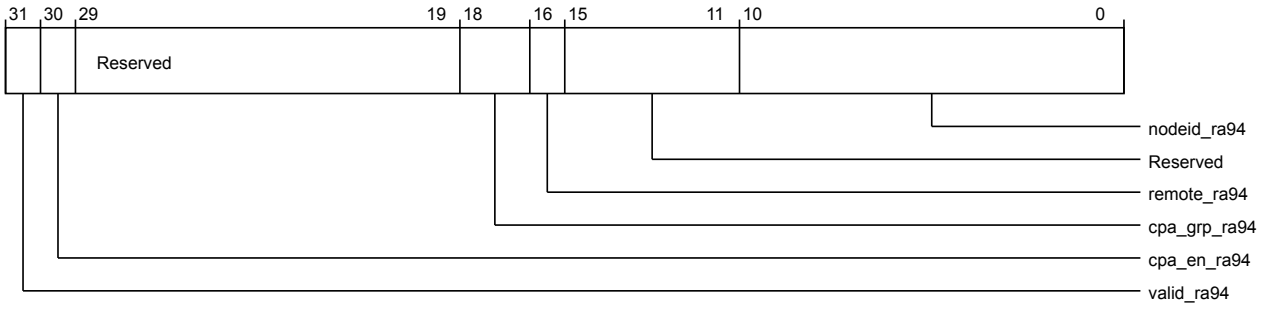

Figure 3-529 por_hnf_rn_phys_id47 (low)

The following table shows the por_hnf_rn_phys_id47 lower register bit assignments.

Table 3-543 por_hnf_rn_phys_id47 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra94	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra94	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra94	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra94	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra94	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id48

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hEA8

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

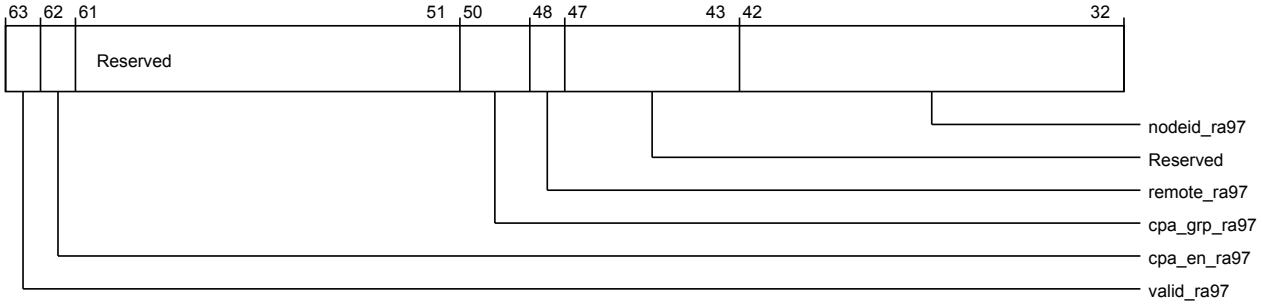

Figure 3-530 por_hnf_rn_phys_id48 (high)

The following table shows the por_hnf_rn_phys_id48 higher register bit assignments.

Table 3-544 por_hnf_rn_phys_id48 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra97	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra97	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra97	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra97	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra97	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

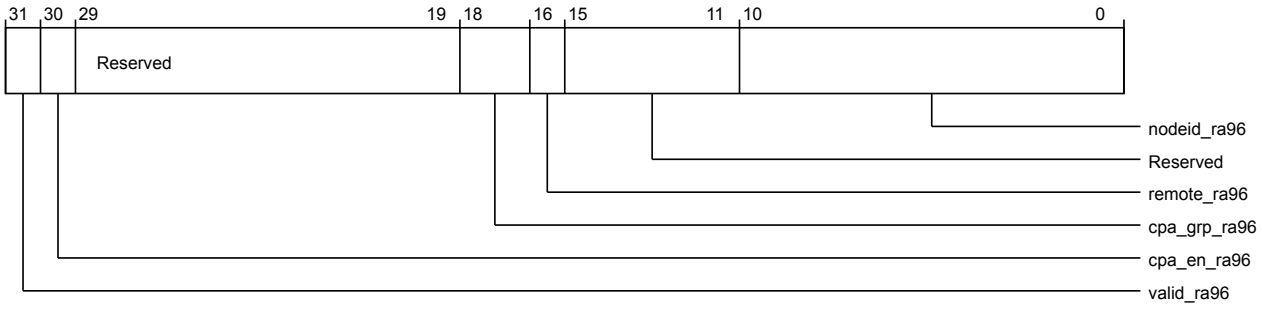

Figure 3-531 por_hnf_rn_phys_id48 (low)

The following table shows the por_hnf_rn_phys_id48 lower register bit assignments.

Table 3-545 por_hnf_rn_phys_id48 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra96	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra96	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra96	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra96	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra96	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id49

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hEB0

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

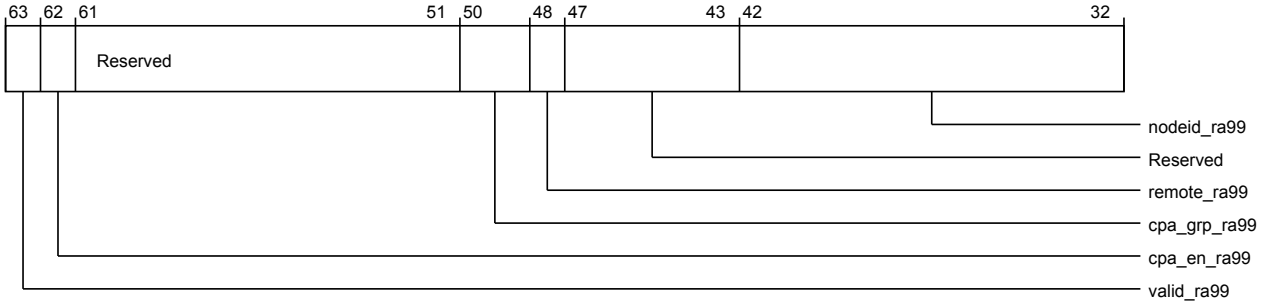

Figure 3-532 por_hnf_rn_phys_id49 (high)

The following table shows the por_hnf_rn_phys_id49 higher register bit assignments.

Table 3-546 por_hnf_rn_phys_id49 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra99	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra99	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra99	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra99	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra99	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

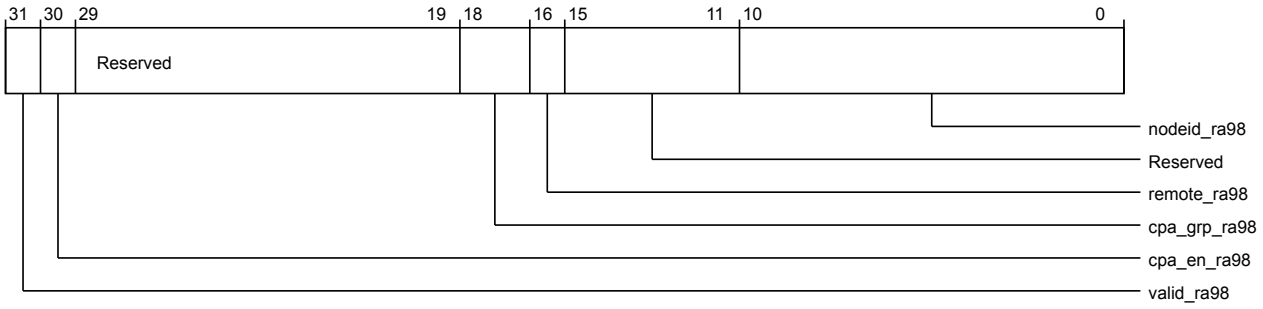

Figure 3-533 por_hnf_rn_phys_id49 (low)

The following table shows the por_hnf_rn_phys_id49 lower register bit assignments.

Table 3-547 por_hnf_rn_phys_id49 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra98	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra98	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra98	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra98	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra98	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id50

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hEB8

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

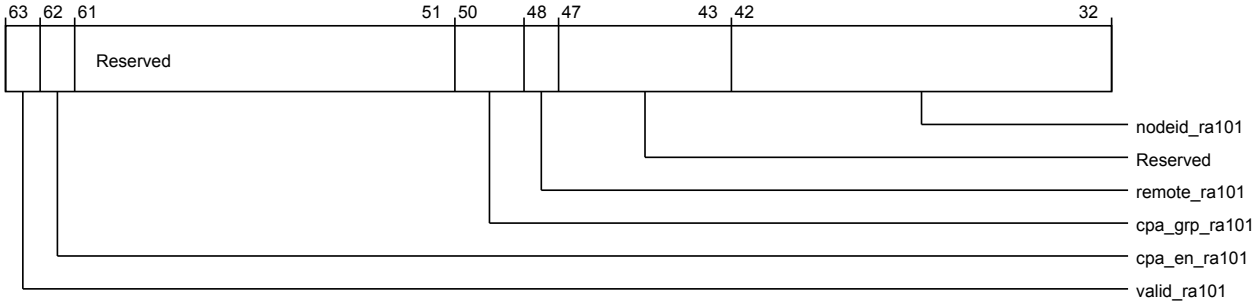

Figure 3-534 por_hnf_rn_phys_id50 (high)

The following table shows the por_hnf_rn_phys_id50 higher register bit assignments.

Table 3-548 por_hnf_rn_phys_id50 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra101	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra101	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra101	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra101	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra101	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

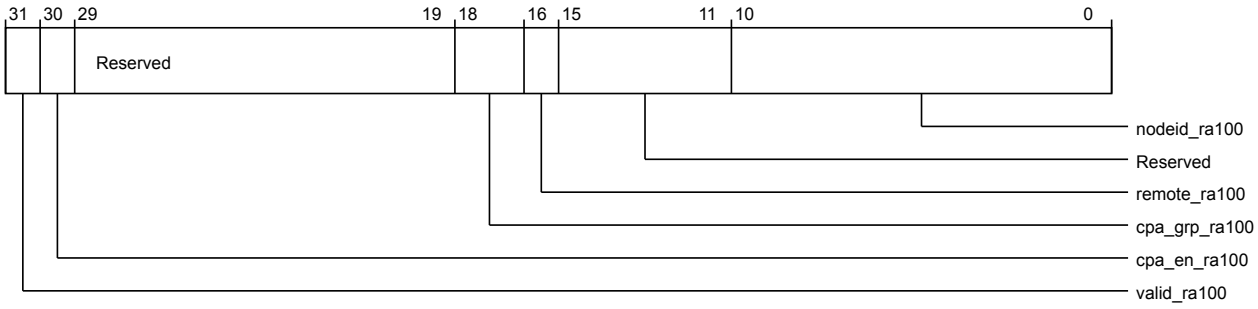

Figure 3-535 por_hnf_rn_phys_id50 (low)

The following table shows the por_hnf_rn_phys_id50 lower register bit assignments.

Table 3-549 por_hnf_rn_phys_id50 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra100	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra100	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra100	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra100	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra100	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id51

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hEC0

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

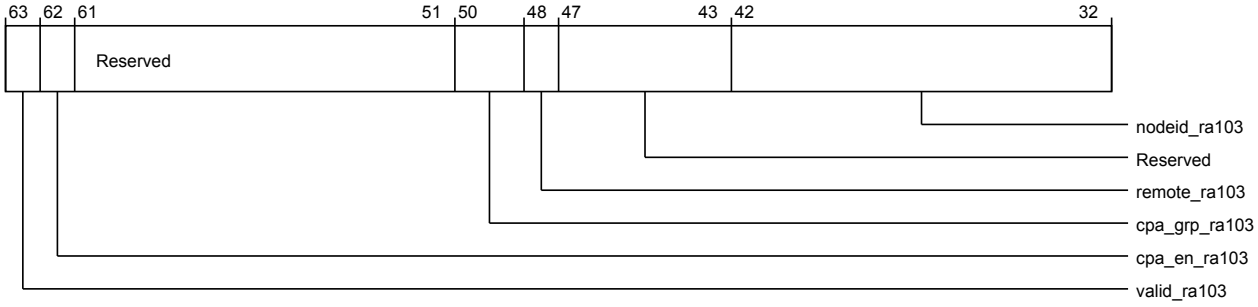

Figure 3-536 por_hnf_rn_phys_id51 (high)

The following table shows the por_hnf_rn_phys_id51 higher register bit assignments.

Table 3-550 por_hnf_rn_phys_id51 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra103	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra103	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra103	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra103	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra103	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

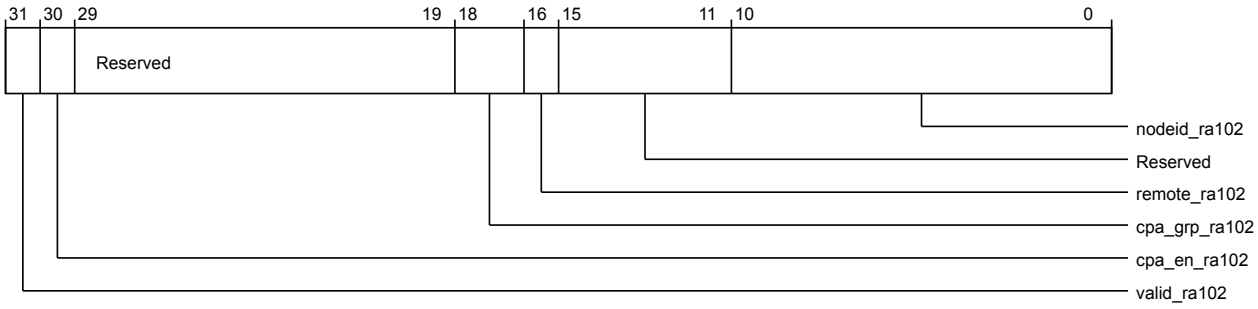

Figure 3-537 por_hnf_rn_phys_id51 (low)

The following table shows the por_hnf_rn_phys_id51 lower register bit assignments.

Table 3-551 por_hnf_rn_phys_id51 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra102	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra102	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra102	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra102	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra102	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id52

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hEC8

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

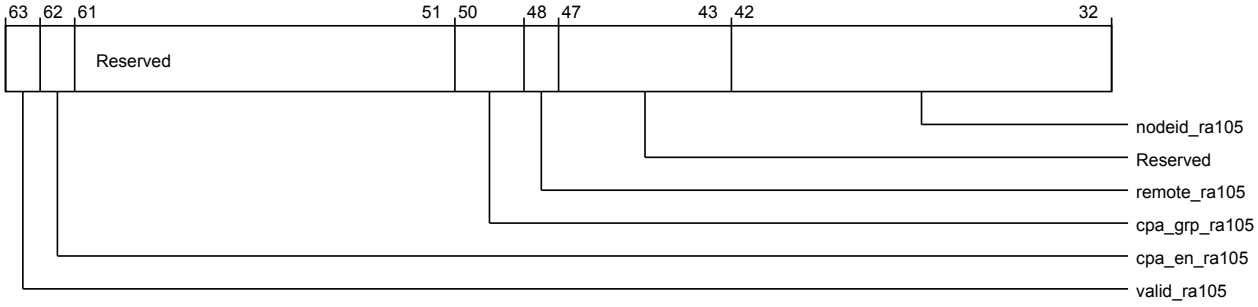

Figure 3-538 por_hnf_rn_phys_id52 (high)

The following table shows the por_hnf_rn_phys_id52 higher register bit assignments.

Table 3-552 por_hnf_rn_phys_id52 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra105	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra105	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra105	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra105	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra105	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

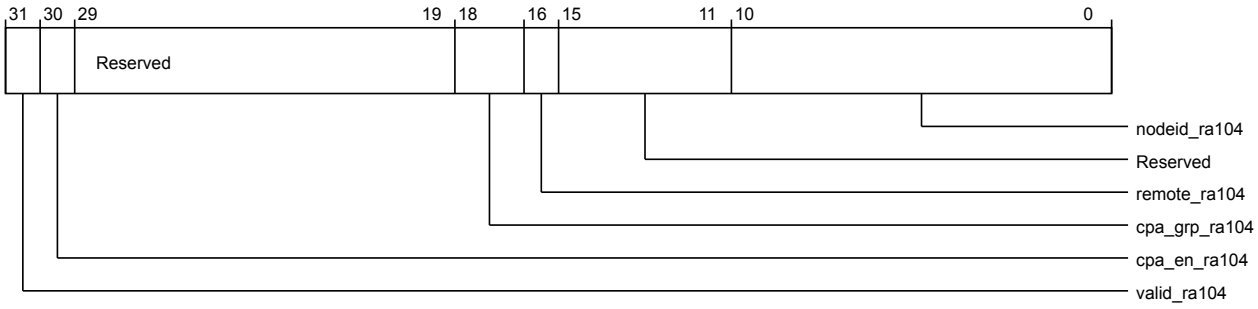

Figure 3-539 por_hnf_rn_phys_id52 (low)

The following table shows the por_hnf_rn_phys_id52 lower register bit assignments.

Table 3-553 por_hnf_rn_phys_id52 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra104	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra104	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra104	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra104	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra104	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id53

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hED0

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

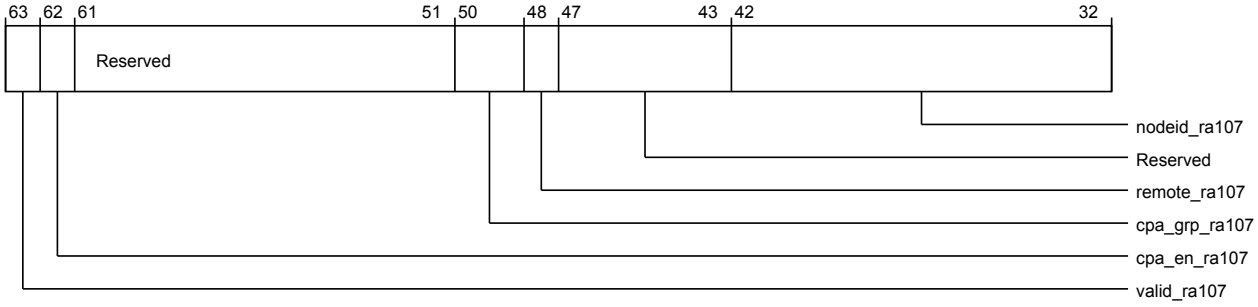

Figure 3-540 por_hnf_rn_phys_id53 (high)

The following table shows the por_hnf_rn_phys_id53 higher register bit assignments.

Table 3-554 por_hnf_rn_phys_id53 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra107	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra107	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra107	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra107	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra107	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

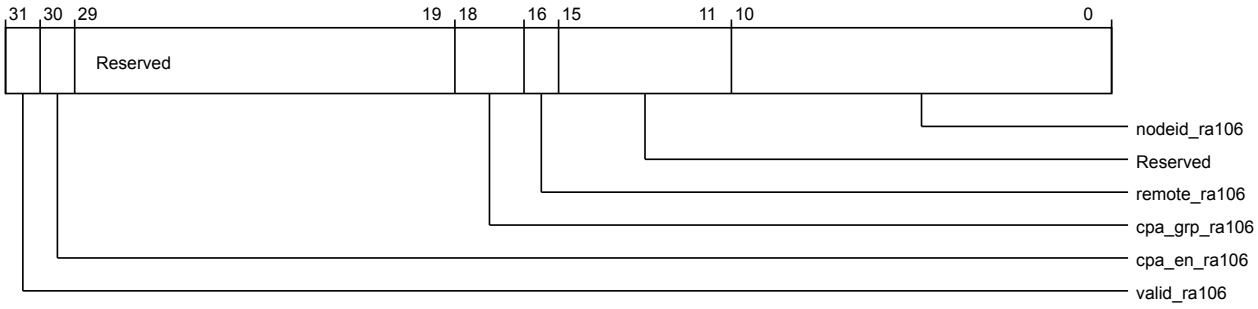

Figure 3-541 por_hnf_rn_phys_id53 (low)

The following table shows the por_hnf_rn_phys_id53 lower register bit assignments.

Table 3-555 por_hnf_rn_phys_id53 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra106	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra106	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra106	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra106	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra106	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id54

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hED8

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

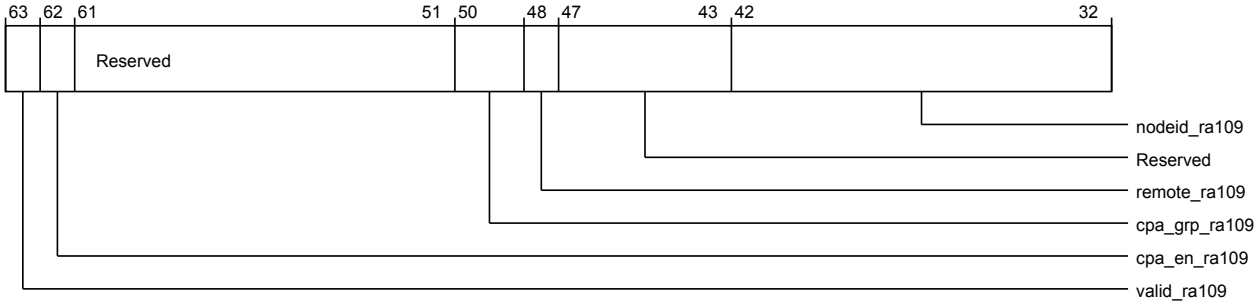

Figure 3-542 por_hnf_rn_phys_id54 (high)

The following table shows the por_hnf_rn_phys_id54 higher register bit assignments.

Table 3-556 por_hnf_rn_phys_id54 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra109	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra109	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra109	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra109	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra109	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

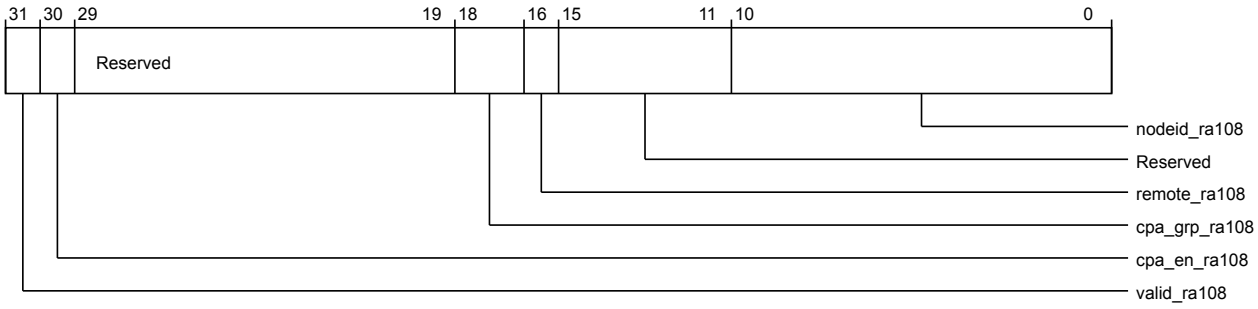

Figure 3-543 por_hnf_rn_phys_id54 (low)

The following table shows the por_hnf_rn_phys_id54 lower register bit assignments.

Table 3-557 por_hnf_rn_phys_id54 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra108	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra108	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra108	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra108	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra108	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id55

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hEE0

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

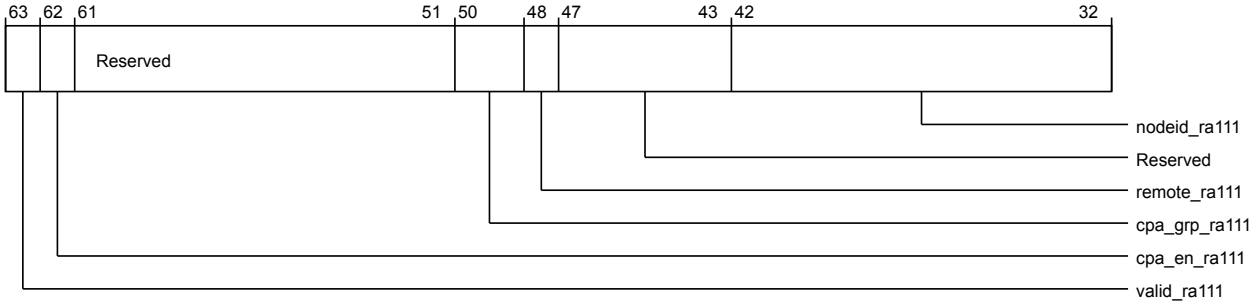

Figure 3-544 por_hnf_rn_phys_id55 (high)

The following table shows the por_hnf_rn_phys_id55 higher register bit assignments.

Table 3-558 por_hnf_rn_phys_id55 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra111	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra111	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra111	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra111	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra111	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

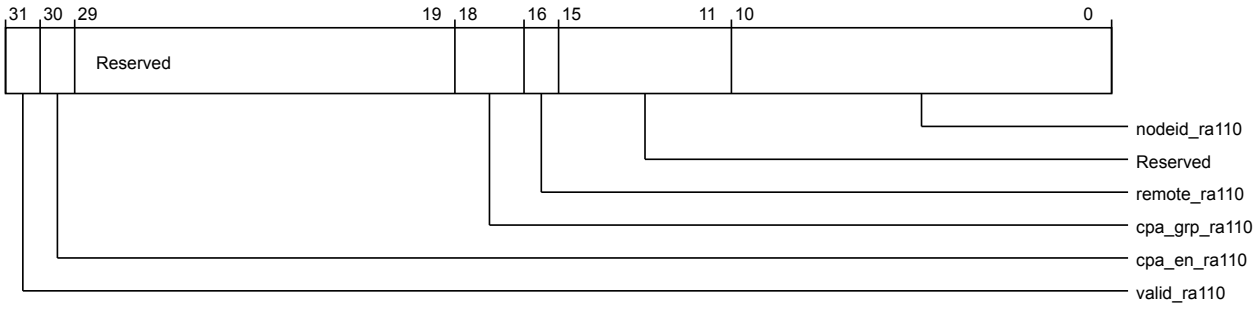

Figure 3-545 por_hnf_rn_phys_id55 (low)

The following table shows the por_hnf_rn_phys_id55 lower register bit assignments.

Table 3-559 por_hnf_rn_phys_id55 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra110	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra110	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra110	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra110	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra110	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id56

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hEE8

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

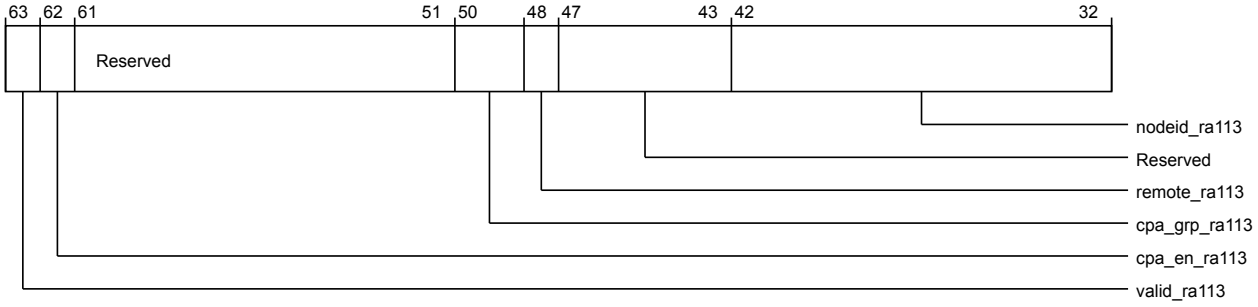

Figure 3-546 por_hnf_rn_phys_id56 (high)

The following table shows the por_hnf_rn_phys_id56 higher register bit assignments.

Table 3-560 por_hnf_rn_phys_id56 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra113	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra113	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra113	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra113	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra113	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

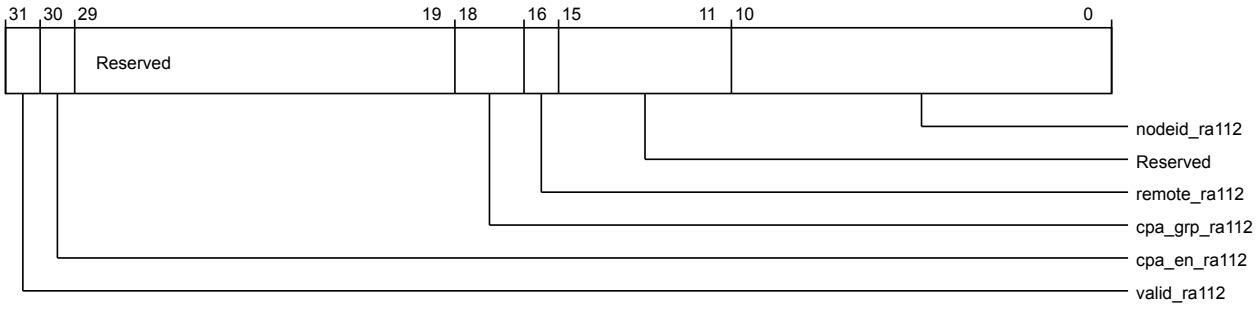

Figure 3-547 por_hnf_rn_phys_id56 (low)

The following table shows the por_hnf_rn_phys_id56 lower register bit assignments.

Table 3-561 por_hnf_rn_phys_id56 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra112	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra112	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra112	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra112	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra112	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id57

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hEF0

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

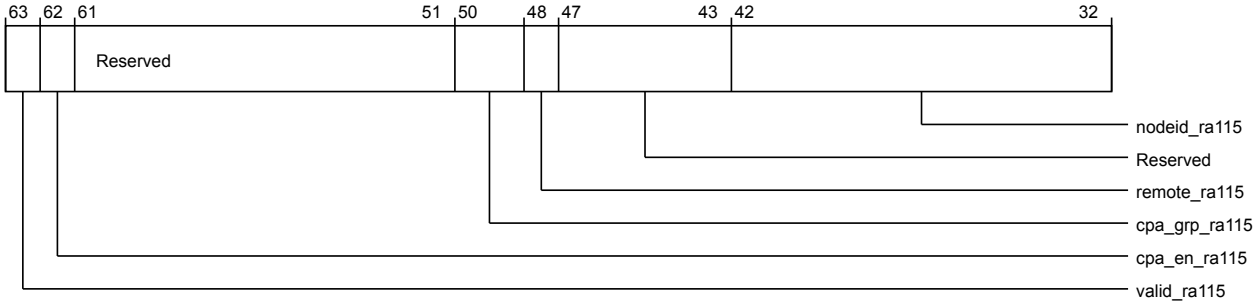

Figure 3-548 por_hnf_rn_phys_id57 (high)

The following table shows the por_hnf_rn_phys_id57 higher register bit assignments.

Table 3-562 por_hnf_rn_phys_id57 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra115	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra115	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra115	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra115	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra115	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

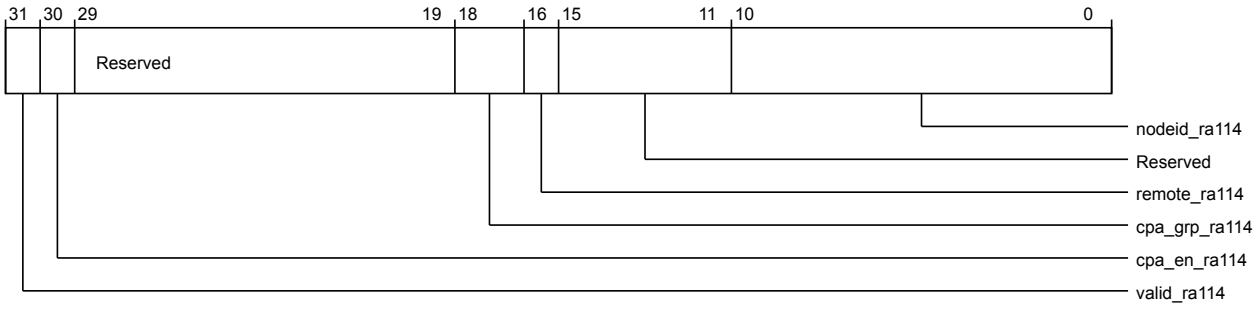

Figure 3-549 por_hnf_rn_phys_id57 (low)

The following table shows the por_hnf_rn_phys_id57 lower register bit assignments.

Table 3-563 por_hnf_rn_phys_id57 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra114	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra114	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra114	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra114	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra114	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id58

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hEF8

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

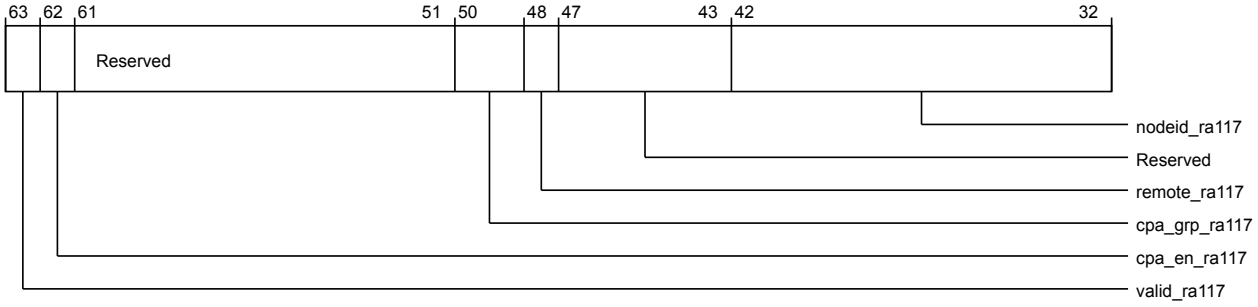

Figure 3-550 por_hnf_rn_phys_id58 (high)

The following table shows the por_hnf_rn_phys_id58 higher register bit assignments.

Table 3-564 por_hnf_rn_phys_id58 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra117	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra117	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra117	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra117	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra117	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

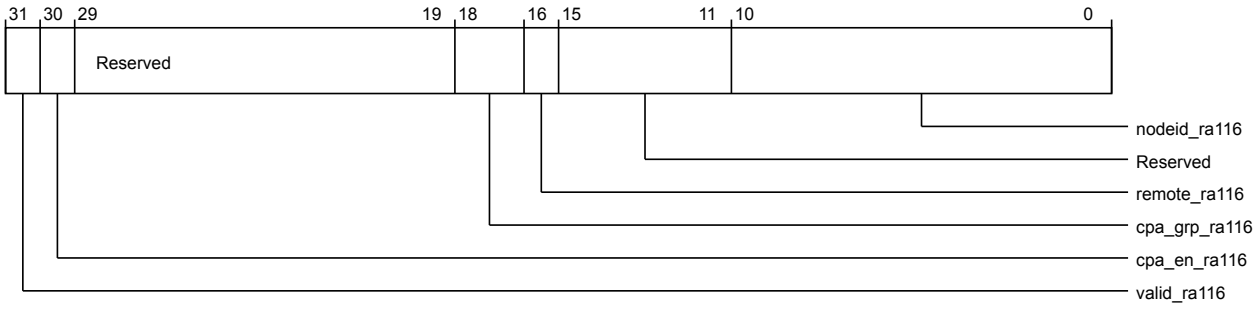

Figure 3-551 por_hnf_rn_phys_id58 (low)

The following table shows the por_hnf_rn_phys_id58 lower register bit assignments.

Table 3-565 por_hnf_rn_phys_id58 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra116	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra116	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra116	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra116	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra116	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id59

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hF70

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

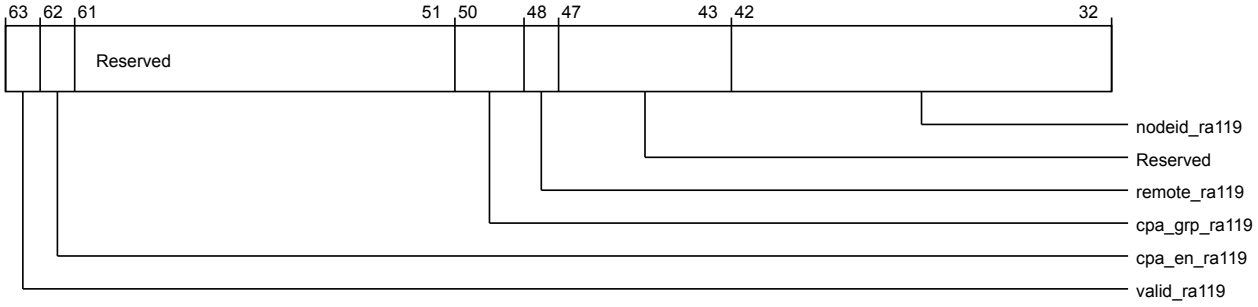

Figure 3-552 por_hnf_rn_phys_id59 (high)

The following table shows the por_hnf_rn_phys_id59 higher register bit assignments.

Table 3-566 por_hnf_rn_phys_id59 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra119	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra119	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra119	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra119	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra119	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

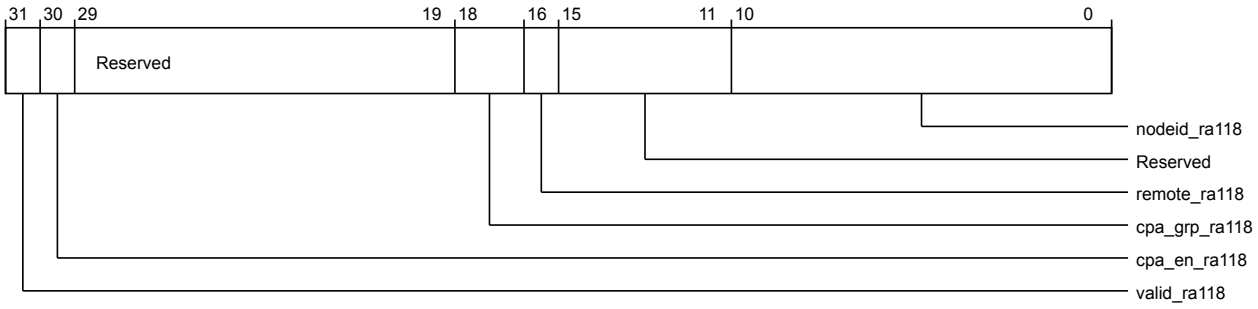

Figure 3-553 por_hnf_rn_phys_id59 (low)

The following table shows the por_hnf_rn_phys_id59 lower register bit assignments.

Table 3-567 por_hnf_rn_phys_id59 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra118	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra118	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra118	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra118	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra118	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id60

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hF78

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

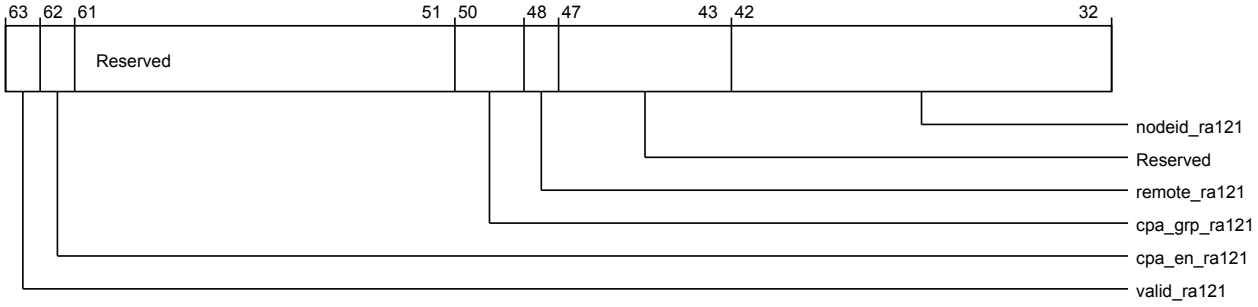

Figure 3-554 por_hnf_rn_phys_id60 (high)

The following table shows the por_hnf_rn_phys_id60 higher register bit assignments.

Table 3-568 por_hnf_rn_phys_id60 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra121	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra121	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra121	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra121	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra121	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

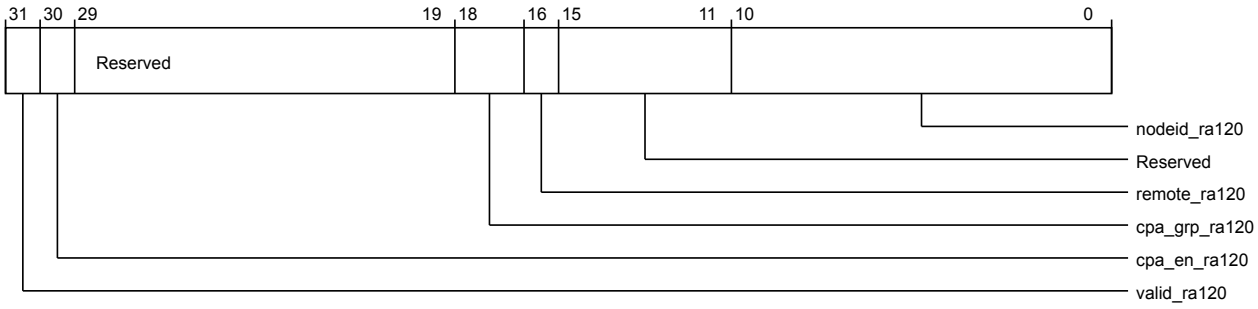

Figure 3-555 por_hnf_rn_phys_id60 (low)

The following table shows the por_hnf_rn_phys_id60 lower register bit assignments.

Table 3-569 por_hnf_rn_phys_id60 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra120	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra120	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra120	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra120	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra120	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id61

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hF80

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

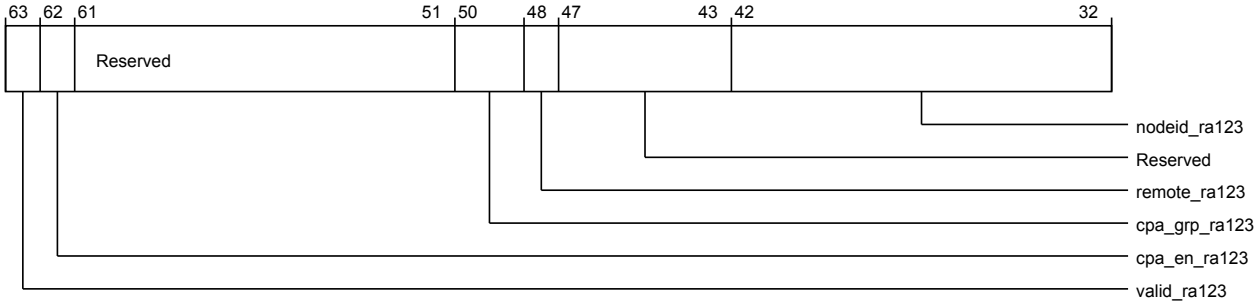

Figure 3-556 por_hnf_rn_phys_id61 (high)

The following table shows the por_hnf_rn_phys_id61 higher register bit assignments.

Table 3-570 por_hnf_rn_phys_id61 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra123	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra123	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra123	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra123	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra123	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

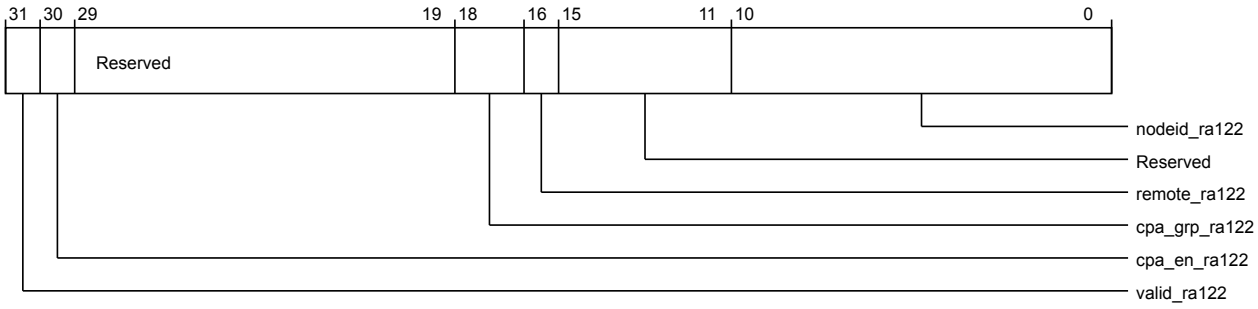

Figure 3-557 por_hnf_rn_phys_id61 (low)

The following table shows the por_hnf_rn_phys_id61 lower register bit assignments.

Table 3-571 por_hnf_rn_phys_id61 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra122	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra122	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra122	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra122	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra122	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id62

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hF88

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

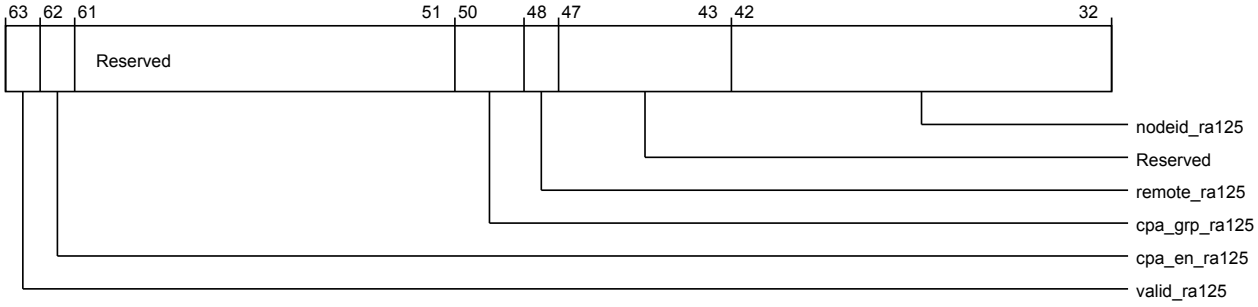

Figure 3-558 por_hnf_rn_phys_id62 (high)

The following table shows the por_hnf_rn_phys_id62 higher register bit assignments.

Table 3-572 por_hnf_rn_phys_id62 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra125	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra125	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra125	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra125	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra125	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

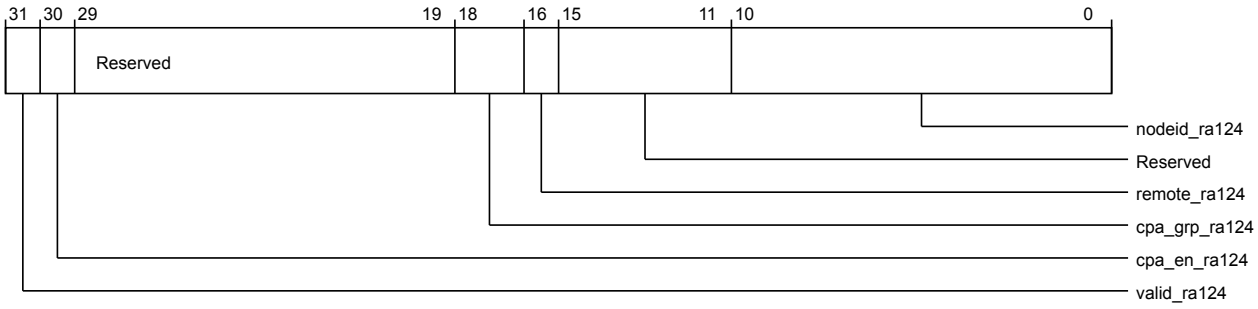

Figure 3-559 por_hnf_rn_phys_id62 (low)

The following table shows the por_hnf_rn_phys_id62 lower register bit assignments.

Table 3-573 por_hnf_rn_phys_id62 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra124	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra124	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra124	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra124	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra124	Specifies the node ID	RW	11'h0

por_hnf_rn_phys_id63

Configures node IDs for RNs in the system corresponding to each RN ID.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hF90

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

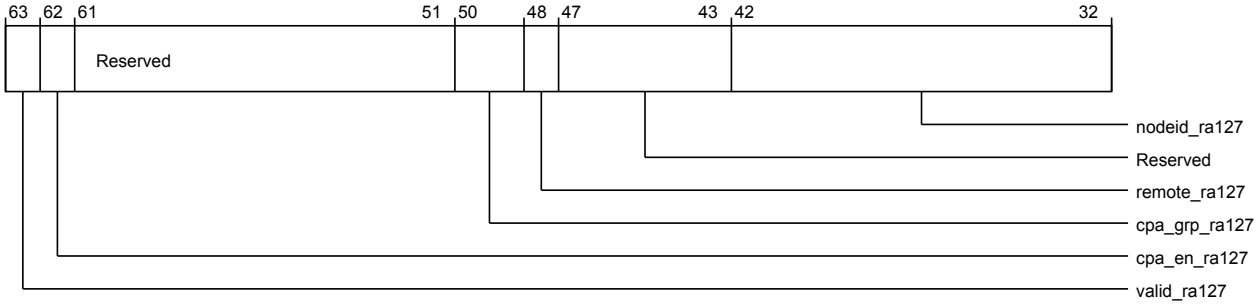

Figure 3-560 por_hnf_rn_phys_id63 (high)

The following table shows the por_hnf_rn_phys_id63 higher register bit assignments.

Table 3-574 por_hnf_rn_phys_id63 (high)

Bits	Field name	Description	Type	Reset
63	valid_ra127	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
62	cpa_en_ra127	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
61:51	Reserved	Reserved	RO	-
50:49	cpa_grp_ra127	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
48	remote_ra127	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
47:43	Reserved	Reserved	RO	-
42:32	nodeid_ra127	Specifies the node ID	RW	11'h0

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The following image shows the lower register bit assignments.

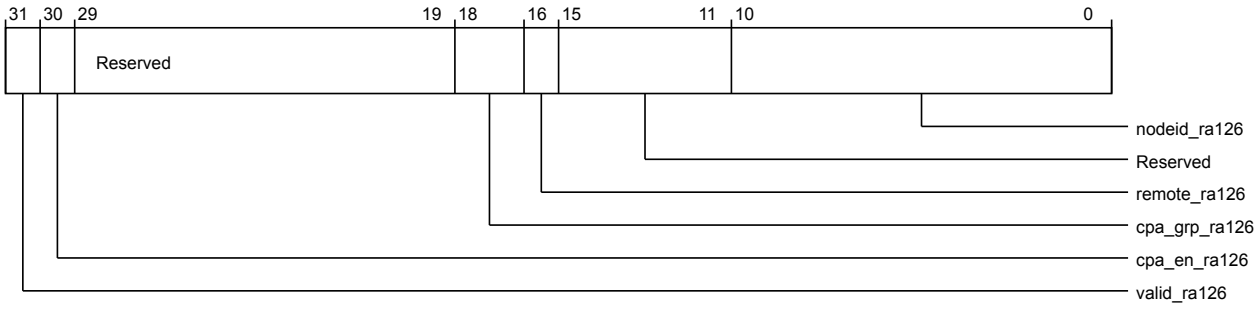

Figure 3-561 por_hnf_rn_phys_id63 (low)

The following table shows the por_hnf_rn_phys_id63 lower register bit assignments.

Table 3-575 por_hnf_rn_phys_id63 (low)

Bits	Field name	Description	Type	Reset
31	valid_ra126	Specifies whether the RN is valid 1'b0: RN ID is not valid 1'b1: RN ID is pointing to a valid CHI device	RW	1'h0
30	cpa_en_ra126	Specifies whether the CCIX port aggregation is enabled 1'b0: CPA not enabled 1'b1: CPA enabled	RW	1'h0
29:19	Reserved	Reserved	RO	-
18:17	cpa_grp_ra126	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'h0
16	remote_ra126	Specifies whether the RN is remote or local 1'b0: Local RN 1'b1: Remote RN	RW	1'h0
15:11	Reserved	Reserved	RO	-
10:0	nodeid_ra126	Specifies the node ID	RW	11'h0

por_hnf_ldid_map_table_reg0

Configures LDID start pointer for remote RN-F's behind each CXG

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hF98

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

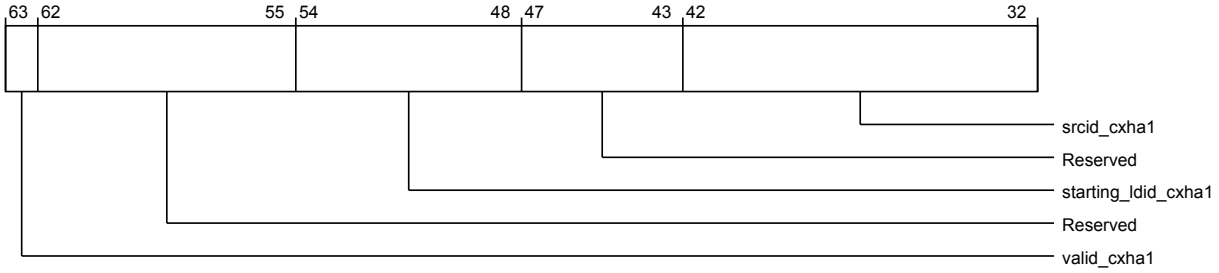

Figure 3-562 por_hnf_ldid_map_table_reg0 (high)

The following table shows the por_hnf_ldid_map_table_reg0 higher register bit assignments.

Table 3-576 por_hnf_ldid_map_table_reg0 (high)

Bits	Field name	Description	Type	Reset
63	valid_cxha1	Specifies CXHA 1 programming is valid	RW	1'h0
62:55	Reserved	Reserved	RO	-
54:48	starting_ldid_cxha1	Specifies the starting LDID for RN-F's behind CXHA 1	RW	7'h0
47:43	Reserved	Reserved	RO	-
42:32	srcid_cxha1	Specifies the node ID for CXHA 1	RW	11'h0

The following image shows the lower register bit assignments.

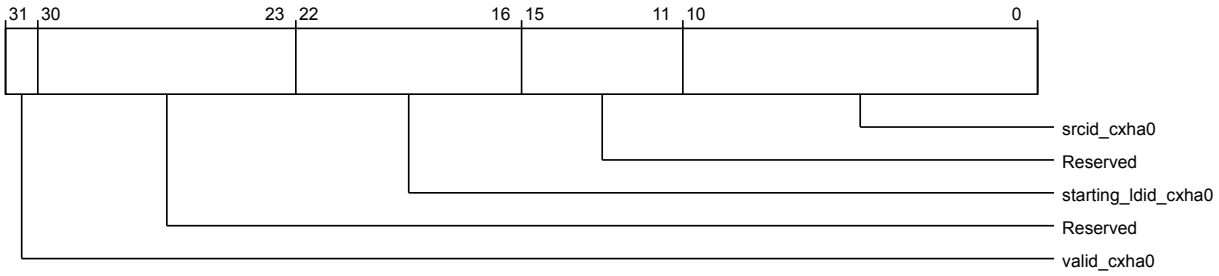

Figure 3-563 por_hnf_ldid_map_table_reg0 (low)

The following table shows the por_hnf_ldid_map_table_reg0 lower register bit assignments.

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Table 3-577 por_hnf_ldid_map_table_reg0 (low)

Bits	Field name	Description	Type	Reset
31	valid_cxha0	Specifies CXHA 0 programming is valid	RW	1'h0
30:23	Reserved	Reserved	RO	-
22:16	starting_ldid_cxha0	Specifies the starting LDID for RN-F's behind CXHA 0	RW	7'h0
15:11	Reserved	Reserved	RO	-
10:0	srcid_cxha0	Specifies the node ID for CXHA 0	RW	11'h0

por_hnf_ldid_map_table_reg1

Configures LDID start pointer for remote RN-F's behind each CXG

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hFA0

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

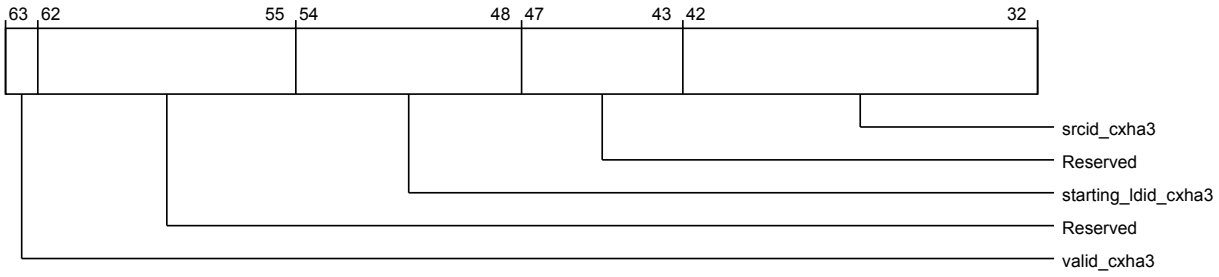

Figure 3-564 por_hnf_ldid_map_table_reg1 (high)

The following table shows the por_hnf_ldid_map_table_reg1 higher register bit assignments.

Table 3-578 por_hnf_ldid_map_table_reg1 (high)

Bits	Field name	Description	Type	Reset
63	valid_cxha3	Specifies CXHA 3 programming is valid	RW	1'h0
62:55	Reserved	Reserved	RO	-
54:48	starting_ldid_cxha3	Specifies the starting LDID for RN-F's behind CXHA 3	RW	7'h0
47:43	Reserved	Reserved	RO	-
42:32	srcid_cxha3	Specifies the node ID for CXHA 3	RW	11'h0

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The following image shows the lower register bit assignments.

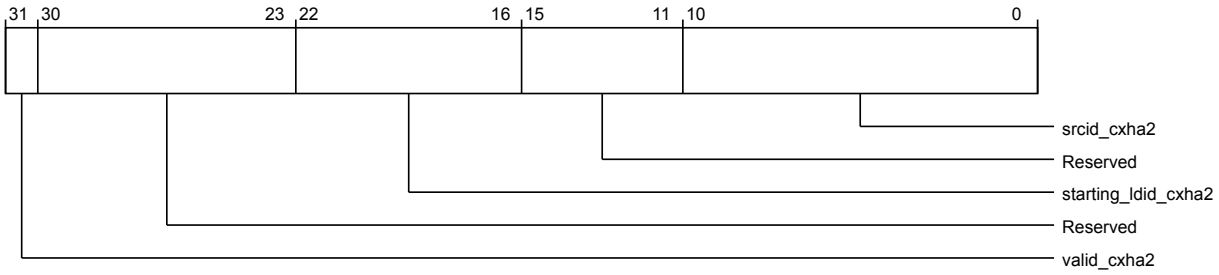

Figure 3-565 por_hnf_ldid_map_table_reg1 (low)

The following table shows the por_hnf_ldid_map_table_reg1 lower register bit assignments.

Table 3-579 por_hnf_ldid_map_table_reg1 (low)

Bits	Field name	Description	Type	Reset
31	valid_cxha2	Specifies CXHA 2 programming is valid	RW	1'h0
30:23	Reserved	Reserved	RO	-
22:16	starting_ldid_cxha2	Specifies the starting LDID for RN-F's behind CXHA 2	RW	7'h0
15:11	Reserved	Reserved	RO	-
10:0	srcid_cxha2	Specifies the node ID for CXHA 2	RW	11'h0

por_hnf_ldid_map_table_reg2

Configures LDID start pointer for remote RN-F's behind each CXG

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hFA8

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

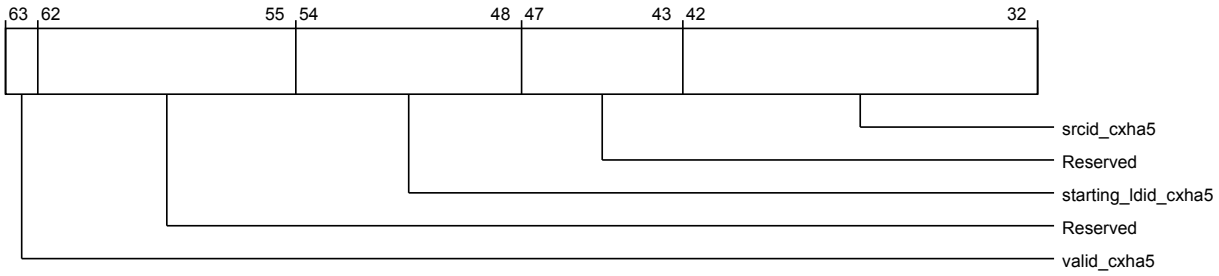

Figure 3-566 por_hnf_ldid_map_table_reg2 (high)

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The following table shows the por_hnf_ldid_map_table_reg2 higher register bit assignments.

Table 3-580 por_hnf_ldid_map_table_reg2 (high)

Bits	Field name	Description	Type	Reset
63	valid_cxha5	Specifies CXHA 5 programming is valid	RW	1'h0
62:55	Reserved	Reserved	RO	-
54:48	starting_ldid_cxha5	Specifies the starting LDID for RN-F's behind CXHA 5	RW	7'h0
47:43	Reserved	Reserved	RO	-
42:32	srcid_cxha5	Specifies the node ID for CXHA 5	RW	11'h0

The following image shows the lower register bit assignments.

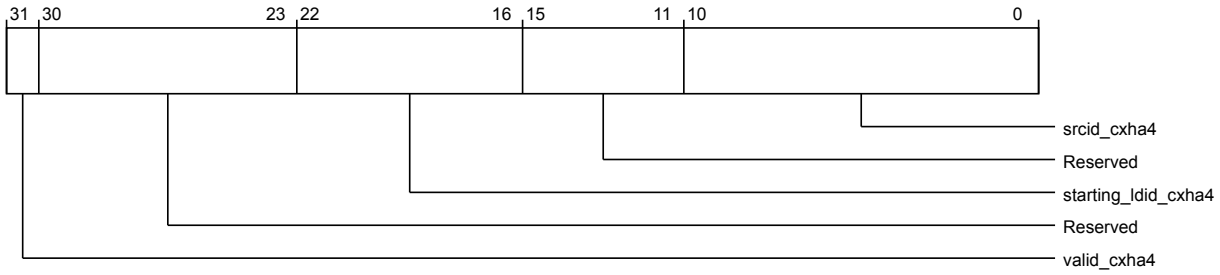

Figure 3-567 por_hnf_ldid_map_table_reg2 (low)

The following table shows the por_hnf_ldid_map_table_reg2 lower register bit assignments.

Table 3-581 por_hnf_ldid_map_table_reg2 (low)

Bits	Field name	Description	Type	Reset
31	valid_cxha4	Specifies CXHA 4 programming is valid	RW	1'h0
30:23	Reserved	Reserved	RO	-
22:16	starting_ldid_cxha4	Specifies the starting LDID for RN-F's behind CXHA 4	RW	7'h0
15:11	Reserved	Reserved	RO	-
10:0	srcid_cxha4	Specifies the node ID for CXHA 4	RW	11'h0

por_hnf_ldid_map_table_reg3

Configures LDID start pointer for remote RN-F's behind each CXG

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hFB0

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

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Secure group override por_hnf_secure_register_groups_override.sam_control

The following image shows the higher register bit assignments.

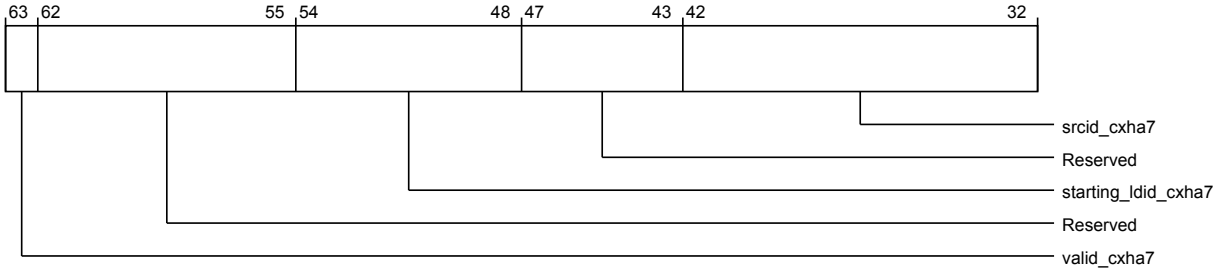

Figure 3-568 por_hnf_ldid_map_table_reg3 (high)

The following table shows the por_hnf_ldid_map_table_reg3 higher register bit assignments.

Table 3-582 por_hnf_ldid_map_table_reg3 (high)

Bits	Field name	Description	Type	Reset
63	valid_cxha7	Specifies CXHA 7 programming is valid	RW	1'h0
62:55	Reserved	Reserved	RO	-
54:48	starting_ldid_cxha7	Specifies the starting LDID for RN-F's behind CXHA 7	RW	7'h0
47:43	Reserved	Reserved	RO	-
42:32	srcid_cxha7	Specifies the node ID for CXHA 7	RW	11'h0

The following image shows the lower register bit assignments.

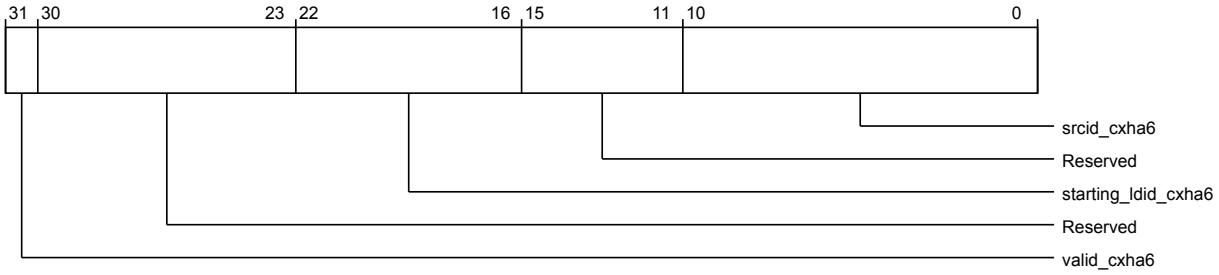

Figure 3-569 por_hnf_ldid_map_table_reg3 (low)

The following table shows the por_hnf_ldid_map_table_reg3 lower register bit assignments.

Table 3-583 por_hnf_ldid_map_table_reg3 (low)

Bits	Field name	Description	Type	Reset
31	valid_cxha6	Specifies CXHA 6 programming is valid	RW	1'h0
30:23	Reserved	Reserved	RO	-
22:16	starting_ldid_cxha6	Specifies the starting LDID for RN-F's behind CXHA 6	RW	7'h0

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Table 3-583 por_hnf_ldid_map_table_reg3 (low) (continued)

Bits	Field name	Description	Type	Reset
15:11	Reserved	Reserved	RO	-
10:0	srcid_cxha6	Specifies the node ID for CXHA 6	RW	11'h0

por_hnf_cfg_slcsf_dbgrd

Controls access modes for SLC tasg, SLC data, and SF tag debug read.

Its characteristics are:

Type WO

Register width (Bits) 64

Address offset 14'hB80

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.slcsf_dbgrd

The following image shows the higher register bit assignments.

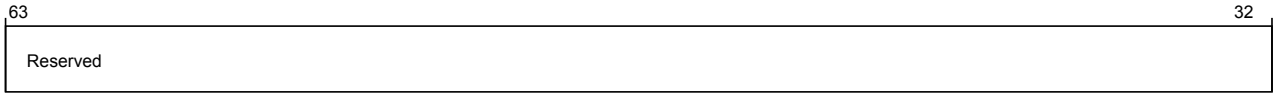

Figure 3-570 por_hnf_cfg_slcsf_dbgrd (high)

The following table shows the por_hnf_cfg_slcsf_dbgrd higher register bit assignments.

Table 3-584 por_hnf_cfg_slcsf_dbgrd (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

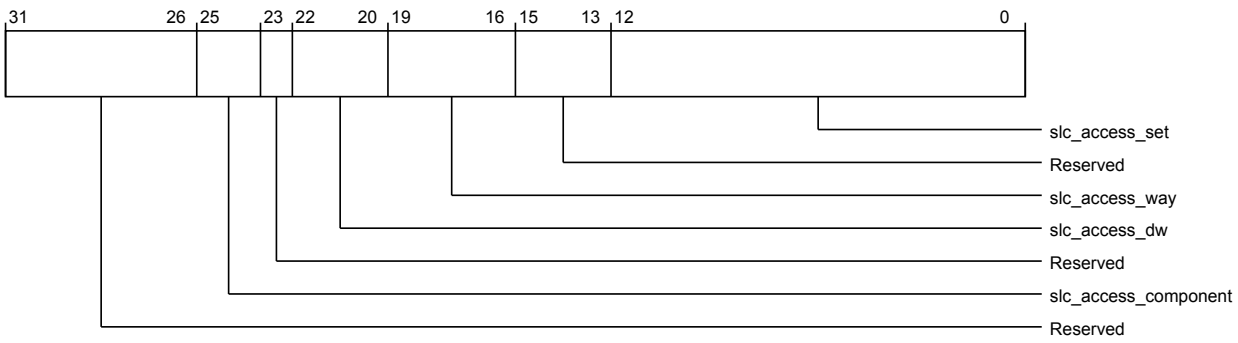

Figure 3-571 por_hnf_cfg_slcsf_dbgrd (low)

The following table shows the por_hnf_cfg_slcsf_dbgrd lower register bit assignments.

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Table 3-585 por_hnf_cfg_slcsf_dbgrd (low)

Bits	Field name	Description	Type	Reset
31:26	Reserved	Reserved	RO	-
25:24	slc_access_component	Specifies SLC/SF array debug read 2'b01: SLC data read 2'b10: SLC tag read 2'b11: SF tag read	WO	2'b00
23	Reserved	Reserved	RO	-
22:20	slc_access_dw	64-bit chunk address for SLC data debug read access	WO	3'h0
19:16	slc_access_way	Way address for SLC/SF debug read access	WO	4'h0
15:13	Reserved	Reserved	RO	-
12:0	slc_access_set	Set address for SLC/SF debug read access	WO	13'h0

por_hnf_slc_cache_access_slc_tag

Contains SLC tag debug read data.

Its characteristics are:

Type RO

Register width (Bits) 64

Address offset 14'hB88

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.slcsf_dbgrd

The following image shows the higher register bit assignments.

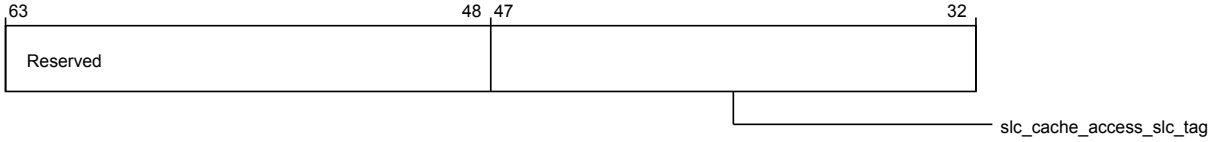

Figure 3-572 por_hnf_slc_cache_access_slc_tag (high)

The following table shows the por_hnf_slc_cache_access_slc_tag higher register bit assignments.

Table 3-586 por_hnf_slc_cache_access_slc_tag (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	slc_cache_access_slc_tag	SLC tag debug read data	RO	48'h0

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The following image shows the lower register bit assignments.

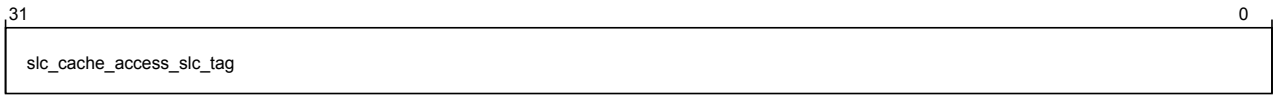

Figure 3-573 por_hnf_slc_cache_access_slc_tag (low)

The following table shows the por_hnf_slc_cache_access_slc_tag lower register bit assignments.

Table 3-587 por_hnf_slc_cache_access_slc_tag (low)

Bits	Field name	Description	Type	Reset
31:0	slc_cache_access_slc_tag	SLC tag debug read data	RO	48'h0

por_hnf_slc_cache_access_slc_data

Contains SLC data RAM debug read data.

Its characteristics are:

Type RO

Register width (Bits) 64

Address offset 14'hB90

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.slcsf_dbgrd

The following image shows the higher register bit assignments.

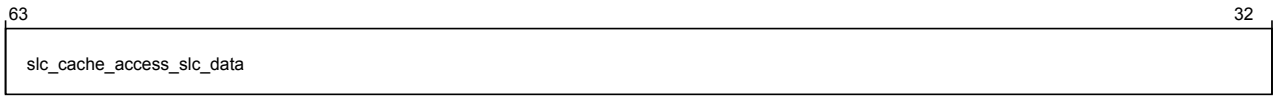

Figure 3-574 por_hnf_slc_cache_access_slc_data (high)

The following table shows the por_hnf_slc_cache_access_slc_data higher register bit assignments.

Table 3-588 por_hnf_slc_cache_access_slc_data (high)

Bits	Field name	Description	Type	Reset
63:32	slc_cache_access_slc_data	SLC data RAM debug read data	RO	64'h0

The following image shows the lower register bit assignments.

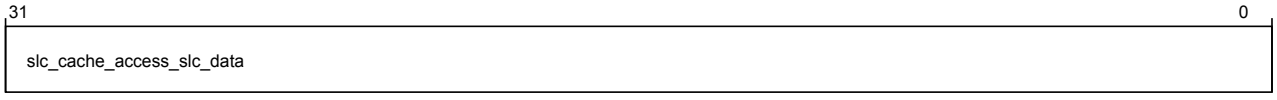

Figure 3-575 por_hnf_slc_cache_access_slc_data (low)

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The following table shows the por_hnf_slc_cache_access_slc_data lower register bit assignments.

Table 3-589 por_hnf_slc_cache_access_slc_data (low)

Bits	Field name	Description	Type	Reset
31:0	slc_cache_access_slc_data	SLC data RAM debug read data	RO	64'h0

por_hnf_slc_cache_access_sf_tag

Contains SF tag debug read data. Bits[63:0]

Its characteristics are:

Type RO

Register width (Bits) 64

Address offset 14'hB98

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.slcsf_dbgrd

The following image shows the higher register bit assignments.

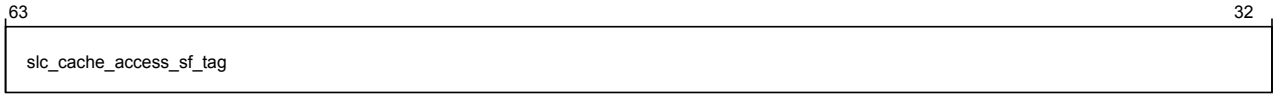

Figure 3-576 por_hnf_slc_cache_access_sf_tag (high)

The following table shows the por_hnf_slc_cache_access_sf_tag higher register bit assignments.

Table 3-590 por_hnf_slc_cache_access_sf_tag (high)

Bits	Field name	Description	Type	Reset
63:32	slc_cache_access_sf_tag	SF tag debug read data	RO	64'h0

The following image shows the lower register bit assignments.

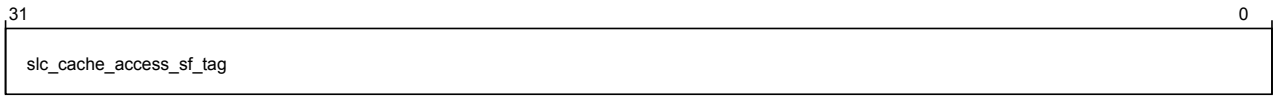

Figure 3-577 por_hnf_slc_cache_access_sf_tag (low)

The following table shows the por_hnf_slc_cache_access_sf_tag lower register bit assignments.

Table 3-591 por_hnf_slc_cache_access_sf_tag (low)

Bits	Field name	Description	Type	Reset
31:0	slc_cache_access_sf_tag	SF tag debug read data	RO	64'h0

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por_hnf_slc_cache_access_sf_tag1

Contains SF tag debug read data bits [127:64], when present in SF Tag

Its characteristics are:

Type RO

Register width (Bits) 64

Address offset 14'hBA0

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.slcsf_dbgrd

The following image shows the higher register bit assignments.

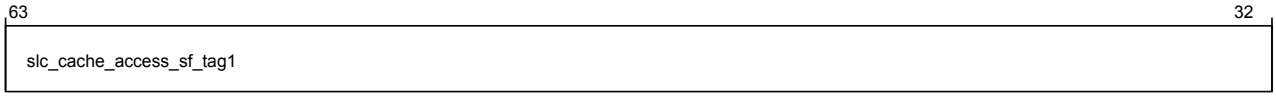

Figure 3-578 por_hnf_slc_cache_access_sf_tag1 (high)

The following table shows the por_hnf_slc_cache_access_sf_tag1 higher register bit assignments.

Table 3-592 por_hnf_slc_cache_access_sf_tag1 (high)

Bits	Field name	Description	Type	Reset
63:32	slc_cache_access_sf_tag1	SF tag debug read data	RO	64'h0

The following image shows the lower register bit assignments.

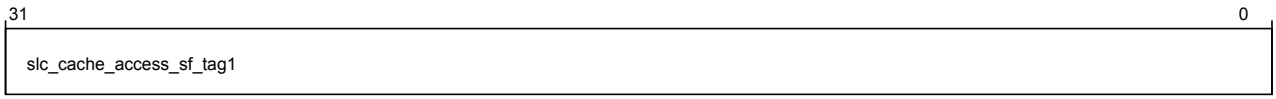

Figure 3-579 por_hnf_slc_cache_access_sf_tag1 (low)

The following table shows the por_hnf_slc_cache_access_sf_tag1 lower register bit assignments.

Table 3-593 por_hnf_slc_cache_access_sf_tag1 (low)

Bits	Field name	Description	Type	Reset
31:0	slc_cache_access_sf_tag1	SF tag debug read data	RO	64'h0

por_hnf_slc_cache_access_sf_tag2

Contains SF tag debug read data bits [128:191], when present in SF Tag

Its characteristics are:

Type RO

Register width (Bits) 64

Address offset 14'hBA8

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_hnf_secure_register_groups_override.slcsf_dbgrd

The following image shows the higher register bit assignments.

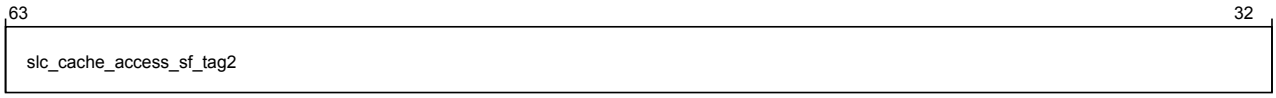

Figure 3-580 por_hnf_slc_cache_access_sf_tag2 (high)

The following table shows the por_hnf_slc_cache_access_sf_tag2 higher register bit assignments.

Table 3-594 por_hnf_slc_cache_access_sf_tag2 (high)

Bits	Field name	Description	Type	Reset
63:32	slc_cache_access_sf_tag2	SF tag debug read data	RO	64'h0

The following image shows the lower register bit assignments.

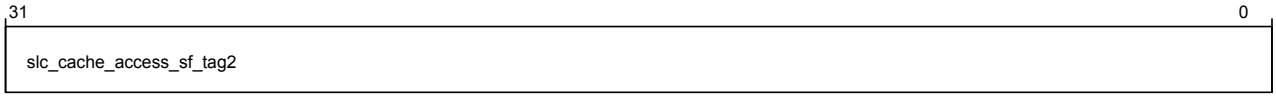

Figure 3-581 por_hnf_slc_cache_access_sf_tag2 (low)

The following table shows the por_hnf_slc_cache_access_sf_tag2 lower register bit assignments.

Table 3-595 por_hnf_slc_cache_access_sf_tag2 (low)

Bits	Field name	Description	Type	Reset
31:0	slc_cache_access_sf_tag2	SF tag debug read data	RO	64'h0

por_hnf_pmu_event_sel

Specifies the PMU event to be counted.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h2000

Register reset 64'b0

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

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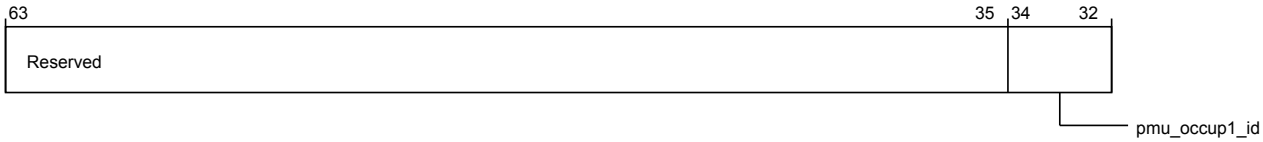

Figure 3-582 por_hnf_pmu_event_sel (high)

The following table shows the por_hnf_pmu_event_sel higher register bit assignments.

Table 3-596 por_hnf_pmu_event_sel (high)

Bits	Field name	Description	Type	Reset
63:35	Reserved	Reserved	RO	-
34:32	pmu_occup1_id	HN-F PMU occupancy 1 select 3'b000: All occupancy selected 3'b001: Read requests 3'b010: Write requests 3'b011: Atomic operation requests 3'b100: Stash requests	RW	3'h0

The following image shows the lower register bit assignments.

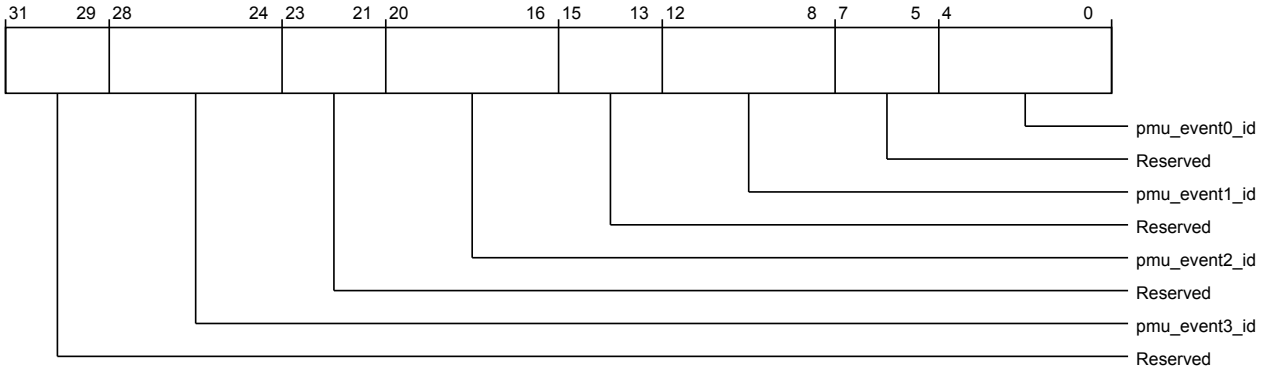

Figure 3-583 por_hnf_pmu_event_sel (low)

The following table shows the por_hnf_pmu_event_sel lower register bit assignments.

Table 3-597 por_hnf_pmu_event_sel (low)

Bits	Field name	Description	Type	Reset
31:29	Reserved	Reserved	RO	-
28:24	pmu_event3_id	HN-F PMU Event 3 select; see pmu_event0_id for encodings	RW	5'h00
23:21	Reserved	Reserved	RO	-
20:16	pmu_event2_id	HN-F PMU Event 2 select; see pmu_event0_id for encodings	RW	5'h00
15:13	Reserved	Reserved	RO	-

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Table 3-597 por_hnf_pmu_event_sel (low) (continued)

Bits	Field name	Description	Type	Reset
12:8	pmu_event1_id	HN-F PMU Event 1 select; see pmu_event0_id for encodings	RW	5'h00
7:5	Reserved	Reserved	RO	-

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Table 3-597 por_hnf_pmu_event_sel (low) (continued)

Bits	Field name	Description	Type	Reset
4:0	pmu_event0_id	HN-F PMU Event 0 select 5'h00: No event 5'h01: PMU_HN_CACHE_MISS_EVENT; counts total cache misses in first lookup result (high priority) 5'h02: PMU_HNSLC_SF_CACHE_ACCESS_EVENT; counts number of cache accesses in first access (high priority) 5'h03: PMU_HN_CACHE_FILL_EVENT; counts total allocations in HN SLC (all cache line allocations to SLC) 5'h04: PMU_HN_POCQ_RETRY_EVENT; counts number of retried requests 5'h05: PMU_HN_POCQ_REQS_RECVD_EVENT; counts number of requests received by HN 5'h06: PMU_HN_SF_HIT_EVENT; counts number of SF hits 5'h07: PMU_HN_SF_EVICTIONS_EVENT; counts number of SF eviction cache invalidations initiated 5'h08: PMU_HN_DIR_SNOOPS_SENT_EVENT; counts number of directed snoops sent (not including SF back invalidation) 5'h09: PMU_HN_DIR_SNOOPS_SENTEVENT; counts number of multicast snoops send (not including SF back invalidation) 5'h0A: PMU_HN_SLC_EVICTION_EVENT; counts number of SLC evictions (dirty only) 5'h0B: PMU_HN_SLC_FILL_INVALID_WAY_EVENT; counts number of SLC fills to an invalid way 5'h0C: PMU_HN_MC_RETRIES_EVENT; counts number of retried transactions by the MC 5'h0D: PMU_HN_MC_REQS_EVENT; counts number of requests sent to MC 5'h0E: PMU_HN_QOS_HH_RETRY_EVENT; counts number of times a HighHigh priority request is protocol retried at the HN-F 5'h0F: PMU_HNF_POCQ_OCCUPANCY_EVENT; counts the POCQ occupancy in HN-F; occupancy filtering is programmed in pmu_occup1_id 5'h10: PMU_HN_POCQ_ADDRHAZ_EVENT; counts number of POCQ address hazards upon allocation 5'h11: PMU_HN_POCQ_ATOMICS_ADDRHAZ_EVENT; counts number of POCQ address hazards upon allocation for atomic operations 5'h12: PMU_HN_LD_ST_SWP_ADQ_FULL_EVENT; counts number of times ADQ is full for Ld/St/SWP type atomic operations while POCQ has pending operations 5'h13: PMU_HN_CMP_ADQ_FULL_EVENT; counts number of times ADQ is full for CMP type atomic operations while POCQ has pending operations 5'h14: PMU_HN_TXDAT_STALL_EVENT; counts number of times HN-F has a pending TXDAT flit but no credits to upload 5'h15: PMU_HN_TXRSP_STALL_EVENT; counts number of times HN-F has a pending TXRSP flit but no credits to upload 5'h16: PMU_HN_SEQ_FULL_EVENT; counts number of times requests are replayed in SLC pipe due to SEQ being full	RW	5'h00

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Table 3-597 por_hnf_pmu_event_sel (low) (continued)

Bits	Field name	Description	Type	Reset
4:0	pmu_event0_id	5'h17: PMU_HN_SEQ_HIT_EVENT; counts number of times a request in SLC hit a pending SF eviction in SEQ 5'h18: PMU_HN_SNP_SENT_EVENT; counts number of snoops sent including directed/ multicast/SF back invalidation 5'h19: PMU_HN_SFBI_DIR_SNP_SENT_EVENT; counts number of times directed snoops were sent due to SF back invalidation 5'h1a: PMU_HN_SFBI_BRD_SNP_SENT_EVENT; counts number of times multicast snoops were sent due to SF back invalidation 5'h1b: PMU_HN_SNP_SENT_UNTRK_EVENT; counts number of times snooped were sent due to untracked RN-Fs 5'h1c: PMU_HN_INTV_DIRTY_EVENT; counts number of times SF back invalidation resulted in dirty line intervention from the RN 5'h1d: PMU_HN_STASH_SNP_SENT_EVENT; counts number of times stash snoops sent 5'h1e: PMU_HN_STASH_DATA_PULL_EVENT; counts number of times stash snoops resulted in data pull from the RN 5'h1f: PMU_HN_SNP_FWDED_EVENT; counts number of times data forward snoops sent	RW	5'h00

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3.3.5 HN-I register descriptions

This section lists the HN-I registers.

por_hni_node_info

Provides component identification information.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h0
Register reset Configuration dependent
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

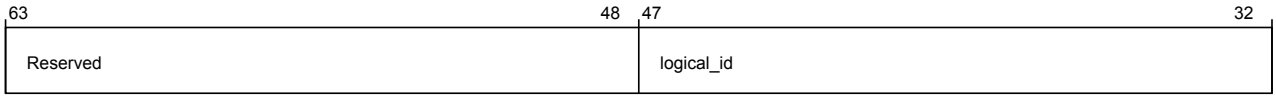

Figure 3-584 por_hni_node_info (high)

The following table shows the por_hni_node_info higher register bit assignments.

Table 3-598 por_hni_node_info (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	logical_id	Component logical ID	RO	Configuration dependent

The following image shows the lower register bit assignments.

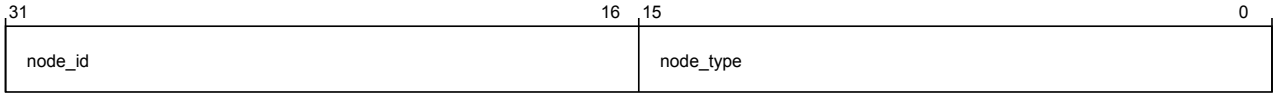

Figure 3-585 por_hni_node_info (low)

The following table shows the por_hni_node_info lower register bit assignments.

Table 3-599 por_hni_node_info (low)

Bits	Field name	Description	Type	Reset
31:16	node_id	Component node ID	RO	Configuration dependent
15:0	node_type	CMN-600 node type identifier	RO	16'h0004

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por_hni_child_info

Provides component child identification information.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h80
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

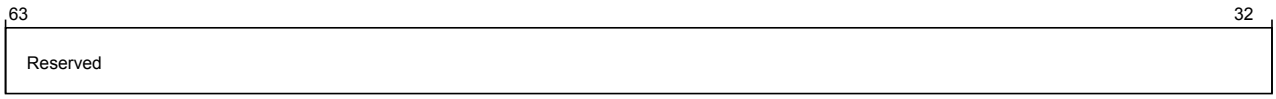

Figure 3-586 por_hni_child_info (high)

The following table shows the por_hni_child_info higher register bit assignments.

Table 3-600 por_hni_child_info (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

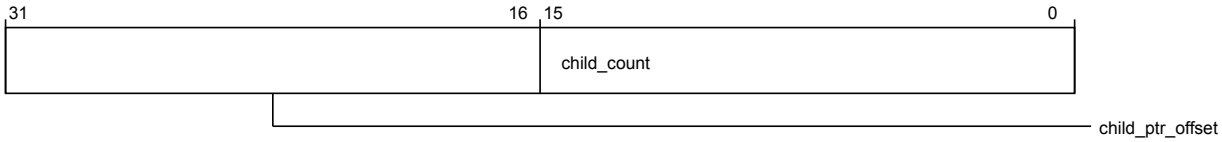

Figure 3-587 por_hni_child_info (low)

The following table shows the por_hni_child_info lower register bit assignments.

Table 3-601 por_hni_child_info (low)

Bits	Field name	Description	Type	Reset
31:16	child_ptr_offset	Starting register offset which contains pointers to the child nodes	RO	16'h0
15:0	child_count	Number of child nodes; used in discovery process	RO	16'b0

por_hni_secure_register_groups_override

Allows non-secure access to predefined groups of secure registers.

Its characteristics are:

Type RW
Register width (Bits) 64

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Address offset 14'h980

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

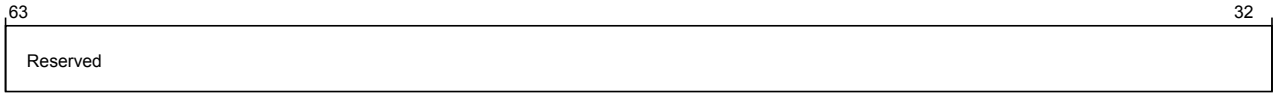

Figure 3-588 por_hni_secure_register_groups_override (high)

The following table shows the por_hni_secure_register_groups_override higher register bit assignments.

Table 3-602 por_hni_secure_register_groups_override (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

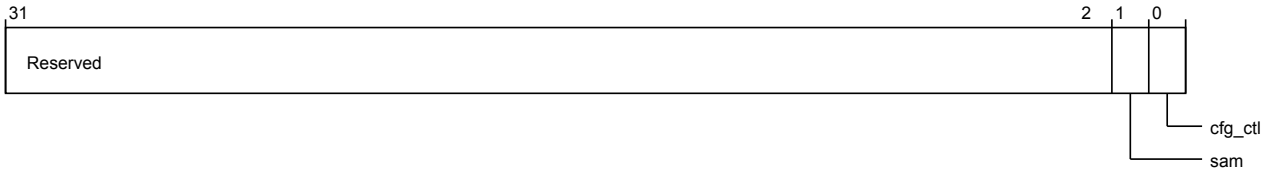

Figure 3-589 por_hni_secure_register_groups_override (low)

The following table shows the por_hni_secure_register_groups_override lower register bit assignments.

Table 3-603 por_hni_secure_register_groups_override (low)

Bits	Field name	Description	Type	Reset
31:2	Reserved	Reserved	RO	-
1	sam	Allows non-secure access to secure SAM registers	RW	1'b0
0	cfg_ctl	Allows non-secure access to secure configuration control register	RW	1'b0

por_hni_unit_info

Provides component identification information for HN-I.

Its characteristics are:

Type RO

Register width (Bits) 64

Address offset 14'h900

Register reset Configuration dependent

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Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

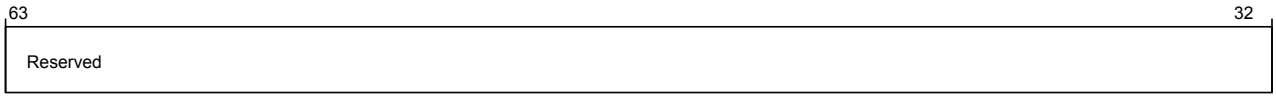

Figure 3-590 por_hni_unit_info (high)

The following table shows the por_hni_unit_info higher register bit assignments.

Table 3-604 por_hni_unit_info (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

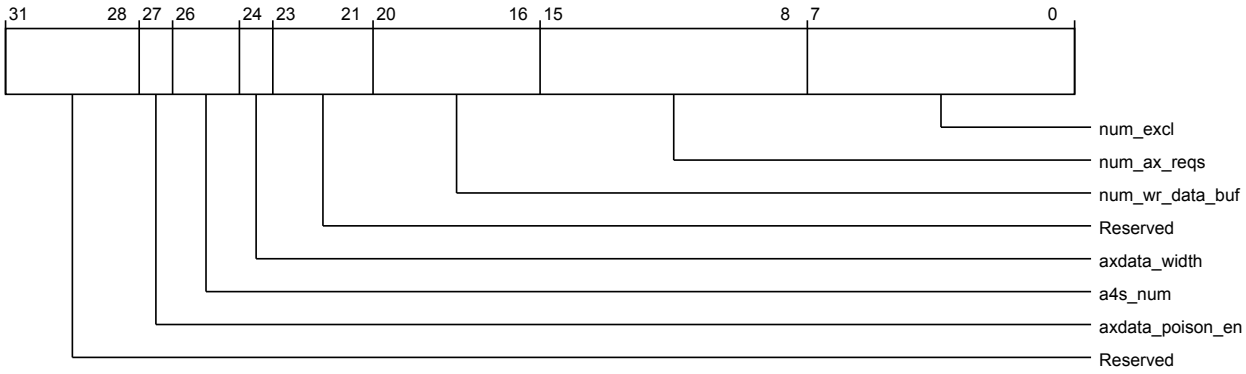

Figure 3-591 por_hni_unit_info (low)

The following table shows the por_hni_unit_info lower register bit assignments.

Table 3-605 por_hni_unit_info (low)

Bits	Field name	Description	Type	Reset
31:28	Reserved	Reserved	RO	-
27	axdata_poison_en	Data poison support on ACE-Lite/AXI4 interface 1'b0: Not supported 1'b1: Supported	RO	Configuration dependent
26:25	a4s_num	Number of AXI4Stream interfaces present	RO	Configuration dependent
24	axdata_width	Data width on ACE-Lite/AXI4 interface 1'b0: 128 bits 1'b1: 256 bits	RO	Configuration dependent
23:21	Reserved	Reserved	RO	-

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Table 3-605 por_hni_unit_info (low) (continued)

Bits	Field name	Description	Type	Reset
20:16	num_wr_data_buf	Number of write data buffers in HN-I	RO	Configuration dependent
15:8	num_ax_reqs	Maximum number of outstanding ACE-Lite/AXI4 requests	RO	Configuration dependent
7:0	num_excl	Number of exclusive monitors in HN-I	RO	Configuration dependent

por_hni_sam_addrregion0_cfg

Configures Address Region 0.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC00

Register reset 64'b11000111111

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_hni_secure_register_groups_override.sam

The following image shows the higher register bit assignments.

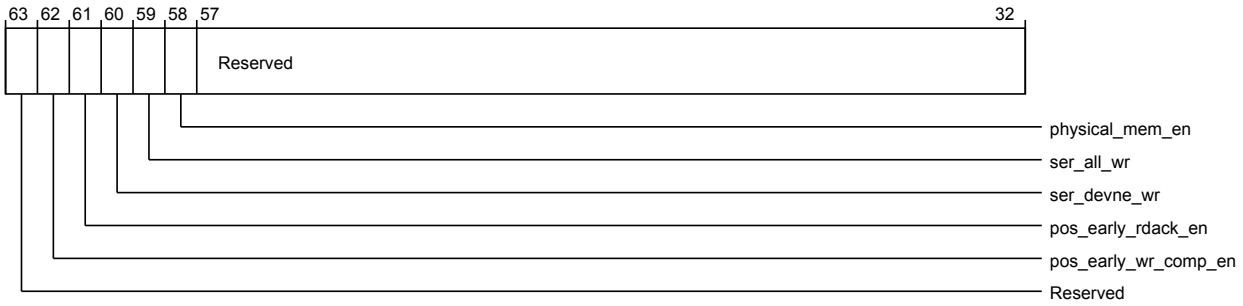

Figure 3-592 por_hni_sam_addrregion0_cfg (high)

The following table shows the por_hni_sam_addrregion0_cfg higher register bit assignments.

Table 3-606 por_hni_sam_addrregion0_cfg (high)

Bits	Field name	Description	Type	Reset
63	Reserved	Reserved	RO	-
62	pos_early_wr_comp_en	Enables early write acknowledgment in Address Region 0; used to improve write performance	RW	1'b1
61	pos_early_rdack_en	Enables sending early read receipts from HN-I in Address Region 0; used to improve ordered read performance	RW	1'b1
60	ser_devne_wr	Used to serialize Device-nGnRnE writes within Address Region 0	RW	1'b0

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Table 3-606 por_hni_sam_addrregion0_cfg (high) (continued)

Bits	Field name	Description	Type	Reset
59	ser_all_wr	Used to serialize all writes within Address Region 0	RW	1'b0
58	physical_mem_en	Address Region 0 follows Arm Architecture Reference Manual physical memory ordering guarantees	RW	1'b0
57:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

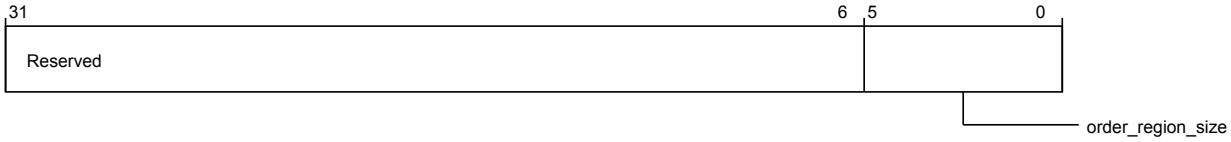

Figure 3-593 por_hni_sam_addrregion0_cfg (low)

The following table shows the por_hni_sam_addrregion0_cfg lower register bit assignments.

Table 3-607 por_hni_sam_addrregion0_cfg (low)

Bits	Field name	Description	Type	Reset
31:6	Reserved	Reserved	RO	-
5:0	order_region_size	<n>; used to calculate Order Region 0 size within Address Region 0 (2^n*4KB)	RW	6'b111111

por_hni_sam_addrregion1_cfg

Configures Address Region 1.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC08

Register reset 64'b0110000000000000000000000000000000000000000000000000000000000000

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_hni_secure_register_groups_override.sam

The following image shows the higher register bit assignments.

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Figure 3-594 por_hni_sam_addrregion1_cfg (high)

The following table shows the por_hni_sam_addrregion1_cfg higher register bit assignments.

Table 3-608 por_hni_sam_addrregion1_cfg (high)

Bits	Field name	Description	Type	Reset
63	valid	Address Region 1 fields are programmed and valid	RW	1'h0
62	pos_early_wr_comp_en	Enables early write acknowledgment in Address Region 1; used to improve write performance	RW	1'b1
61	pos_early_rdack_en	Enables sending early read receipts from HN-I in Address Region 1; used to improve ordered read performance	RW	1'b1
60	ser_devne_wr	Used to serialize Device-nGnRnE writes within Address Region 1	RW	1'b0
59	ser_all_wr	Used to serialize all writes within Address Region 1	RW	1'b0
58	physical_mem_en	Address Region 1 follows Arm Architecture Reference Manual physical memory ordering guarantees	RW	1'b0
57:56	Reserved	Reserved	RO	-
55:32	base_addr	Address Region 1 base address; [address width-1:12] CONSTRAINT: Must be an integer multiple of the Address Region 1 size.	RW	36'h0

The following image shows the lower register bit assignments.

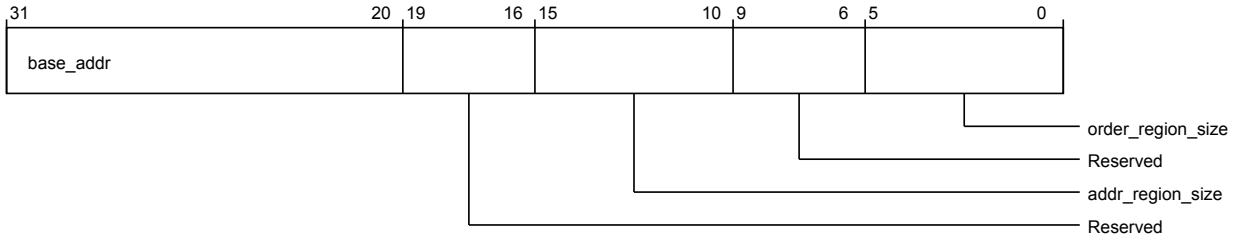

Figure 3-595 por_hni_sam_addrregion1_cfg (low)

The following table shows the por_hni_sam_addrregion1_cfg lower register bit assignments.

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Table 3-609 por_hni_sam_addrregion1_cfg (low)

Bits	Field name	Description	Type	Reset
31:20	base_addr	Address Region 1 base address; [address width-1:12] CONSTRAINT: Must be an integer multiple of the Address Region 1 size.	RW	36'h0
19:16	Reserved	Reserved	RO	-
15:10	addr_region_size	<n>; used to calculate Address Region 1 size (2^n*4KB) CONSTRAINT: <n> must be configured so that the Address Region 1 size is less than or equal to 2^(address width).	RW	6'h0
9:6	Reserved	Reserved	RO	-
5:0	order_region_size	<n>; used to calculate Order Region 1 size within Address Region 1 (2^n*4KB)	RW	6'h0

por_hni_sam_addrregion2_cfg

Configures Address Region 2.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC10

Register reset 64'b0110000000000000000000000000000000000000000000000000000000000000

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_hni_secure_register_groups_override.sam

The following image shows the higher register bit assignments.

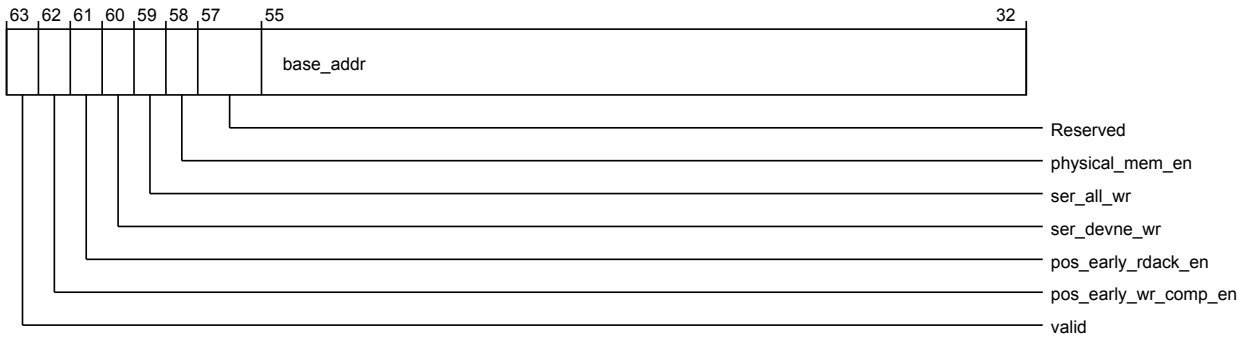

Figure 3-596 por_hni_sam_addrregion2_cfg (high)

The following table shows the por_hni_sam_addrregion2_cfg higher register bit assignments.

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Table 3-610 por_hni_sam_addrregion2_cfg (high)

Bits	Field name	Description	Type	Reset
63	valid	Address Region 2 fields are programmed and valid	RW	1'h0
62	pos_early_wr_comp_en	Enables early write acknowledgment in Address Region 2; used to improve write performance	RW	1'b1
61	pos_early_rdack_en	Enables sending early read receipts from HN-I in Address Region 2; used to improve ordered read performance	RW	1'b1
60	ser_devne_wr	Used to serialize Device-nGnRnE writes within Address Region 2	RW	1'b0
59	ser_all_wr	Used to serialize all writes within Address Region 2	RW	1'b0
58	physical_mem_en	Address Region 2 follows Arm Architecture Reference Manual physical memory ordering guarantees	RW	1'b0
57:56	Reserved	Reserved	RO	-
55:32	base_addr	Address Region 2 base address; [address width-1:12] CONSTRAINT: Must be an integer multiple of the Address Region 2 size	RW	36'h0

The following image shows the lower register bit assignments.

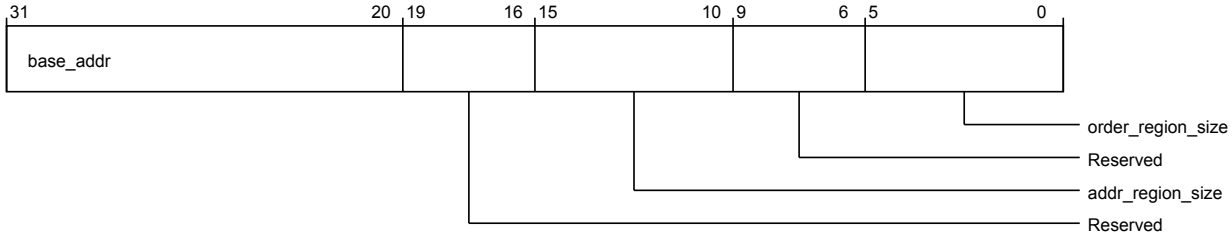

Figure 3-597 por_hni_sam_addrregion2_cfg (low)

The following table shows the por_hni_sam_addrregion2_cfg lower register bit assignments.

Table 3-611 por_hni_sam_addrregion2_cfg (low)

Bits	Field name	Description	Type	Reset
31:20	base_addr	Address Region 2 base address; [address width-1:12] CONSTRAINT: Must be an integer multiple of the Address Region 2 size	RW	36'h0
19:16	Reserved	Reserved	RO	-
15:10	addr_region_size	<n>; used to calculate Address Region 2 size (2^n*4KB) CONSTRAINT: <n> must be configured so that the Address Region 2 size is less than or equal to 2^(address width).	RW	6'h0
9:6	Reserved	Reserved	RO	-
5:0	order_region_size	<n>; used to calculate Order Region 2 size within Address Region 2 (2^n*4KB)	RW	6'h0

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por_hni_sam_addrregion3_cfg

Configures Address Region 3.

Its characteristics are:

Type	RW
Register width (Bits)	64
Address offset	14'hC18
Register reset	64'b0110000000000000000000000000000000000000000000000000000000000000
Usage constraints	Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.
Secure group override	por_hni_secure_register_groups_override.sam

The following image shows the higher register bit assignments.

Figure 3-598 por_hni_sam_addrregion3_cfg (high)

The following table shows the por_hni_sam_addrregion3_cfg higher register bit assignments.

Table 3-612 por_hni_sam_addrregion3_cfg (high)

Bits	Field name	Description	Type	Reset
63	valid	Fields of Address Region 3 are programmed and valid	RW	1'h0
62	pos_early_wr_comp_en	Enables early write acknowledgment in Address Region 3; used to improve write performance	RW	1'b1
61	pos_early_rdack_en	Enables sending early read receipts from HN-I in Address Region 3; used to improve ordered read performance	RW	1'b1
60	ser_devne_wr	Used to serialize Device-nGnRnE writes within Address Region 3	RW	1'b0
59	ser_all_wr	Used to serialize all writes within Address Region 3	RW	1'b0
58	physical_mem_en	Address Region 3 follows Arm Architecture Reference Manual physical memory ordering guarantees	RW	1'b0
57:56	Reserved	Reserved	RO	-
55:32	base_addr	Address Region 3 base address; [address width-1:12] CONSTRAINT: Must be an integer multiple of the Address Region 3 size	RW	36'h0

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The following image shows the lower register bit assignments.

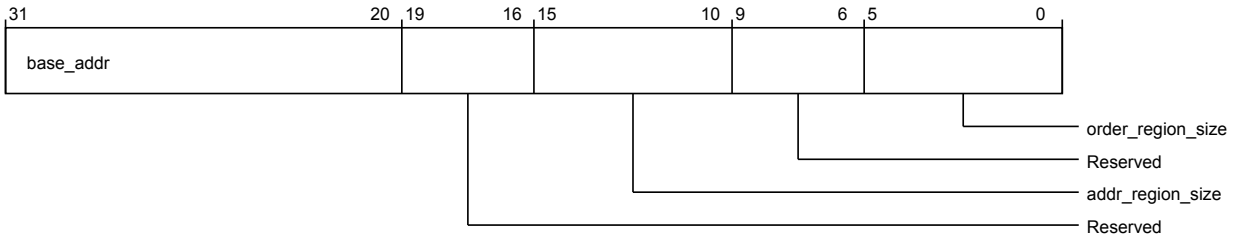

Figure 3-599 por_hni_sam_addrregion3_cfg (low)

The following table shows the por_hni_sam_addrregion3_cfg lower register bit assignments.

Table 3-613 por_hni_sam_addrregion3_cfg (low)

Bits	Field name	Description	Type	Reset
31:20	base_addr	Address Region 3 base address; [address width-1:12] CONSTRAINT: Must be an integer multiple of the Address Region 3 size	RW	36'h0
19:16	Reserved	Reserved	RO	-
15:10	addr_region_size	<n>; used to calculate Address Region 3 size (2^n*4KB) CONSTRAINT: <n> must be configured so that the Address Region 3 size is less than or equal to 2^(address width).	RW	6'h0
9:6	Reserved	Reserved	RO	-
5:0	order_region_size	<n>; used to calculate Order Region 3 size within Address Region 3 (2^n*4KB)	RW	6'h0

por_hni_cfg_ctl

Functions as the configuration control register for HN-I.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hA00

Register reset 64'b1

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_hni_secure_register_groups_override.cfg_ctl

The following image shows the higher register bit assignments.

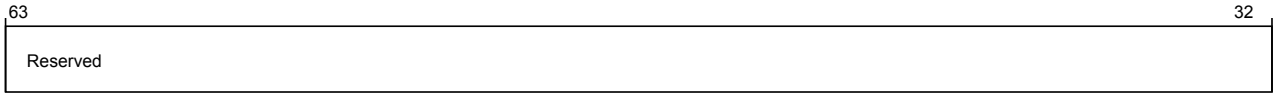

Figure 3-600 por_hni_cfg_ctl (high)

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The following table shows the por_hni_cfg_ctl higher register bit assignments.

Table 3-614 por_hni_cfg_ctl (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

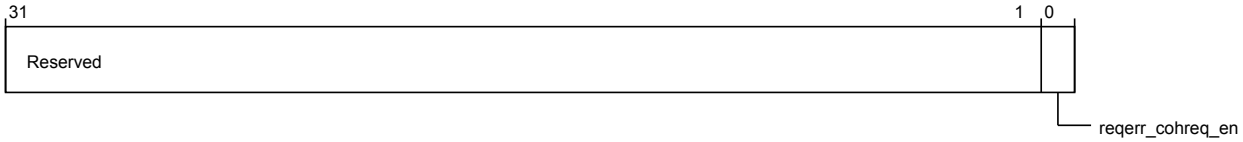

Figure 3-601 por_hni_cfg_ctl (low)

The following table shows the por_hni_cfg_ctl lower register bit assignments.

Table 3-615 por_hni_cfg_ctl (low)

Bits	Field name	Description	Type	Reset
31:1	Reserved	Reserved	RO	-
0	reqerr_cohreq_en	Enables sending of NDE response error to RN and logging of error information for the following requests: 1. Coherent Read 2. CleanUnique/MakeUnique 3. Coherent/CopyBack Write	RW	1'b1

por_hni_aux_ctl

Functions as the auxiliary control register for HN-I.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hA08

Register reset 64'b0

Usage constraints Only accessible by secure accesses. This register can be modified only with prior written permission from Arm.

The following image shows the higher register bit assignments.

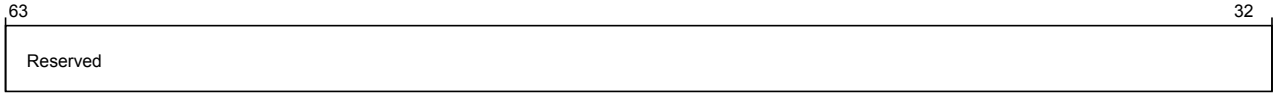

Figure 3-602 por_hni_aux_ctl (high)

The following table shows the por_hni_aux_ctl higher register bit assignments.

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Table 3-616 por_hni_aux_ctl (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

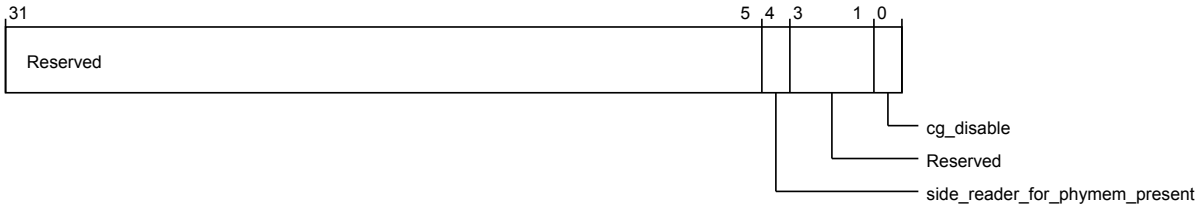

Figure 3-603 por_hni_aux_ctl (low)

The following table shows the por_hni_aux_ctl lower register bit assignments.

Table 3-617 por_hni_aux_ctl (low)

Bits	Field name	Description	Type	Reset
31:5	Reserved	Reserved	RO	-
4	side_reader_for_phymem_present	Enables side reader in physical memory range	RW	1'b0
3:1	Reserved	Reserved	RO	-
0	cg_disable	Disables HN-I architectural clock gates	RW	1'b0

por_hni_errfr

Functions as the error feature register.

Its characteristics are:

Type RO

Register width (Bits) 64

Address offset 14'h3000

Register reset 64'b0000010100101

Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

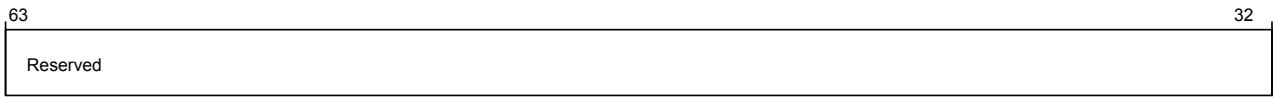

Figure 3-604 por_hni_errfr (high)

The following table shows the por_hni_errfr higher register bit assignments.

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Table 3-618 por_hni_errfr (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

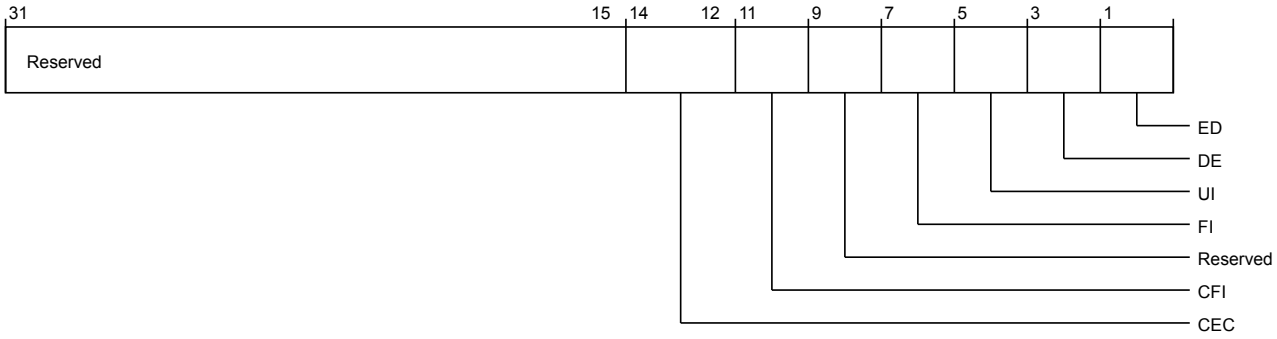

Figure 3-605 por_hni_errfr (low)

The following table shows the por_hni_errfr lower register bit assignments.

Table 3-619 por_hni_errfr (low)

Bits	Field name	Description	Type	Reset
31:15	Reserved	Reserved	RO	-
14:12	CEC	Standard corrected error count mechanism 3'b000: Does not implement standardized error counter model	RO	3'b000
11:10	CFI	Corrected error interrupt	RO	2'b00
9:8	Reserved	Reserved	RO	-
7:6	FI	Fault handling interrupt	RO	2'b10
5:4	UI	Uncorrected error interrupt	RO	2'b10
3:2	DE	Deferred errors	RO	2'b01
1:0	ED	Error detection	RO	2'b01

por_hni_errctlr

Functions as the error control register. Controls whether specific error-handling interrupts and error detection/deferment are enabled.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h3008

Register reset 64'b0

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Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

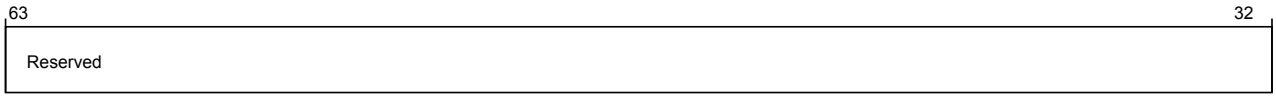

Figure 3-606 por_hni_errctlr (high)

The following table shows the por_hni_errctlr higher register bit assignments.

Table 3-620 por_hni_errctlr (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

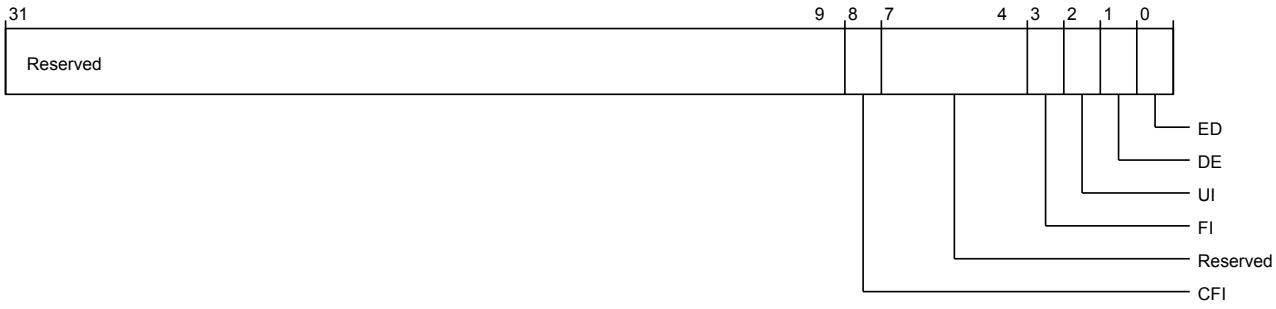

Figure 3-607 por_hni_errctlr (low)

The following table shows the por_hni_errctlr lower register bit assignments.

Table 3-621 por_hni_errctlr (low)

Bits	Field name	Description	Type	Reset
31:9	Reserved	Reserved	RO	-
8	CFI	Enables corrected error interrupt as specified in por_hni_errfr.CFI	RW	1'b0
7:4	Reserved	Reserved	RO	-
3	FI	Enables fault handling interrupt for all detected deferred errors as specified in por_hni_errfr.FI	RW	1'b0
2	UI	Enables uncorrected error interrupt as specified in por_hni_errfr.UI	RW	1'b0
1	DE	Enables error deferment as specified in por_hni_errfr.DE	RW	1'b0
0	ED	Enables error detection as specified in por_hni_errfr.ED	RW	1'b0

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por_hni_errstatus

Functions as the error status register. AV and MV bits must be cleared in the same cycle, otherwise the error record does not have a consistent view.

Its characteristics are:

Type W1C

Register width (Bits) 64

Address offset 14'h3010

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

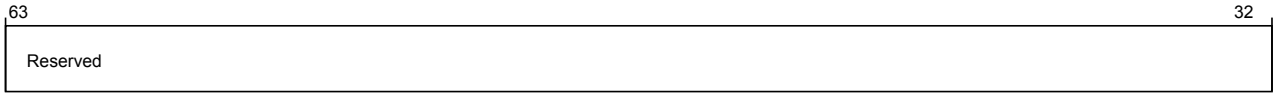

Figure 3-608 por_hni_errstatus (high)

The following table shows the por_hni_errstatus higher register bit assignments.

Table 3-622 por_hni_errstatus (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

Figure 3-609 por_hni_errstatus (low)

The following table shows the por_hni_errstatus lower register bit assignments.

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Table 3-623 por_hni_errstatus (low)

Bits	Field name	Description	Type	Reset
31	AV	Address register valid; writes to this bit are ignored if any of the UE, DE, or CE bits are set to 1, and the highest priority are not cleared to 0 in the same write; write a 1 to clear 1'b1: Address is valid; por_hni_erraddr contains a physical address for that recorded error 1'b0: Address is not valid	W1C	1'b0
30	V	Register valid; writes to this bit are ignored if any of the UE, DE, or CE bits are set to 1, and are not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one error recorded; register is valid 1'b0: No errors recorded	W1C	1'b0
29	UE	Uncorrected errors; writes to this bit are ignored if the OF bit is set to 1, and is not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one error detected that is not corrected and is not deferred to a slave 1'b0: No uncorrected errors detected	W1C	1'b0
28	Reserved	Reserved	RO	-
27	OF	Overflow; asserted when multiple errors of the highest priority type are detected; write a 1 to clear 1'b1: More than one error detected 1'b0: Only one error of the highest priority type detected as described by UE/DE/CE fields	W1C	1'b0
26	MV	por_hni_errmisc valid; writes to this bit are ignored if any of the UE, DE, or CE bits are set to 1, and the highest priority are not cleared to 0 in the same write; write a 1 to clear 1'b1: Miscellaneous registers are valid 1'b0: Miscellaneous registers are not valid	W1C	1'b0
25	Reserved	Reserved	RO	-
24	CE	Corrected errors; writes to this bit are ignored if the OF bit is set to 1, and is not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one transient corrected error recorded 1'b0: No corrected errors recorded	W1C	1'b0
23	DE	Deferred errors; writes to this bit are ignored if the OF bit is set to 1, and is not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one error is not corrected and is deferred 1'b0: No errors deferred	W1C	1'b0
22:0	Reserved	Reserved	RO	-

por_hni_erraddr

Contains the error record address.

Its characteristics are:

Type RW

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Register width (Bits) 64

Address offset 14'h3018

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

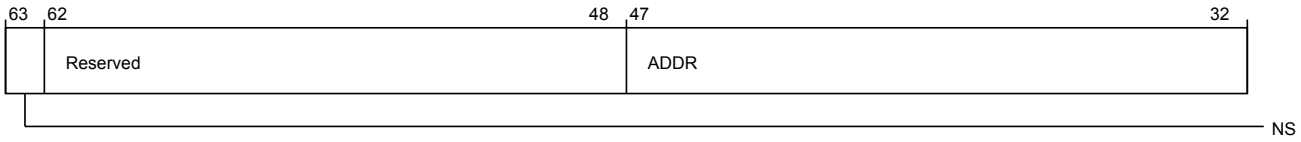

Figure 3-610 por_hni_erraddr (high)

The following table shows the por_hni_erraddr higher register bit assignments.

Table 3-624 por_hni_erraddr (high)

Bits	Field name	Description	Type	Reset
63	NS	Security status of transaction 1'b1: Non-secure transaction 1'b0: Secure transaction CONSTRAINT: por_hni_erraddr.NS is redundant. Since it is writable, it cannot be used for logic qualification.	RW	1'b0
62:48	Reserved	Reserved	RO	-
47:32	ADDR	Transaction address	RW	48'b0

The following image shows the lower register bit assignments.

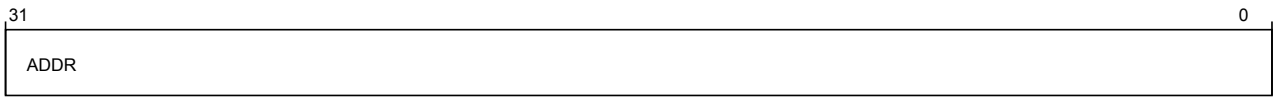

Figure 3-611 por_hni_erraddr (low)

The following table shows the por_hni_erraddr lower register bit assignments.

Table 3-625 por_hni_erraddr (low)

Bits	Field name	Description	Type	Reset
31:0	ADDR	Transaction address	RW	48'b0

por_hni_errmisc

Functions as the miscellaneous error register. Contains miscellaneous information about deferred/ uncorrected errors.

Its characteristics are:

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Type RW
Register width (Bits) 64
Address offset 14'h3020
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

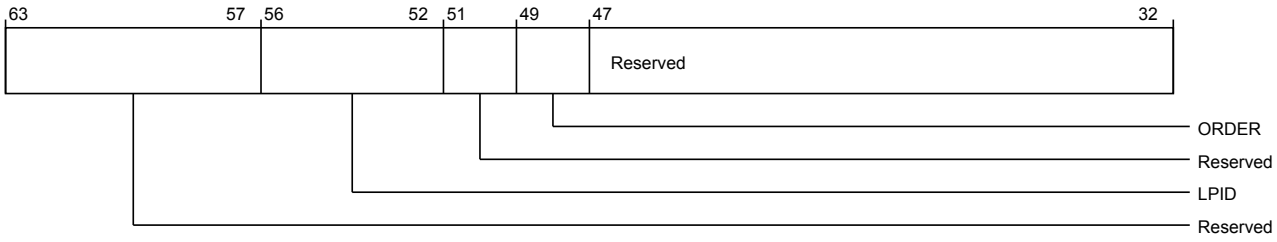

Figure 3-612 por_hni_errmisc (high)

The following table shows the por_hni_errmisc higher register bit assignments.

Table 3-626 por_hni_errmisc (high)

Bits	Field name	Description	Type	Reset
63:57	Reserved	Reserved	RO	-
56:52	LPID	Error logic processor ID	RW	5'b0
51:50	Reserved	Reserved	RO	-
49:48	ORDER	Error order	RW	4'b0
47:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

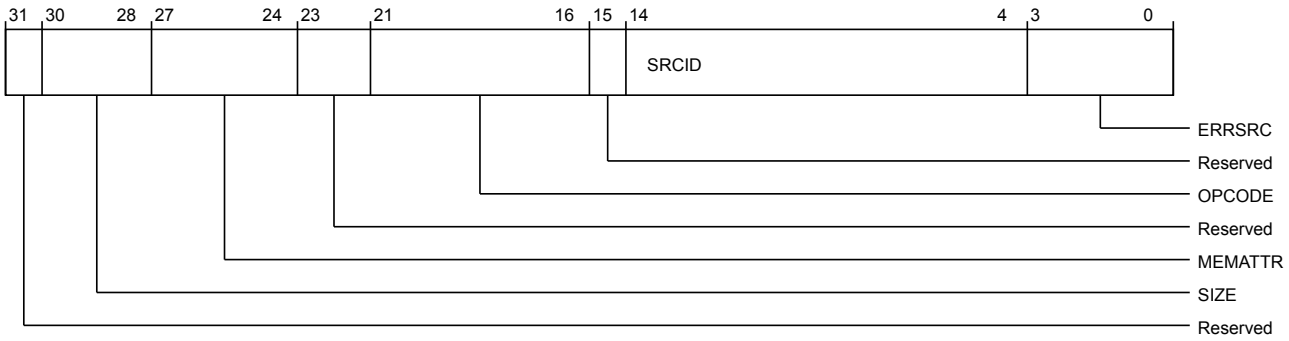

Figure 3-613 por_hni_errmisc (low)

The following table shows the por_hni_errmisc lower register bit assignments.

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Table 3-627 por_hni_errmisc (low)

Bits	Field name	Description	Type	Reset
31	Reserved	Reserved	RO	-
30:28	SIZE	Error transaction size	RW	3'b0
27:24	MEMATTR	Error memory attributes	RW	4'b0
23:22	Reserved	Reserved	RO	-
21:16	OPCODE	Error opcode	RW	6'b0
15	Reserved	Reserved	RO	-
14:4	SRCID	Error source ID	RW	11'b0
3:0	ERRSRC	Error source 4'b0000: Coherent read 4'b0001: Coherent write 4'b0010: CleanUnique/MakeUnique 4'b0011: Atomic 4'b0100: Illegal configuration read 4'b0101: Illegal configuration write 4'b0110: Configuration write data partial byte enable error 4'b0111: Configuration write data parity error or poison error 4'b1000: BRESP error 4'b1001: Poison error 4'b1010: BRESP error and poison error ——— **Note** ——— For configuration write data, BRESP, and poison errors, por_hni_errmisc.SRCID is the only valid field. For other error types, all fields are valid. ———	RW	4'b0

por_hni_errfr_NS

Functions as the non-secure error feature register.

Its characteristics are:

Type RO

Register width (Bits) 64

Address offset 14'h3100

Register reset 64'b0000010100101

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

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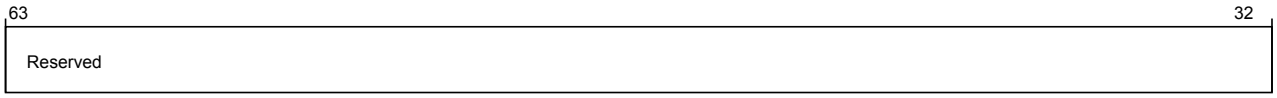

Figure 3-614 por_hni_errfr_ns (high)

The following table shows the por_hni_errfr_NS higher register bit assignments.

Table 3-628 por_hni_errfr_ns (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

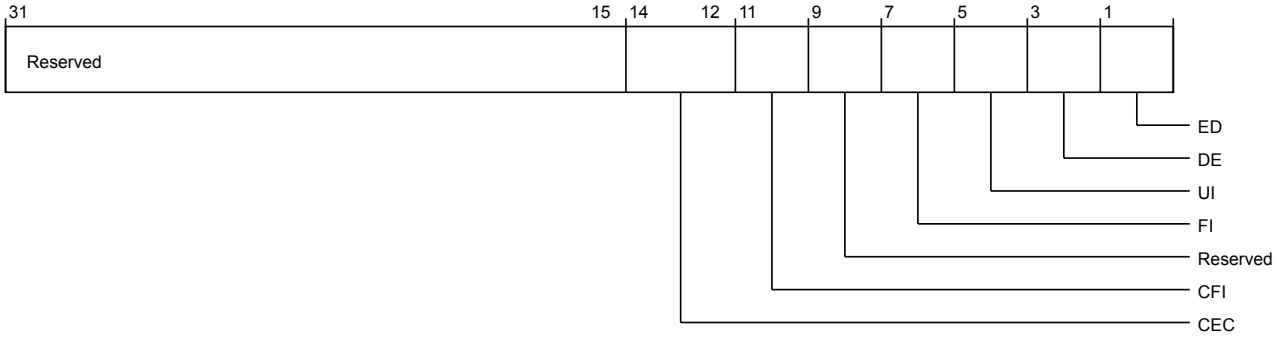

Figure 3-615 por_hni_errfr_ns (low)

The following table shows the por_hni_errfr_NS lower register bit assignments.

Table 3-629 por_hni_errfr_ns (low)

Bits	Field name	Description	Type	Reset
31:15	Reserved	Reserved	RO	-
14:12	CEC	Standard corrected error count mechanism 3'b000: Does not implement standardized error counter model	RO	3'b000
11:10	CFI	Corrected error interrupt	RO	2'b00
9:8	Reserved	Reserved	RO	-
7:6	FI	Fault handling interrupt	RO	2'b10
5:4	UI	Uncorrected error interrupt	RO	2'b10
3:2	DE	Deferred errors	RO	2'b01
1:0	ED	Error detection	RO	2'b01

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por_hni_errctlr_NS

Functions as the non-secure error control register. Controls whether specific error-handling interrupts and error detection/deferment are enabled.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h3108

Register reset 64'b0

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

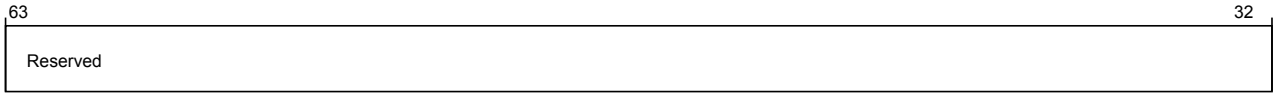

Figure 3-616 por_hni_errctlr_ns (high)

The following table shows the por_hni_errctlr_NS higher register bit assignments.

Table 3-630 por_hni_errctlr_ns (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

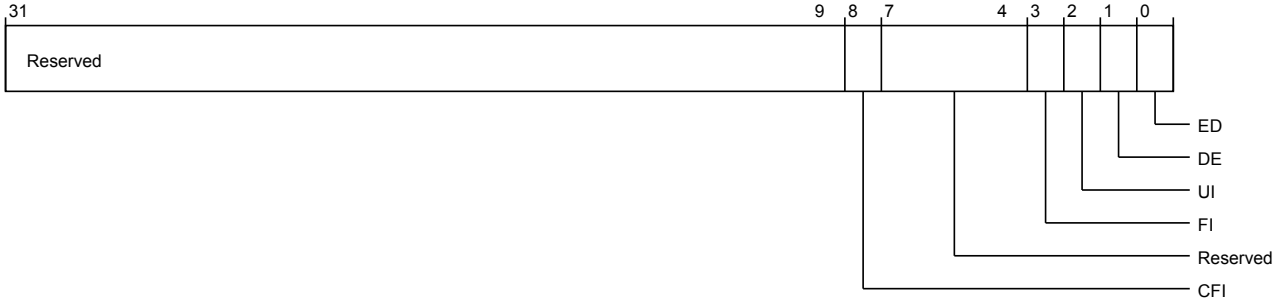

Figure 3-617 por_hni_errctlr_ns (low)

The following table shows the por_hni_errctlr_NS lower register bit assignments.

Table 3-631 por_hni_errctlr_ns (low)

Bits	Field name	Description	Type	Reset
31:9	Reserved	Reserved	RO	-
8	CFI	Enables corrected error interrupt as specified in por_hni_errfr_NS.CFI	RW	1'b0
7:4	Reserved	Reserved	RO	-

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Table 3-631 por_hni_errctlr_ns (low) (continued)

Bits	Field name	Description	Type	Reset
3	FI	Enables fault handling interrupt for all detected deferred errors as specified in por_hni_errfr_NS.FI	RW	1'b0
2	UI	Enables uncorrected error interrupt as specified in por_hni_errfr_NS.UI	RW	1'b0
1	DE	Enables error deferment as specified in por_hni_errfr_NS.DE	RW	1'b0
0	ED	Enables error detection as specified in por_hni_errfr_NS.ED	RW	1'b0

por_hni_errstatus_NS

Functions as the non-secure error status register.

Its characteristics are:

Type W1C
Register width (Bits) 64
Address offset 14'h3110
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

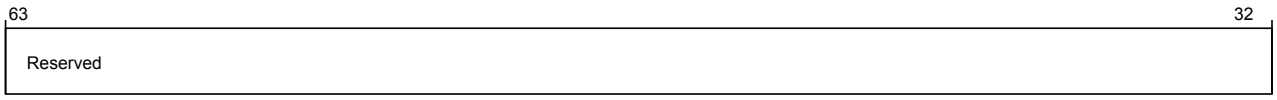

Figure 3-618 por_hni_errstatus_ns (high)

The following table shows the por_hni_errstatus_NS higher register bit assignments.

Table 3-632 por_hni_errstatus_ns (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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Figure 3-619 por_hni_errstatus_ns (low)

The following table shows the por_hni_errstatus_NS lower register bit assignments.

Table 3-633 por_hni_errstatus_ns (low)

Bits	Field name	Description	Type	Reset
31	AV	Address register valid; writes to this bit are ignored if any of the UE, DE, or CE bits are set to 1, and the highest priority are not cleared to 0 in the same write; write a 1 to clear 1'b1: Address is valid; por_hni_erraddr_NS contains a physical address for that recorded error 1'b0: Address is not valid	W1C	1'b0
30	V	Register valid; writes to this bit are ignored if any of the UE, DE, or CE bits are set to 1, and are not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one error recorded; register is valid 1'b0: No errors recorded	W1C	1'b0
29	UE	Uncorrected errors; writes to this bit are ignored if the OF bit is set to 1, and is not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one error detected that is not corrected and is not deferred to a slave 1'b0: No uncorrected errors detected	W1C	1'b0
28	Reserved	Reserved	RO	-
27	OF	Overflow; asserted when multiple errors of the highest priority type are detected; write a 1 to clear 1'b1: More than one error detected 1'b0: Only one error of the highest priority type detected as described by UE/DE/CE fields	W1C	1'b0
26	MV	por_hni_errmisc_NS valid; writes to this bit are ignored if any of the UE, DE, or CE bits are set to 1, and the highest priority are not cleared to 0 in the same write; write a 1 to clear 1'b1: Miscellaneous registers are valid 1'b0: Miscellaneous registers are not valid	W1C	1'b0
25	Reserved	Reserved	RO	-

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Table 3-633 por_hni_errstatus_ns (low) (continued)

Bits	Field name	Description	Type	Reset
24	CE	Corrected errors; writes to this bit are ignored if the OF bit is set to 1, and is not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one transient corrected error recorded 1'b0: No corrected errors recorded	W1C	1'b0
23	DE	Deferred errors; writes to this bit are ignored if the OF bit is set to 1, and is not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one error is not corrected and is deferred 1'b0: No errors deferred	W1C	1'b0
22:0	Reserved	Reserved	RO	-

por_hni_erraddr_NS

Contains the non-secure error record address.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h3118
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

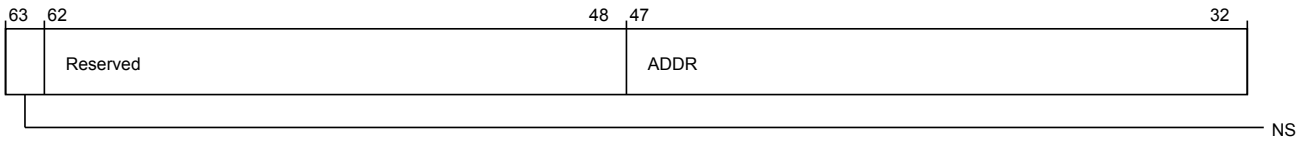

Figure 3-620 por_hni_erraddr_ns (high)

The following table shows the por_hni_erraddr_NS higher register bit assignments.

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Table 3-634 por_hni_erraddr_ns (high)

Bits	Field name	Description	Type	Reset
63	NS	Security status of transaction 1'b1: Non-secure transaction 1'b0: Secure transaction CONSTRAINT: por_hni_erraddr_NS.NS is redundant. Since it is writable, it cannot be used for logic qualification.	RW	1'b0
62:48	Reserved	Reserved	RO	-
47:32	ADDR	Transaction address	RW	48'b0

The following image shows the lower register bit assignments.

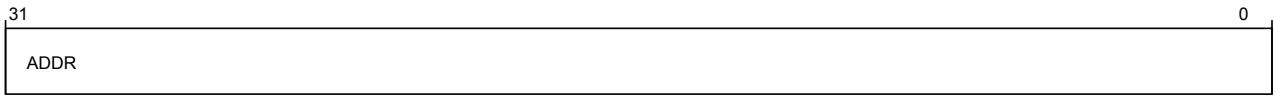

Figure 3-621 por_hni_erraddr_ns (low)

The following table shows the por_hni_erraddr_NS lower register bit assignments.

Table 3-635 por_hni_erraddr_ns (low)

Bits	Field name	Description	Type	Reset
31:0	ADDR	Transaction address	RW	48'b0

por_hni_errmisc_NS

Functions as the non-secure miscellaneous error register. Contains miscellaneous information about deferred/uncorrected errors.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h3120

Register reset 64'b0

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

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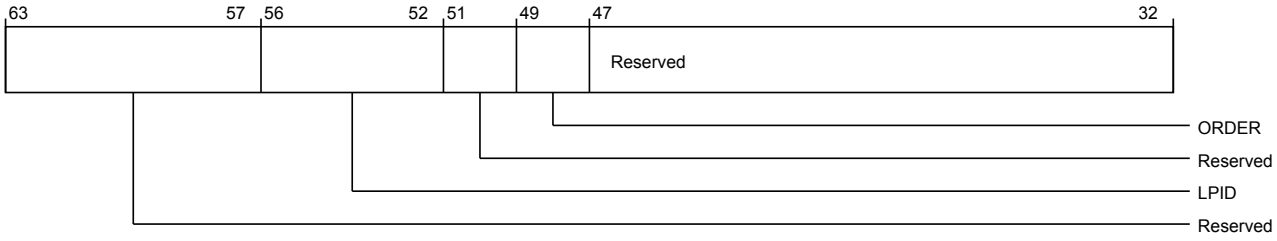

Figure 3-622 por_hni_errmisc_ns (high)

The following table shows the por_hni_errmisc_NS higher register bit assignments.

Table 3-636 por_hni_errmisc_ns (high)

Bits	Field name	Description	Type	Reset
63:57	Reserved	Reserved	RO	-
56:52	LPID	Error logic processor ID	RW	5'b0
51:50	Reserved	Reserved	RO	-
49:48	ORDER	Error order	RW	4'b0
47:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

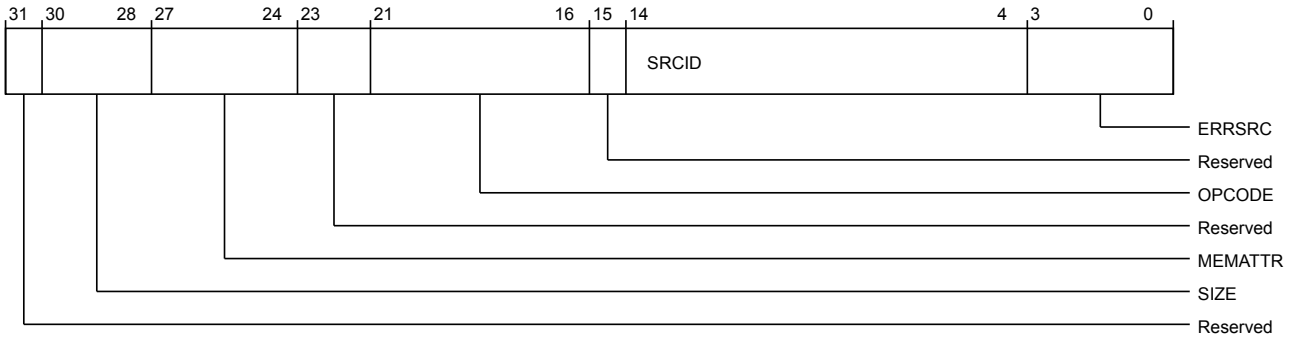

Figure 3-623 por_hni_errmisc_ns (low)

The following table shows the por_hni_errmisc_NS lower register bit assignments.

Table 3-637 por_hni_errmisc_ns (low)

Bits	Field name	Description	Type	Reset
31	Reserved	Reserved	RO	-
30:28	SIZE	Error transaction size	RW	3'b0
27:24	MEMATTR	Error memory attributes	RW	4'b0
23:22	Reserved	Reserved	RO	-

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Table 3-637 por_hni_errmisc_ns (low) (continued)

Bits	Field name	Description	Type	Reset
21:16	OPCODE	Error opcode	RW	6'b0
15	Reserved	Reserved	RO	-
14:4	SRCID	Error source ID	RW	11'b0
3:0	ERRSRC	Error source 4'b0000: Coherent read 4'b0001: Coherent write 4'b0010: CleanUnique/MakeUnique 4'b0011: Atomic 4'b0100: Illegal configuration read 4'b0101: Illegal configuration write 4'b0110: Configuration write data partial byte enable error 4'b0111: Configuration write data parity error or poison error 4'b1000: BRESP error 4'b1001: Poison error 4'b1010: BRESP error and poison error ——— **Note** ——— For configuration write data, BRESP, and poison errors, por_hni_errmisc_NS.SRCID is the only valid field. For other error types, all fields are valid. ———	RW	4'b0

por_hni_pmu_event_sel

Specifies the PMU event to be counted.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h2000
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

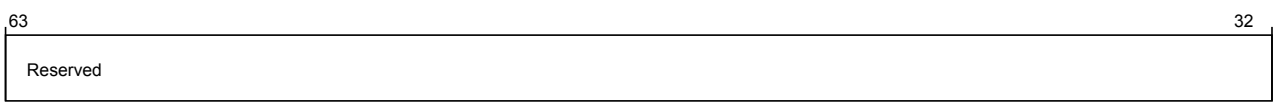

Figure 3-624 por_hni_pmu_event_sel (high)

The following table shows the por_hni_pmu_event_sel higher register bit assignments.

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Table 3-638 por_hni_pmu_event_sel (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

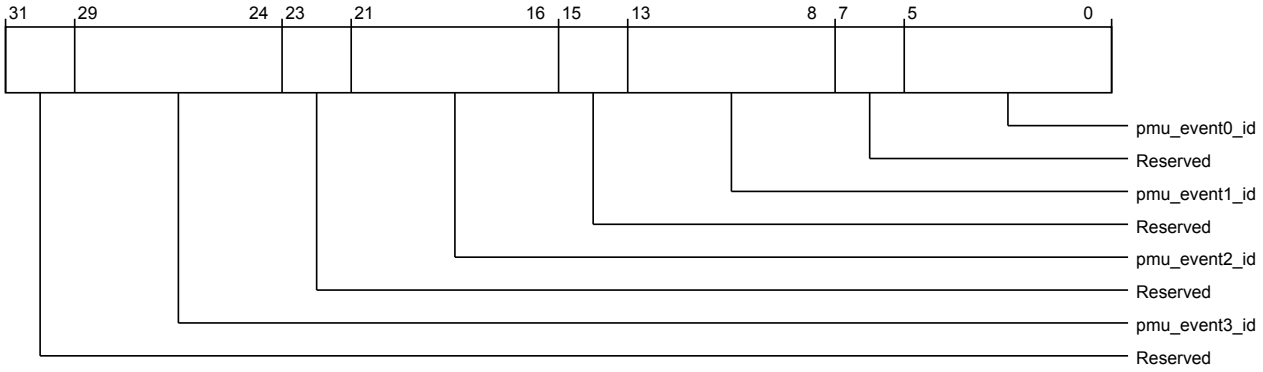

Figure 3-625 por_hni_pmu_event_sel (low)

The following table shows the por_hni_pmu_event_sel lower register bit assignments.

Table 3-639 por_hni_pmu_event_sel (low)

Bits	Field name	Description	Type	Reset
31:30	Reserved	Reserved	RO	-
29:24	pmu_event3_id	HN-I PMU Event 3 select; see pmu_event0_id for encodings	RW	6'b0
23:22	Reserved	Reserved	RO	-
21:16	pmu_event2_id	HN-I PMU Event 2 select; see pmu_event0_id for encodings	RW	6'b0
15:14	Reserved	Reserved	RO	-
13:8	pmu_event1_id	HN-I PMU Event 1 select; see pmu_event0_id for encodings	RW	6'b0

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Table 3-639 por_hni_pmu_event_sel (low) (continued)

Bits	Field name	Description	Type	Reset
7:6	Reserved	Reserved	RO	-
5:0	pmu_event0_id	HN-I PMU Event 0 select 6'h00: No event 6'h20: RRT read occupancy count overflow 6'h21: RRT write occupancy count overflow 6'h22: RDT read occupancy count overflow 6'h23: RDT write occupancy count overflow 6'h24: WDB occupancy count overflow 6'h25: RRT read allocation 6'h26: RRT write allocation 6'h27: RDT read allocation 6'h28: RDT write allocation 6'h29: WDB allocation 6'h2A: RETRYACK TXRSP flit sent 6'h2B: ARVALID set without ARREADY event 6'h2C: ARREADY set without ARVALID event 6'h2D: AWVALID set without AWREADY event 6'h2E: AWREADY set without AWVALID event 6'h2F: WVALID set without WREADY event 6'h30: TXDAT stall (TXDAT valid but no link credit available) 6'h31: Non-PCIe serialization event 6'h32: PCIe serialization event ——————— **Note** ——————— All other encodings are reserved. ———————————————	RW	6'b0

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3.3.6 XP register descriptions

Lists the XP registers.

por_mxp_node_info

Provides component identification information.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h0
Register reset Configuration dependent
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

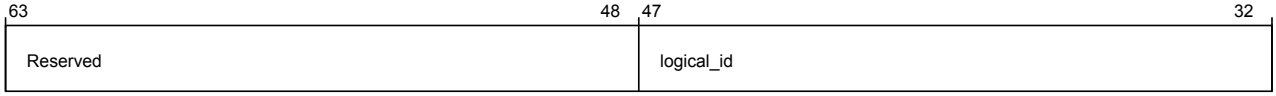

Figure 3-626 por_mxp_node_info (high)

The following table shows the por_mxp_node_info higher register bit assignments.

Table 3-640 por_mxp_node_info (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	logical_id	Component logical ID	RO	Configuration dependent

The following image shows the lower register bit assignments.

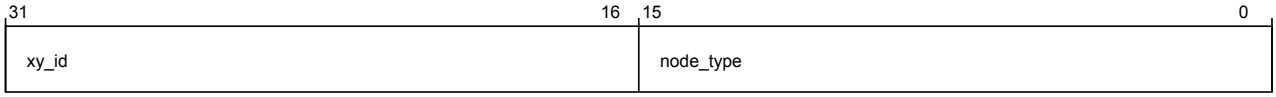

Figure 3-627 por_mxp_node_info (low)

The following table shows the por_mxp_node_info lower register bit assignments.

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Table 3-641 por_mxp_node_info (low)

Bits	Field name	Description	Type	Reset
31:16	xy_id	Identifies (X,Y) location of XP within the mesh **Note** The (X,Y) location is specified following the node ID format as defined in Node ID mapping section, with the bottom 3 bits, corresponding to port ID and device ID, set to 0. Bits 31:11 must always be set to 0. The range of bits representing the (X,Y) location varies for different node ID formats.	RO	16'h0000
15:0	node_type	CMN-600 node type identifier	RO	16'h0006

por_mxp_device_port_connect_info_p0

Contains device port connection information for port 0.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h8
Register reset Configuration dependent
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

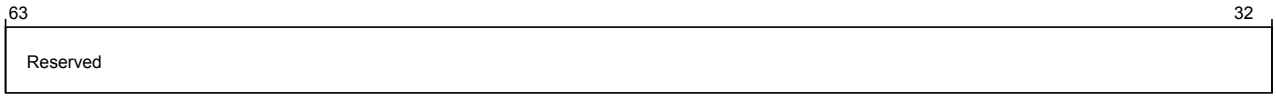

Figure 3-628 por_mxp_device_port_connect_info_p0 (high)

The following table shows the por_mxp_device_port_connect_info_p0 higher register bit assignments.

Table 3-642 por_mxp_device_port_connect_info_p0 (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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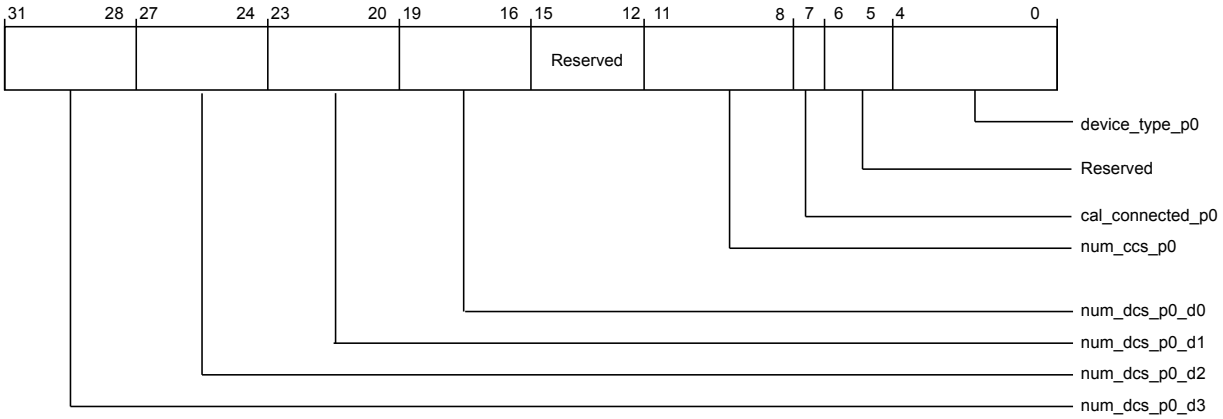

Figure 3-629 por_mxp_device_port_connect_info_p0 (low)

The following table shows the por_mxp_device_port_connect_info_p0 lower register bit assignments.

Table 3-643 por_mxp_device_port_connect_info_p0 (low)

Bits	Field name	Description	Type	Reset
31:28	num_dcs_p0_d3	Number of device credited slices connected to port 0 device 3 (Allowed values: 0-4)	RO	Configuration dependent
27:24	num_dcs_p0_d2	Number of device credited slices connected to port 0 device 2 (Allowed values: 0-4)	RO	Configuration dependent
23:20	num_dcs_p0_d1	Number of device credited slices connected to port 0 device 1 (Allowed values: 0-4)	RO	Configuration dependent
19:16	num_dcs_p0_d0	Number of device credited slices connected to port 0 device 0 (Allowed values: 0-4)	RO	Configuration dependent
15:12	Reserved	Reserved	RO	-
11:8	num_ccs_p0	Number of CAL credited slices connected on port0 (Allowed values: 0-2)	RO	Configuration dependent
7	cal_connected_p0	When set, CAL is connected on port0 (Allowed values: 0-1)	RO	Configuration dependent

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Table 3-643 por_mxp_device_port_connect_info_p0 (low) (continued)

Bits	Field name	Description	Type	Reset
6:5	Reserved	Reserved	RO	-
4:0	device_type_p0	Connected device type 5'b00000: Reserved 5'b00001: RN-I 5'b00010: RN-D 5'b00011: Reserved 5'b00100: RN-F_CHIB 5'b00101: RN-F_CHIB_ESAM 5'b00110: RN-F_CHIA 5'b00111: RN-F_CHIA_ESAM 5'b01000: HN-T 5'b01001: HN-I 5'b01010: HN-D 5'b01011: Reserved 5'b01100: SN-F 5'b01101: SBSX 5'b01110: HN-F 5'b01111: Reserved 5'b10000: Reserved 5'b10001: CXHA 5'b10010: CXRA 5'b10011: CXRH 5'b10100-5'b11111: Reserved	RO	Configuration dependent

por_mxp_device_port_connect_info_p1

Contains device port connection information for port 1.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h10
Register reset Configuration dependent
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

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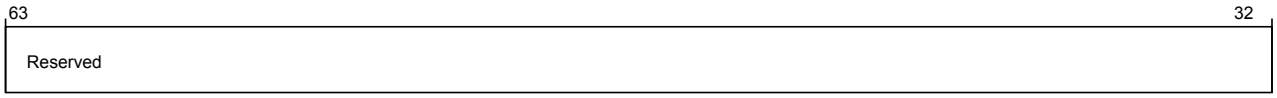

Figure 3-630 por_mxp_device_port_connect_info_p1 (high)

The following table shows the por_mxp_device_port_connect_info_p1 higher register bit assignments.

Table 3-644 por_mxp_device_port_connect_info_p1 (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

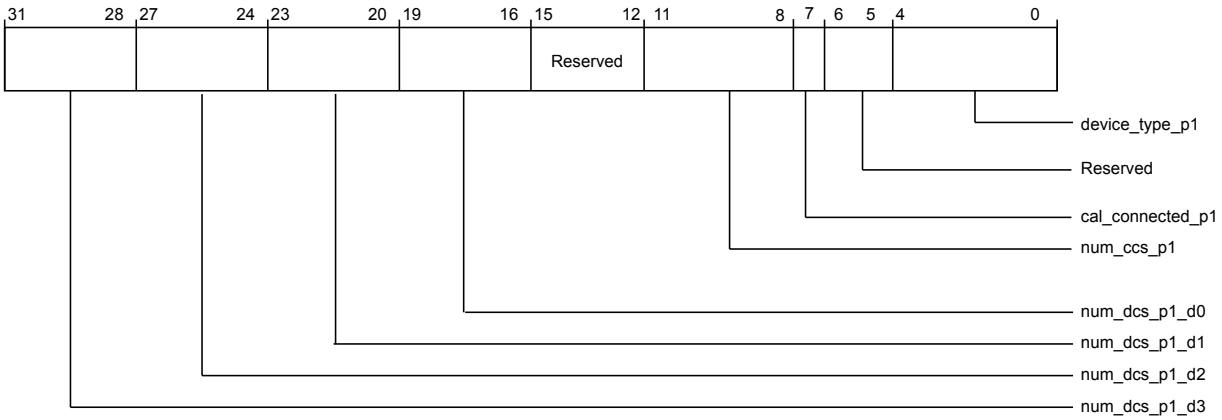

Figure 3-631 por_mxp_device_port_connect_info_p1 (low)

The following table shows the por_mxp_device_port_connect_info_p1 lower register bit assignments.

Table 3-645 por_mxp_device_port_connect_info_p1 (low)

Bits	Field name	Description	Type	Reset
31:28	num_dcs_p1_d3	Number of device credited slices connected to port 1 device 3 (Allowed values: 0-4)	RO	Configuration dependent
27:24	num_dcs_p1_d2	Number of device credited slices connected to port 1 device 2 (Allowed values: 0-4)	RO	Configuration dependent
23:20	num_dcs_p1_d1	Number of device credited slices connected to port 1 device 1 (Allowed values: 0-4)	RO	Configuration dependent
19:16	num_dcs_p1_d0	Number of device credited slices connected to port 1 device 0 (Allowed values: 0-4)	RO	Configuration dependent
15:12	Reserved	Reserved	RO	-
11:8	num_ccs_p1	Number of CAL credited slices connected on port1 (Allowed values: 0-2)	RO	Configuration dependent
7	cal_connected_p1	When set, CAL is connected on port1 (Allowed values: 0-1)	RO	Configuration dependent

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Table 3-645 por_mxp_device_port_connect_info_p1 (low) (continued)

Bits	Field name	Description	Type	Reset
6:5	Reserved	Reserved	RO	-
4:0	device_type_p1	Connected device type 5'b00000: Reserved 5'b00001: RN-I 5'b00010: RN-D 5'b00011: Reserved 5'b00100: RN-F CHIB 5'b00101: RN-F CHIB ESAM 5'b00110: RN-F CHIA 5'b00111: RN-F CHIA ESAM 5'b01000: HN-T 5'b01001: HN-I 5'b01010: HN-D 5'b01011: Reserved 5'b01100: SN-F 5'b01101: SBSX 5'b01110: HN-F 5'b01111: Reserved 5'b10000: Reserved 5'b10001: CXHA 5'b10010: CXRA 5'b10011: CXRH 5'b10100-5'b11111: Reserved	RO	Configuration dependent

por_mxp_mesh_port_connect_info_east

Contains port connection information for East port.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h18
Register reset Configuration dependent
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

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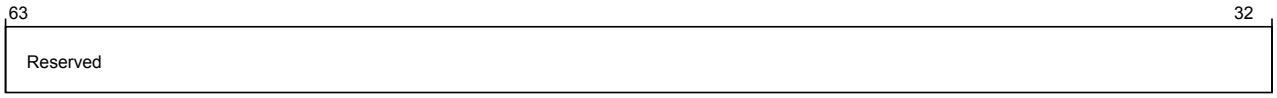

Figure 3-632 por_mxp_mesh_port_connect_info_east (high)

The following table shows the por_mxp_mesh_port_connect_info_east higher register bit assignments.

Table 3-646 por_mxp_mesh_port_connect_info_east (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

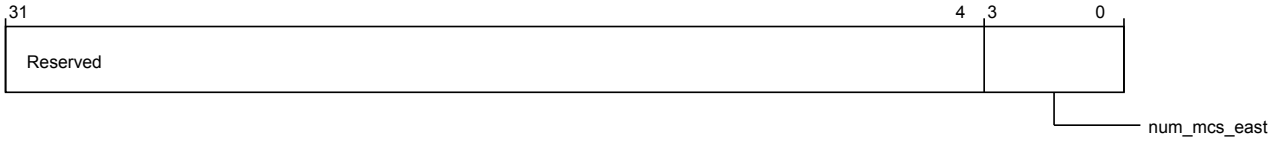

Figure 3-633 por_mxp_mesh_port_connect_info_east (low)

The following table shows the por_mxp_mesh_port_connect_info_east lower register bit assignments.

Table 3-647 por_mxp_mesh_port_connect_info_east (low)

Bits	Field name	Description	Type	Reset
31:4	Reserved	Reserved	RO	-
3:0	num_mcs_east	Number of mesh credited slices connected to East port (Allowed values: 0-4)	RO	Configuration dependent

por_mxp_mesh_port_connect_info_north

Contains port connection information for North port.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h20
Register reset Configuration dependent
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

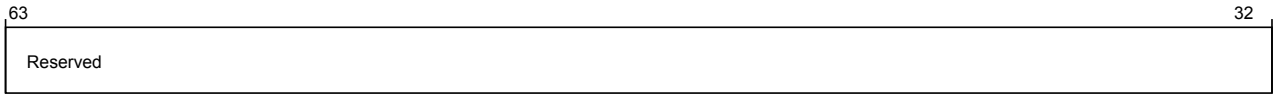

Figure 3-634 por_mxp_mesh_port_connect_info_north (high)

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The following table shows the por_mxp_mesh_port_connect_info_north higher register bit assignments.

Table 3-648 por_mxp_mesh_port_connect_info_north (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

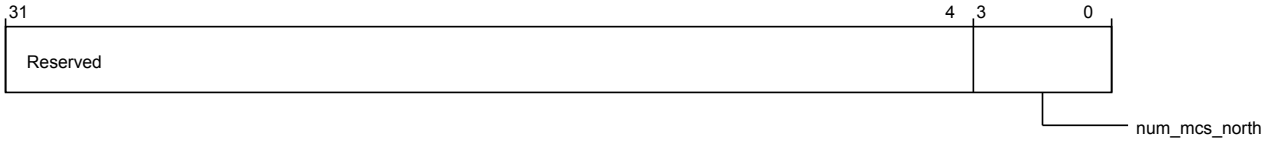

Figure 3-635 por_mxp_mesh_port_connect_info_north (low)

The following table shows the por_mxp_mesh_port_connect_info_north lower register bit assignments.

Table 3-649 por_mxp_mesh_port_connect_info_north (low)

Bits	Field name	Description	Type	Reset
31:4	Reserved	Reserved	RO	-
3:0	num_mcs_north	Number of mesh credited slices connected to North port (Allowed values: 0-4)	RO	Configuration dependent

por_mxp_child_info

Provides component child identification information.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h80
Register reset Configuration dependent
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

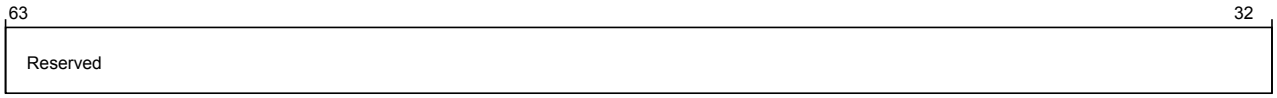

Figure 3-636 por_mxp_child_info (high)

The following table shows the por_mxp_child_info higher register bit assignments.

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Table 3-650 por_mxp_child_info (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

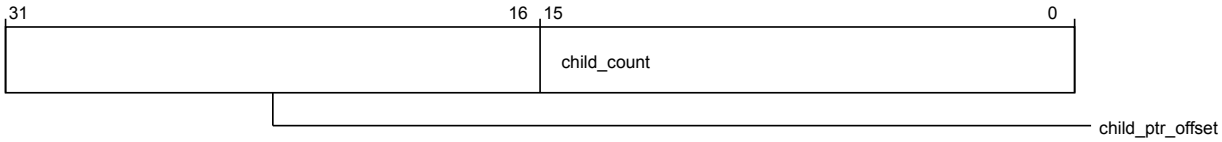

Figure 3-637 por_mxp_child_info (low)

The following table shows the por_mxp_child_info lower register bit assignments.

Table 3-651 por_mxp_child_info (low)

Bits	Field name	Description	Type	Reset
31:16	child_ptr_offset	Starting register offset which contains pointers to the child nodes	RO	16'h100
15:0	child_count	Number of child nodes; used in discovery process	RO	Configuration dependent

por_mxp_child_pointer_0

Contains base address of the configuration slave for child 0.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h100
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

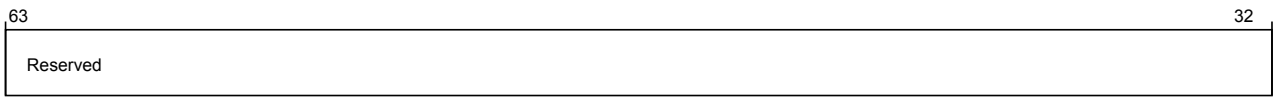

Figure 3-638 por_mxp_child_pointer_0 (high)

The following table shows the por_mxp_child_pointer_0 higher register bit assignments.

Table 3-652 por_mxp_child_pointer_0 (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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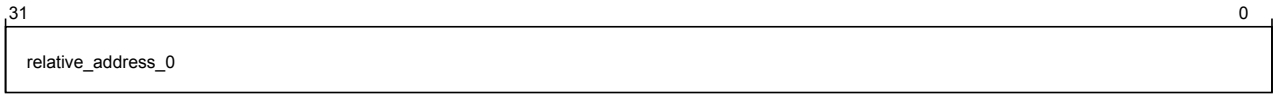

Figure 3-639 por_mxp_child_pointer_0 (low)

The following table shows the por_mxp_child_pointer_0 lower register bit assignments.

Table 3-653 por_mxp_child_pointer_0 (low)

Bits	Field name	Description	Type	Reset
31:0	relative_address_0	Bit [31]: External or internal child node 1'b1: Indicates this child pointer points to a configuration node that is external to CMN-600 1'b0: Indicates this child pointer points to a configuration node that is internal to CMN-600 Bits [30:28]: Set to 3'b000 Bits [27:0]: Child node address offset relative to PERIPHBASE	RO	32'b0

por_mxp_child_pointer_1

Contains base address of the configuration slave for child 1.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h108
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

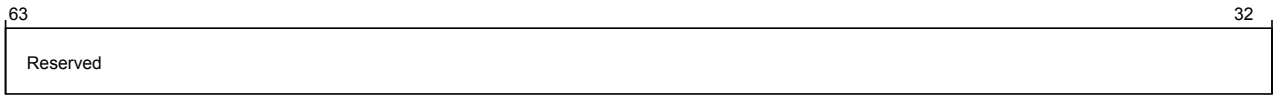

Figure 3-640 por_mxp_child_pointer_1 (high)

The following table shows the por_mxp_child_pointer_1 higher register bit assignments.

Table 3-654 por_mxp_child_pointer_1 (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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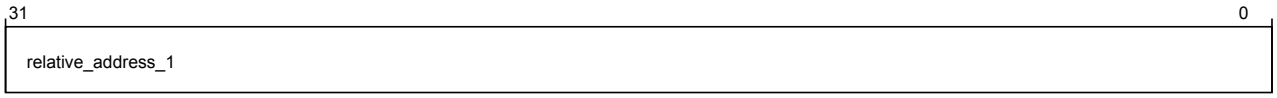

Figure 3-641 por_mxp_child_pointer_1 (low)

The following table shows the por_mxp_child_pointer_1 lower register bit assignments.

Table 3-655 por_mxp_child_pointer_1 (low)

Bits	Field name	Description	Type	Reset
31:0	relative_address_1	Bit [31]: External or internal child node 1'b1: Indicates this child pointer points to a configuration node that is external to CMN-600 1'b0: Indicates this child pointer points to a configuration node that is internal to CMN-600 Bits [30:28]: Set to 3'b000 Bits [27:0]: Child node address offset relative to PERIPHBASE	RO	32'b0

por_mxp_child_pointer_2

Contains base address of the configuration slave for child 2.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h110
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

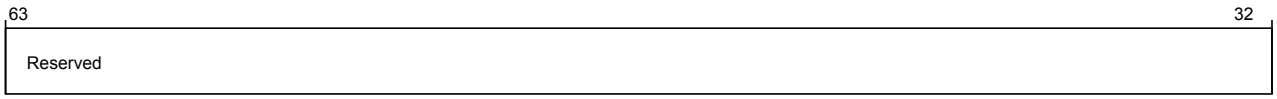

Figure 3-642 por_mxp_child_pointer_2 (high)

The following table shows the por_mxp_child_pointer_2 higher register bit assignments.

Table 3-656 por_mxp_child_pointer_2 (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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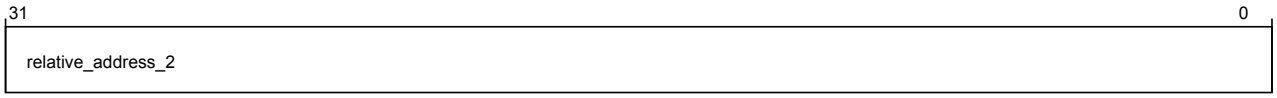

Figure 3-643 por_mxp_child_pointer_2 (low)

The following table shows the por_mxp_child_pointer_2 lower register bit assignments.

Table 3-657 por_mxp_child_pointer_2 (low)

Bits	Field name	Description	Type	Reset
31:0	relative_address_2	Bit [31]: External or internal child node 1'b1: Indicates this child pointer points to a configuration node that is external to CMN-600 1'b0: Indicates this child pointer points to a configuration node that is internal to CMN-600 Bits [30:28]: Set to 3'b000 Bits [27:0]: Child node address offset relative to PERIPHBASE	RO	32'b0

por_mxp_child_pointer_3

Contains base address of the configuration slave for child 3.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h118
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

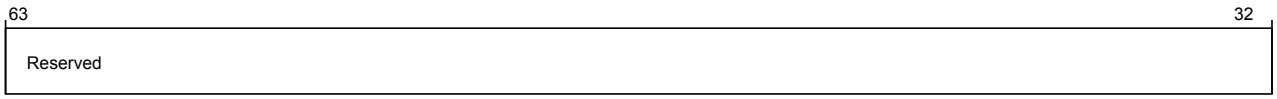

Figure 3-644 por_mxp_child_pointer_3 (high)

The following table shows the por_mxp_child_pointer_3 higher register bit assignments.

Table 3-658 por_mxp_child_pointer_3 (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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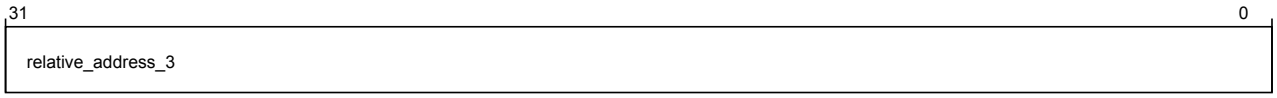

Figure 3-645 por_mxp_child_pointer_3 (low)

The following table shows the por_mxp_child_pointer_3 lower register bit assignments.

Table 3-659 por_mxp_child_pointer_3 (low)

Bits	Field name	Description	Type	Reset
31:0	relative_address_3	Bit [31]: External or internal child node 1'b1: Indicates this child pointer points to a configuration node that is external to CMN-600 1'b0: Indicates this child pointer points to a configuration node that is internal to CMN-600 Bits [30:28]: Set to 3'b000 Bits [27:0]: Child node address offset relative to PERIPHBASE	RO	32'b0

por_mxp_child_pointer_4

Contains base address of the configuration slave for child 4.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h120
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

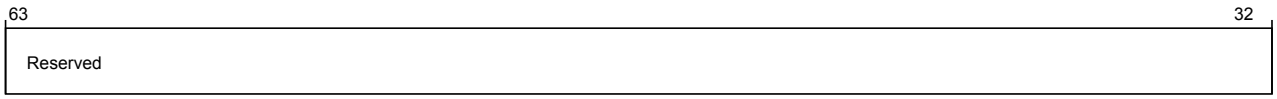

Figure 3-646 por_mxp_child_pointer_4 (high)

The following table shows the por_mxp_child_pointer_4 higher register bit assignments.

Table 3-660 por_mxp_child_pointer_4 (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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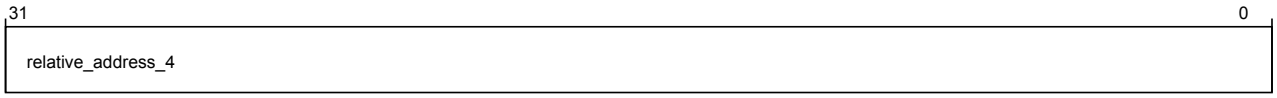

Figure 3-647 por_mxp_child_pointer_4 (low)

The following table shows the por_mxp_child_pointer_4 lower register bit assignments.

Table 3-661 por_mxp_child_pointer_4 (low)

Bits	Field name	Description	Type	Reset
31:0	relative_address_4	Bit [31]: External or internal child node 1'b1: Indicates this child pointer points to a configuration node that is external to CMN-600 1'b0: Indicates this child pointer points to a configuration node that is internal to CMN-600 Bits [30:28]: Set to 3'b000 Bits [27:0]: Child node address offset relative to PERIPHBASE	RO	32'b0

por_mxp_child_pointer_5

Contains base address of the configuration slave for child 5.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h128
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

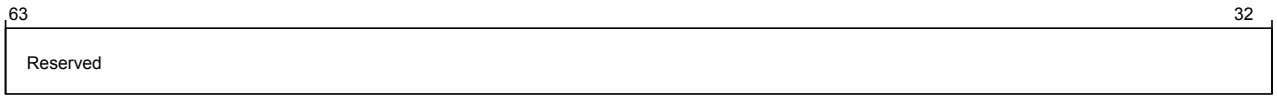

Figure 3-648 por_mxp_child_pointer_5 (high)

The following table shows the por_mxp_child_pointer_5 higher register bit assignments.

Table 3-662 por_mxp_child_pointer_5 (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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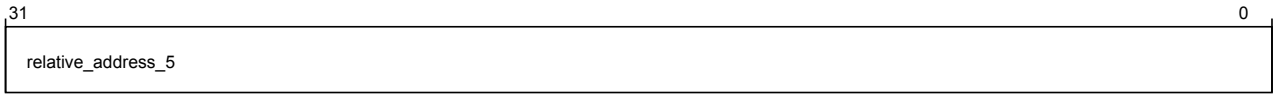

Figure 3-649 por_mxp_child_pointer_5 (low)

The following table shows the por_mxp_child_pointer_5 lower register bit assignments.

Table 3-663 por_mxp_child_pointer_5 (low)

Bits	Field name	Description	Type	Reset
31:0	relative_address_5	Bit [31]: External or internal child node 1'b1: Indicates this child pointer points to a configuration node that is external to CMN-600 1'b0: Indicates this child pointer points to a configuration node that is internal to CMN-600 Bits [30:28]: Set to 3'b000 Bits [27:0]: Child node address offset relative to PERIPHBASE	RO	32'b0

por_mxp_child_pointer_6

Contains base address of the configuration slave for child 6.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h130
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

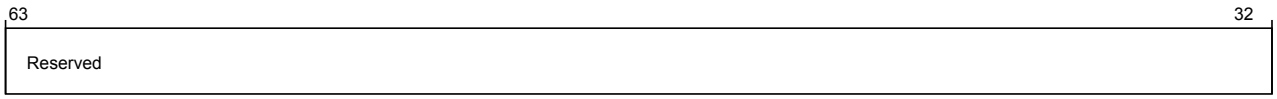

Figure 3-650 por_mxp_child_pointer_6 (high)

The following table shows the por_mxp_child_pointer_6 higher register bit assignments.

Table 3-664 por_mxp_child_pointer_6 (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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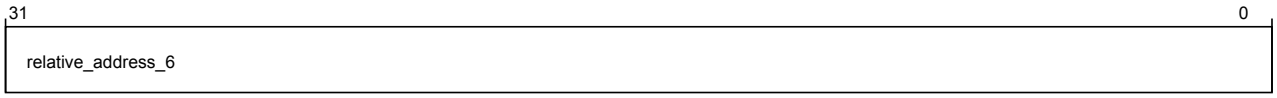

Figure 3-651 por_mxp_child_pointer_6 (low)

The following table shows the por_mxp_child_pointer_6 lower register bit assignments.

Table 3-665 por_mxp_child_pointer_6 (low)

Bits	Field name	Description	Type	Reset
31:0	relative_address_6	Bit [31]: External or internal child node 1'b1: Indicates this child pointer points to a configuration node that is external to CMN-600 1'b0: Indicates this child pointer points to a configuration node that is internal to CMN-600 Bits [30:28]: Set to 3'b000 Bits [27:0]: Child node address offset relative to PERIPHBASE	RO	32'b0

por_mxp_child_pointer_7

Contains base address of the configuration slave for child 7.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h138
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

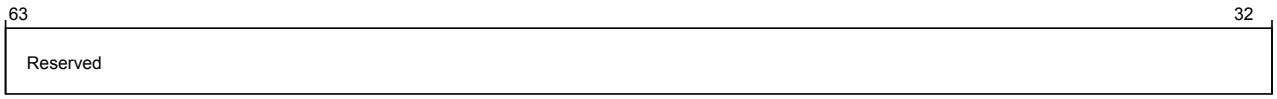

Figure 3-652 por_mxp_child_pointer_7 (high)

The following table shows the por_mxp_child_pointer_7 higher register bit assignments.

Table 3-666 por_mxp_child_pointer_7 (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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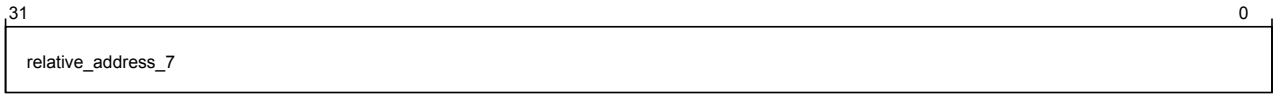

Figure 3-653 por_mxp_child_pointer_7 (low)

The following table shows the por_mxp_child_pointer_7 lower register bit assignments.

Table 3-667 por_mxp_child_pointer_7 (low)

Bits	Field name	Description	Type	Reset
31:0	relative_address_7	Bit [31]: External or internal child node 1'b1: Indicates this child pointer points to a configuration node that is external to CMN-600 1'b0: Indicates this child pointer points to a configuration node that is internal to CMN-600 Bits [30:28]: Set to 3'b000 Bits [27:0]: Child node address offset relative to PERIPHBASE	RO	32'b0

por_mxp_child_pointer_8

Contains base address of the configuration slave for child 8.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h140
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

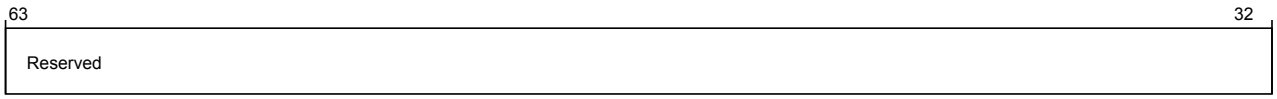

Figure 3-654 por_mxp_child_pointer_8 (high)

The following table shows the por_mxp_child_pointer_8 higher register bit assignments.

Table 3-668 por_mxp_child_pointer_8 (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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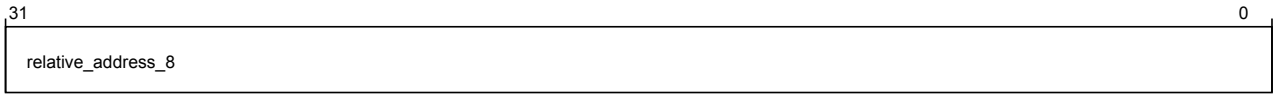

Figure 3-655 por_mxp_child_pointer_8 (low)

The following table shows the por_mxp_child_pointer_8 lower register bit assignments.

Table 3-669 por_mxp_child_pointer_8 (low)

Bits	Field name	Description	Type	Reset
31:0	relative_address_8	Bit [31]: External or internal child node 1'b1: Indicates this child pointer points to a configuration node that is external to CMN-600 1'b0: Indicates this child pointer points to a configuration node that is internal to CMN-600 Bits [30:28]: Set to 3'b000 Bits [27:0]: Child node address offset relative to PERIPHBASE	RO	32'b0

por_mxp_child_pointer_9

Contains base address of the configuration slave for child 9.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h148
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

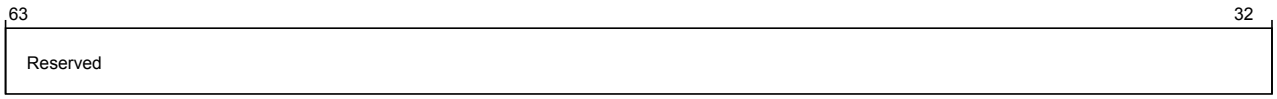

Figure 3-656 por_mxp_child_pointer_9 (high)

The following table shows the por_mxp_child_pointer_9 higher register bit assignments.

Table 3-670 por_mxp_child_pointer_9 (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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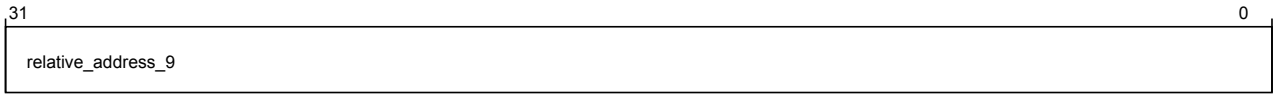

Figure 3-657 por_mxp_child_pointer_9 (low)

The following table shows the por_mxp_child_pointer_9 lower register bit assignments.

Table 3-671 por_mxp_child_pointer_9 (low)

Bits	Field name	Description	Type	Reset
31:0	relative_address_9	Bit [31]: External or internal child node 1'b1: Indicates this child pointer points to a configuration node that is external to CMN-600 1'b0: Indicates this child pointer points to a configuration node that is internal to CMN-600 Bits [30:28]: Set to 3'b000 Bits [27:0]: Child node address offset relative to PERIPHBASE	RO	32'b0

por_mxp_child_pointer_10

Contains base address of the configuration slave for child 10.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h150
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

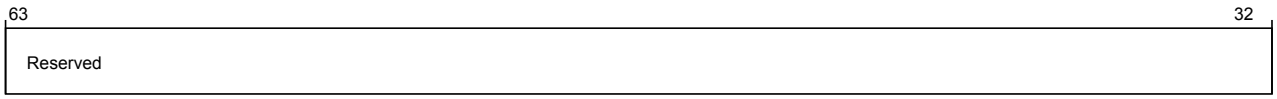

Figure 3-658 por_mxp_child_pointer_10 (high)

The following table shows the por_mxp_child_pointer_10 higher register bit assignments.

Table 3-672 por_mxp_child_pointer_10 (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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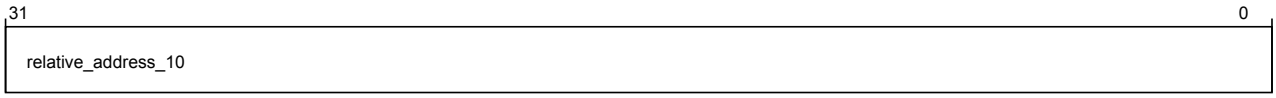

Figure 3-659 por_mxp_child_pointer_10 (low)

The following table shows the por_mxp_child_pointer_10 lower register bit assignments.

Table 3-673 por_mxp_child_pointer_10 (low)

Bits	Field name	Description	Type	Reset
31:0	relative_address_10	Bit [31]: External or internal child node 1'b1: Indicates this child pointer points to a configuration node that is external to CMN-600 1'b0: Indicates this child pointer points to a configuration node that is internal to CMN-600 Bits [30:28]: Set to 3'b000 Bits [27:0]: Child node address offset relative to PERIPHBASE	RO	32'b0

por_mxp_child_pointer_11

Contains base address of the configuration slave for child 11.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h158
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

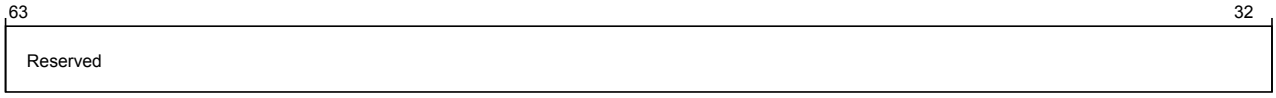

Figure 3-660 por_mxp_child_pointer_11 (high)

The following table shows the por_mxp_child_pointer_11 higher register bit assignments.

Table 3-674 por_mxp_child_pointer_11 (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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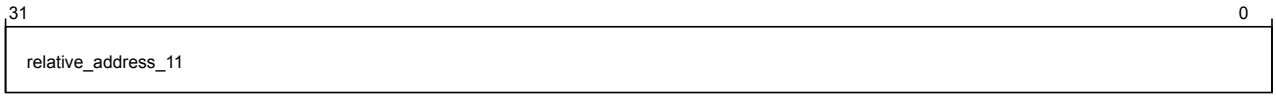

Figure 3-661 por_mxp_child_pointer_11 (low)

The following table shows the por_mxp_child_pointer_11 lower register bit assignments.

Table 3-675 por_mxp_child_pointer_11 (low)

Bits	Field name	Description	Type	Reset
31:0	relative_address_11	Bit [31]: External or internal child node 1'b1: Indicates this child pointer points to a configuration node that is external to CMN-600 1'b0: Indicates this child pointer points to a configuration node that is internal to CMN-600 Bits [30:28]: Set to 3'b000 Bits [27:0]: Child node address offset relative to PERIPHBASE	RO	32'b0

por_mxp_child_pointer_12

Contains base address of the configuration slave for child 12.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h160
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

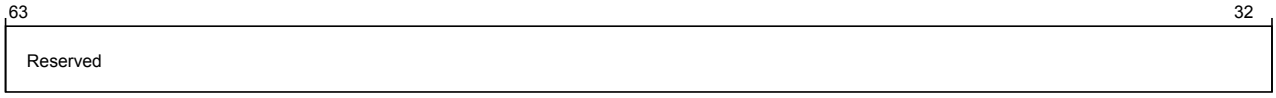

Figure 3-662 por_mxp_child_pointer_12 (high)

The following table shows the por_mxp_child_pointer_12 higher register bit assignments.

Table 3-676 por_mxp_child_pointer_12 (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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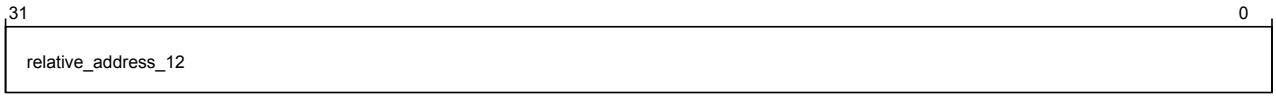

Figure 3-663 por_mxp_child_pointer_12 (low)

The following table shows the por_mxp_child_pointer_12 lower register bit assignments.

Table 3-677 por_mxp_child_pointer_12 (low)

Bits	Field name	Description	Type	Reset
31:0	relative_address_12	Bit [31]: External or internal child node 1'b1: Indicates this child pointer points to a configuration node that is external to CMN-600 1'b0: Indicates this child pointer points to a configuration node that is internal to CMN-600 Bits [30:28]: Set to 3'b000 Bits [27:0]: Child node address offset relative to PERIPHBASE	RO	32'b0

por_mxp_child_pointer_13

Contains base address of the configuration slave for child 13.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h168
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

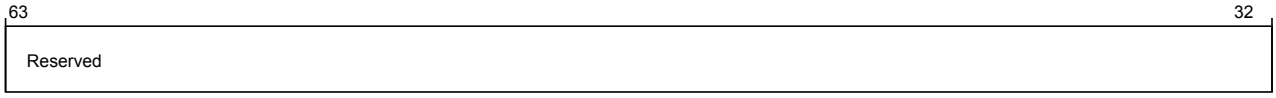

Figure 3-664 por_mxp_child_pointer_13 (high)

The following table shows the por_mxp_child_pointer_13 higher register bit assignments.

Table 3-678 por_mxp_child_pointer_13 (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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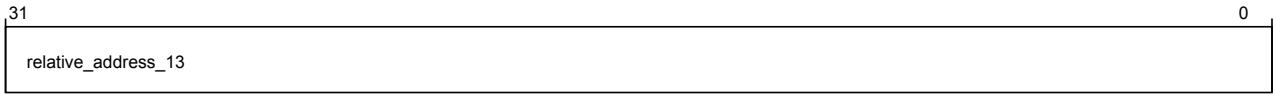

Figure 3-665 por_mxp_child_pointer_13 (low)

The following table shows the por_mxp_child_pointer_13 lower register bit assignments.

Table 3-679 por_mxp_child_pointer_13 (low)

Bits	Field name	Description	Type	Reset
31:0	relative_address_13	Bit [31]: External or internal child node 1'b1: Indicates this child pointer points to a configuration node that is external to CMN-600 1'b0: Indicates this child pointer points to a configuration node that is internal to CMN-600 Bits [30:28]: Set to 3'b000 Bits [27:0]: Child node address offset relative to PERIPHBASE	RO	32'b0

por_mxp_child_pointer_14

Contains base address of the configuration slave for child 14.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h170
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

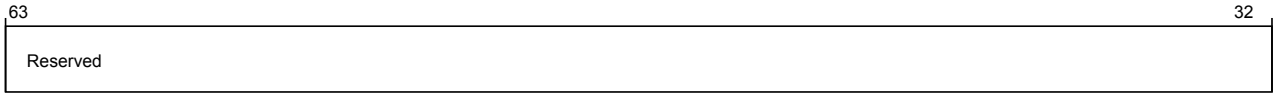

Figure 3-666 por_mxp_child_pointer_14 (high)

The following table shows the por_mxp_child_pointer_14 higher register bit assignments.

Table 3-680 por_mxp_child_pointer_14 (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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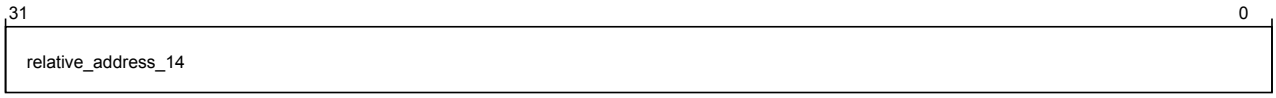

Figure 3-667 por_mxp_child_pointer_14 (low)

The following table shows the por_mxp_child_pointer_14 lower register bit assignments.

Table 3-681 por_mxp_child_pointer_14 (low)

Bits	Field name	Description	Type	Reset
31:0	relative_address_14	Bit [31]: External or internal child node 1'b1: Indicates this child pointer points to a configuration node that is external to CMN-600 1'b0: Indicates this child pointer points to a configuration node that is internal to CMN-600 Bits [30:28]: Set to 3'b000 Bits [27:0]: Child node address offset relative to PERIPHBASE	RO	32'b0

por_mxp_child_pointer_15

Contains base address of the configuration slave for child 15.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h178
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

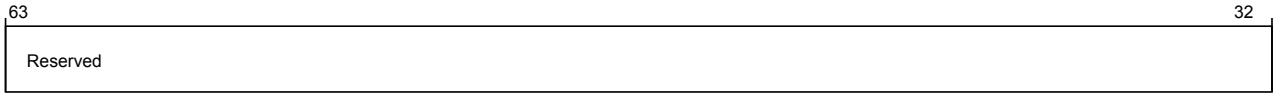

Figure 3-668 por_mxp_child_pointer_15 (high)

The following table shows the por_mxp_child_pointer_15 higher register bit assignments.

Table 3-682 por_mxp_child_pointer_15 (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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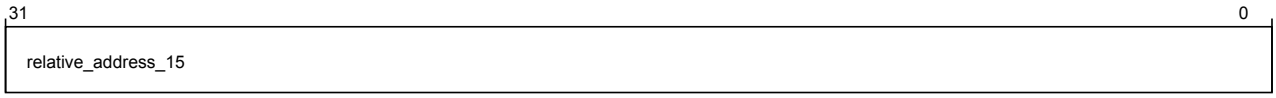

Figure 3-669 por_mxp_child_pointer_15 (low)

The following table shows the por_mxp_child_pointer_15 lower register bit assignments.

Table 3-683 por_mxp_child_pointer_15 (low)

Bits	Field name	Description	Type	Reset
31:0	relative_address_15	Bit [31]: External or internal child node 1'b1: Indicates this child pointer points to a configuration node that is external to CMN-600 1'b0: Indicates this child pointer points to a configuration node that is internal to CMN-600 Bits [30:28]: Set to 3'b000 Bits [27:0]: Child node address offset relative to PERIPHBASE	RO	32'b0

por_mxp_p0_info

Provides component identification information for XP port 0.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h900
Register reset Configuration dependent
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

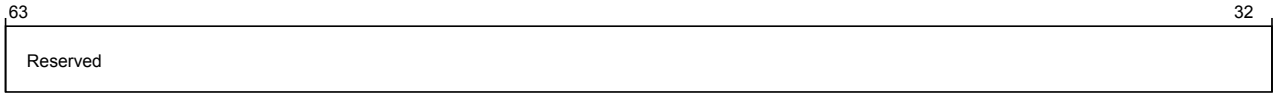

Figure 3-670 por_mxp_p0_info (high)

The following table shows the por_mxp_p0_info higher register bit assignments.

Table 3-684 por_mxp_p0_info (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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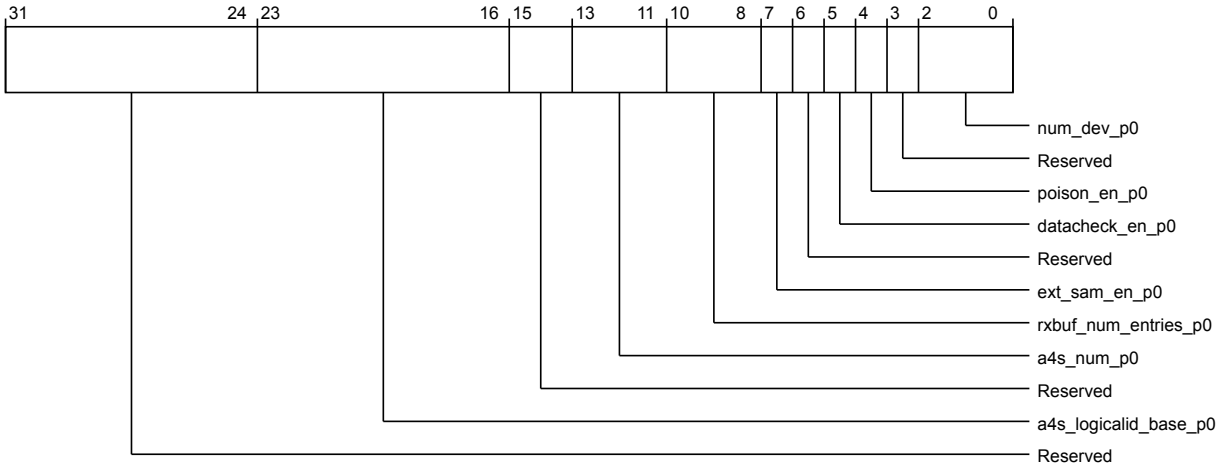

Figure 3-671 por_mxp_p0_info (low)

The following table shows the por_mxp_p0_info lower register bit assignments.

Table 3-685 por_mxp_p0_info (low)

Bits	Field name	Description	Type	Reset
31:24	Reserved	Reserved	RO	-
23:16	a4s_logicalid_base_p0	AXI4Stream interfaces logical ID base at this port (0 or 1)	RO	Configuration dependent
15:14	Reserved	Reserved	RO	-
13:11	a4s_num_p0	Total number of RN-F AXI4Stream interfaces at this port (0 to 4)	RO	Configuration dependent
10:8	rxbuf_num_entries_p0	Number of input buffers for each device at this port (2 to 4)	RO	Configuration dependent
7	ext_sam_en_p0	ESAM enable	RO	Configuration dependent
6	Reserved	Reserved	RO	-
5	datacheck_en_p0	Datacheck enable	RO	Configuration dependent
4	poison_en_p0	Poison enable	RO	Configuration dependent
3	Reserved	Reserved	RO	-
2:0	num_dev_p0	Number of devices connected to this port (0 to 4)	RO	Configuration dependent

por_mxp_p1_info

Provides component identification information for XP port 1.

Its characteristics are:

Type RO

Register width (Bits) 64

Address offset 14'h908

Register reset Configuration dependent

Usage constraints There are no usage constraints.

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The following image shows the higher register bit assignments.

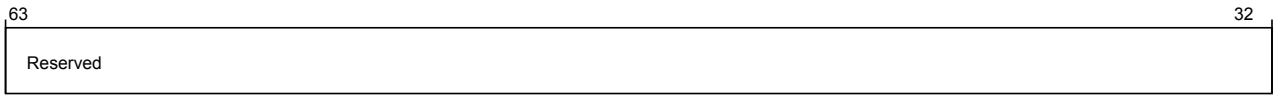

Figure 3-672 por_mxp_p1_info (high)

The following table shows the por_mxp_p1_info higher register bit assignments.

Table 3-686 por_mxp_p1_info (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

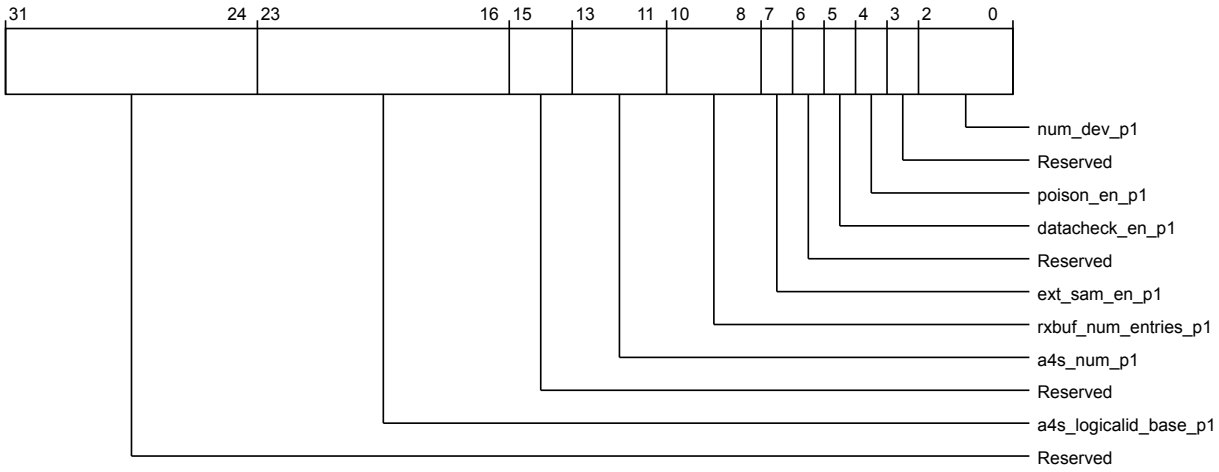

Figure 3-673 por_mxp_p1_info (low)

The following table shows the por_mxp_p1_info lower register bit assignments.

Table 3-687 por_mxp_p1_info (low)

Bits	Field name	Description	Type	Reset
31:24	Reserved	Reserved	RO	-
23:16	a4s_logicalid_base_p1	AXI4Stream interfaces logical ID base at this port (0 or 1)	RO	Configuration dependent
15:14	Reserved	Reserved	RO	-
13:11	a4s_num_p1	Total number of RN-F AXI4Stream interfaces at this port (0 to 4)	RO	Configuration dependent
10:8	rxbuf_num_entries_p1	Number of input buffers at this port (2 to 4)	RO	Configuration dependent
7	ext_sam_en_p1	ESAM enable	RO	Configuration dependent
6	Reserved	Reserved	RO	-
5	datacheck_en_p1	Datacheck enable	RO	Configuration dependent

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Table 3-687 por_mxp_p1_info (low) (continued)

Bits	Field name	Description	Type	Reset
4	poison_en_p1	Poison enable	RO	Configuration dependent
3	Reserved	Reserved	RO	-
2:0	num_dev_p1	Number of devices connected to this port (0 to 4)	RO	Configuration dependent

por_mxp_secure_register_groups_override

Allows non-secure access to predefined groups of secure registers.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h980

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

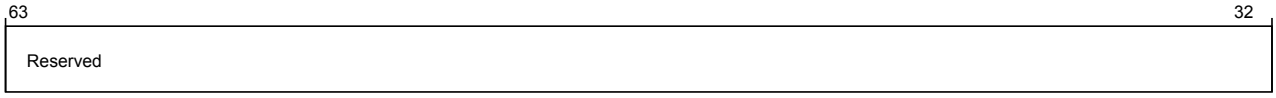

Figure 3-674 por_mxp_secure_register_groups_override (high)

The following table shows the por_mxp_secure_register_groups_override higher register bit assignments.

Table 3-688 por_mxp_secure_register_groups_override (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

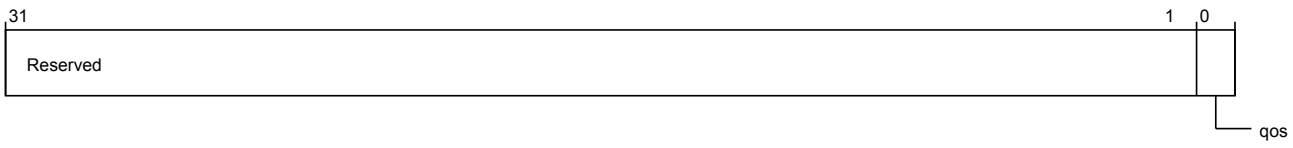

Figure 3-675 por_mxp_secure_register_groups_override (low)

The following table shows the por_mxp_secure_register_groups_override lower register bit assignments.

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Table 3-689 por_mxp_secure_register_groups_override (low)

Bits	Field name	Description	Type	Reset
31:1	Reserved	Reserved	RO	-
0	qos	Allows non-secure access to secure QoS registers	RW	1'b0

por_mxp_aux_ctl

Functions as the auxiliary control register for XP.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hA00

Register reset 64'b0

Usage constraints Only accessible by secure accesses. This register can be modified only with prior written permission from Arm.

The following image shows the higher register bit assignments.

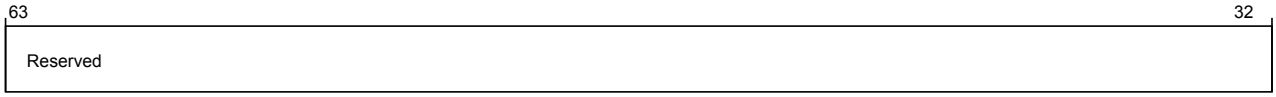

Figure 3-676 por_mxp_aux_ctl (high)

The following table shows the por_mxp_aux_ctl higher register bit assignments.

Table 3-690 por_mxp_aux_ctl (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

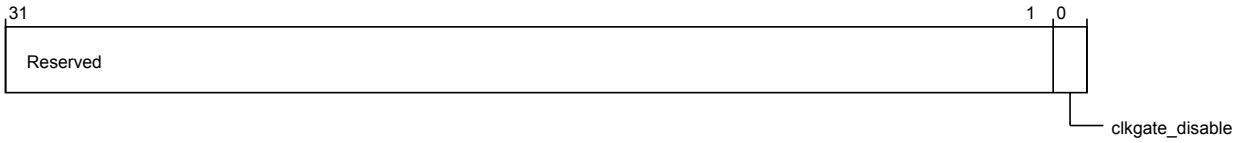

Figure 3-677 por_mxp_aux_ctl (low)

The following table shows the por_mxp_aux_ctl lower register bit assignments.

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Table 3-691 por_mxp_aux_ctl (low)

Bits	Field name	Description	Type	Reset
31:1	Reserved	Reserved	RO	-
0	clkgate_disable	Disables clock gating when set	RW	1'b0

por_mxp_p0_qos_control

Controls QoS settings for devices connected to port 0.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hA80
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

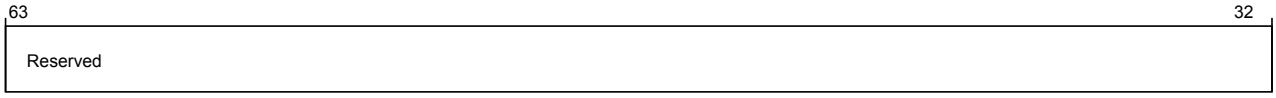

Figure 3-678 por_mxp_p0_qos_control (high)

The following table shows the por_mxp_p0_qos_control higher register bit assignments.

Table 3-692 por_mxp_p0_qos_control (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

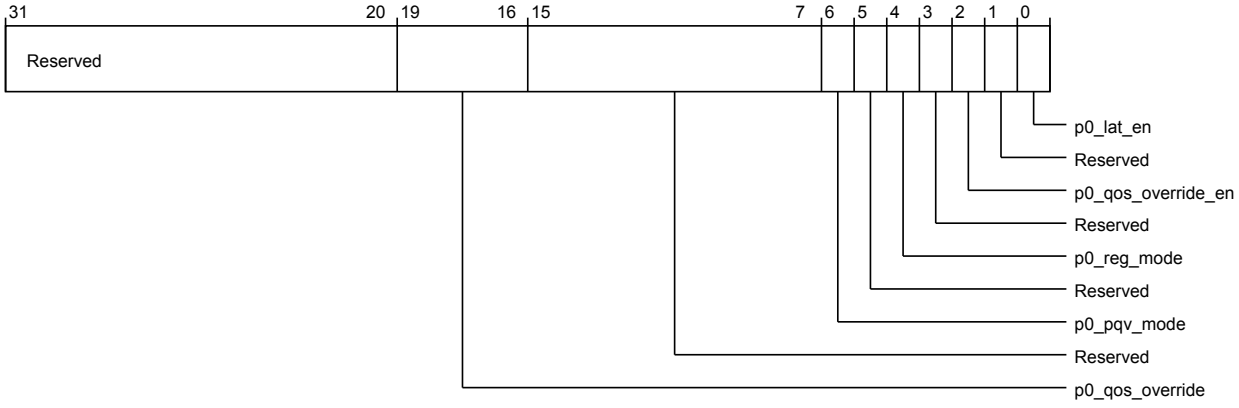

Figure 3-679 por_mxp_p0_qos_control (low)

The following table shows the por_mxp_p0_qos_control lower register bit assignments.

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Table 3-693 por_mxp_p0_qos_control (low)

Bits	Field name	Description	Type	Reset
31:20	Reserved	Reserved	RO	-
19:16	p0_qos_override	QoS override value for port 0	RW	4'b0000
15:7	Reserved	Reserved	RO	-
6	p0_pqv_mode	Configures the QoS regulator mode during period mode 1'b0: Normal mode; QoS value is stable when the master is idle 1'b1: Quiesce high mode; QoS value tends to the maximum value when the master is idle	RW	1'b0
5	Reserved	Reserved	RO	-
4	p0_reg_mode	Configures the QoS regulator mode 1'b0: Latency mode 1'b1: Period mode; used for bandwidth regulation	RW	1'b0
3	Reserved	Reserved	RO	-
2	p0_qos_override_en	Enables port 0 QoS override; when set, allows QoS value on inbound transactions to be overridden	RW	1'b0
1	Reserved	Reserved	RO	-
0	p0_lat_en	Enables port 0 QoS regulation when set	RW	1'b0

por_mxp_p0_qos_lat_tgt

Controls QoS target latency/period (in cycles) for regulation of devices connected to port 0.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hA88
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

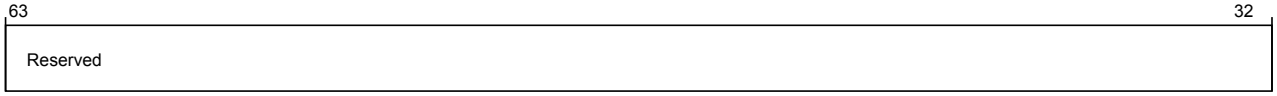

Figure 3-680 por_mxp_p0_qos_lat_tgt (high)

The following table shows the por_mxp_p0_qos_lat_tgt higher register bit assignments.

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Table 3-694 por_mxp_p0_qos_lat_tgt (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

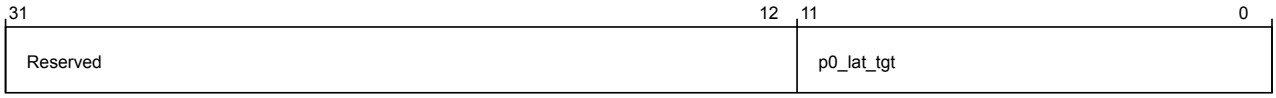

Figure 3-681 por_mxp_p0_qos_lat_tgt (low)

The following table shows the por_mxp_p0_qos_lat_tgt lower register bit assignments.

Table 3-695 por_mxp_p0_qos_lat_tgt (low)

Bits	Field name	Description	Type	Reset
31:12	Reserved	Reserved	RO	-
11:0	p0_lat_tgt	Port 0 transaction target latency/period; a value of 0 corresponds to no regulation	RW	12'h000

por_mxp_p0_qos_lat_scale

Controls the QoS target scale factor for devices connected to port 0. The scale factor is represented in powers of two from the range 2^(-3) to 2^(-10).

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hA90

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

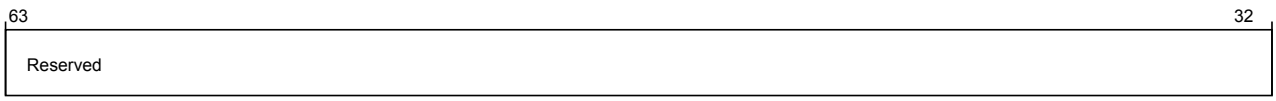

Figure 3-682 por_mxp_p0_qos_lat_scale (high)

The following table shows the por_mxp_p0_qos_lat_scale higher register bit assignments.

Table 3-696 por_mxp_p0_qos_lat_scale (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

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The following image shows the lower register bit assignments.

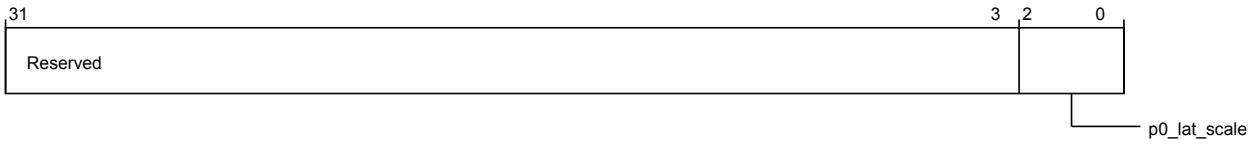

Figure 3-683 por_mxp_p0_qos_lat_scale (low)

The following table shows the por_mxp_p0_qos_lat_scale lower register bit assignments.

Table 3-697 por_mxp_p0_qos_lat_scale (low)

Bits	Field name	Description	Type	Reset
31:3	Reserved	Reserved	RO	-
2:0	p0_lat_scale	Port 0 QoS scale factor 3'b000: 2^(-3) 3'b001: 2^(-4) 3'b010: 2^(-5) 3'b011: 2^(-6) 3'b100: 2^(-7) 3'b101: 2^(-8) 3'b110: 2^(-9) 3'b111: 2^(-10)	RW	3'h0

por_mxp_p0_qos_lat_range

Controls the minimum and maximum QoS values generated by the QoS regulator for devices connected to port 0.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hA98
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

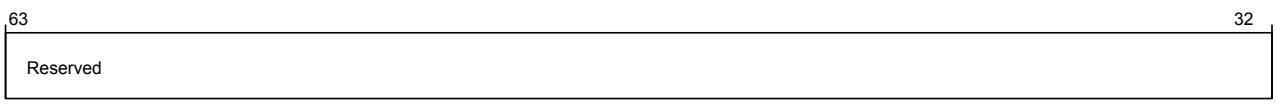

Figure 3-684 por_mxp_p0_qos_lat_range (high)

The following table shows the por_mxp_p0_qos_lat_range higher register bit assignments.

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Table 3-698 por_mxp_p0_qos_lat_range (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

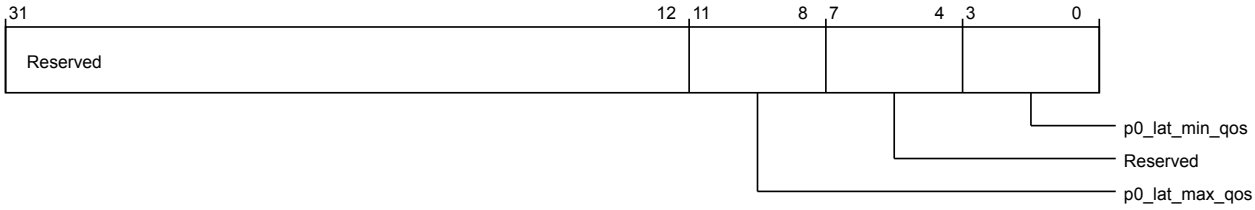

Figure 3-685 por_mxp_p0_qos_lat_range (low)

The following table shows the por_mxp_p0_qos_lat_range lower register bit assignments.

Table 3-699 por_mxp_p0_qos_lat_range (low)

Bits	Field name	Description	Type	Reset
31:12	Reserved	Reserved	RO	-
11:8	p0_lat_max_qos	Port 0 QoS maximum value	RW	4'h0
7:4	Reserved	Reserved	RO	-
3:0	p0_lat_min_qos	Port 0 QoS minimum value	RW	4'h0

por_mxp_p1_qos_control

Controls QoS settings for devices connected to port 1.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hAA0
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

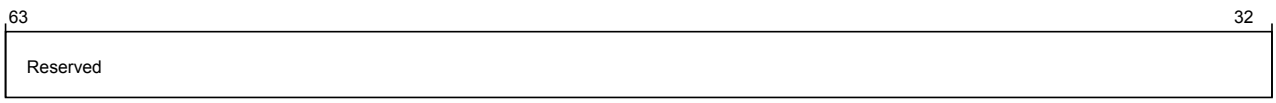

Figure 3-686 por_mxp_p1_qos_control (high)

The following table shows the por_mxp_p1_qos_control higher register bit assignments.

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Table 3-700 por_mxp_p1_qos_control (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

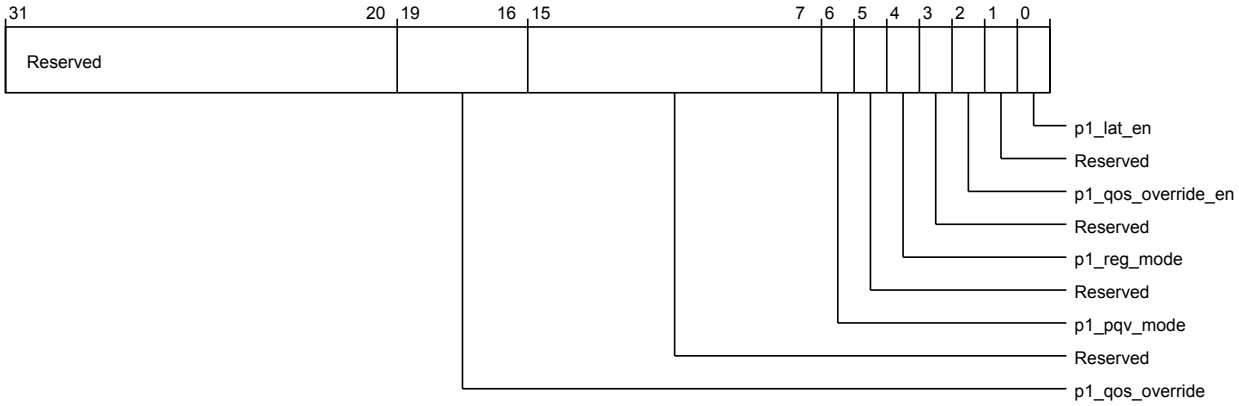

Figure 3-687 por_mxp_p1_qos_control (low)

The following table shows the por_mxp_p1_qos_control lower register bit assignments.

Table 3-701 por_mxp_p1_qos_control (low)

Bits	Field name	Description	Type	Reset
31:20	Reserved	Reserved	RO	-
19:16	p1_qos_override	QoS override value for port 1	RW	4'b0000
15:7	Reserved	Reserved	RO	-
6	p1_pqv_mode	Configures the QoS regulator mode during period mode 1'b0: Normal mode; QoS value is stable when the master is idle 1'b1: Quiesce high mode; QoS value tends to the maximum value when the master is idle	RW	1'b0
5	Reserved	Reserved	RO	-
4	p1_reg_mode	Configures the QoS regulator mode 1'b0: Latency mode 1'b1: Period mode; used for bandwidth regulation	RW	1'b0
3	Reserved	Reserved	RO	-
2	p1_qos_override_en	Enables port 1 QoS override; when set, allows QoS value on inbound transactions to be overridden	RW	1'b0
1	Reserved	Reserved	RO	-
0	p1_lat_en	Enables port 1 QoS regulation when set	RW	1'b0

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por_mxp_p1_qos_lat_tgt

Controls QoS target latency/period (in cycles) for regulation of devices connected to port 1.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hAA8
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

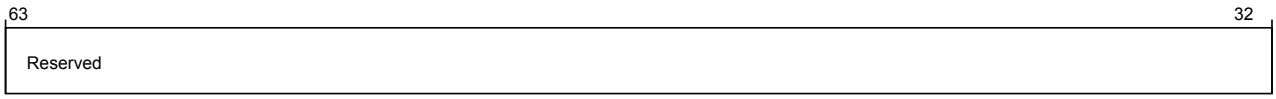

Figure 3-688 por_mxp_p1_qos_lat_tgt (high)

The following table shows the por_mxp_p1_qos_lat_tgt higher register bit assignments.

Table 3-702 por_mxp_p1_qos_lat_tgt (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

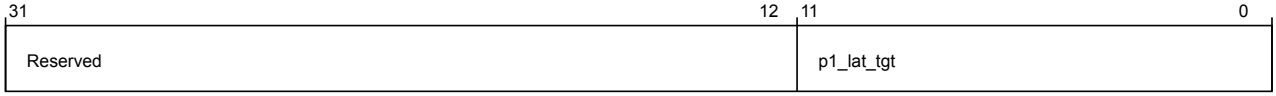

Figure 3-689 por_mxp_p1_qos_lat_tgt (low)

The following table shows the por_mxp_p1_qos_lat_tgt lower register bit assignments.

Table 3-703 por_mxp_p1_qos_lat_tgt (low)

Bits	Field name	Description	Type	Reset
31:12	Reserved	Reserved	RO	-
11:0	p1_lat_tgt	Port 1 transaction target latency/period; a value of 0 corresponds to no regulation	RW	12'h000

por_mxp_p1_qos_lat_scale

Controls the QoS target scale factor for devices connected to port 1. The scale factor is represented in powers of two from the range 2^(-3) to 2^(-10).

Its characteristics are:

Type RW

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Register width (Bits) 64

Address offset 14'hAB0

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

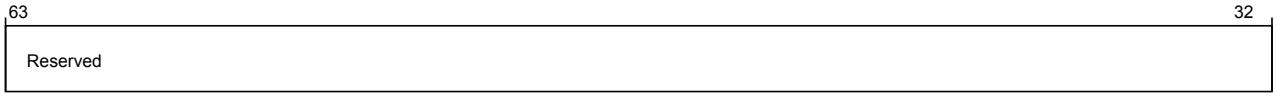

Figure 3-690 por_mxp_p1_qos_lat_scale (high)

The following table shows the por_mxp_p1_qos_lat_scale higher register bit assignments.

Table 3-704 por_mxp_p1_qos_lat_scale (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

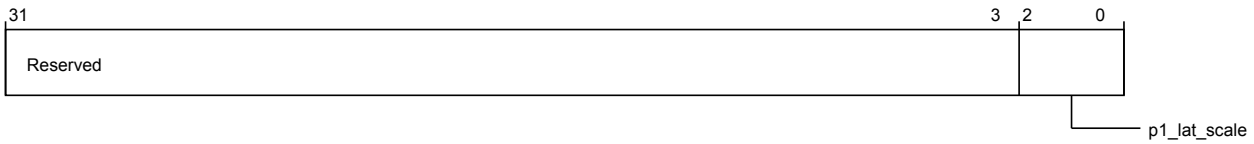

Figure 3-691 por_mxp_p1_qos_lat_scale (low)

The following table shows the por_mxp_p1_qos_lat_scale lower register bit assignments.

Table 3-705 por_mxp_p1_qos_lat_scale (low)

Bits	Field name	Description	Type	Reset
31:3	Reserved	Reserved	RO	-
2:0	p1_lat_scale	Port 1 QoS scale factor 3'b000: 2^(-3) 3'b001: 2^(-4) 3'b010: 2^(-5) 3'b011: 2^(-6) 3'b100: 2^(-7) 3'b101: 2^(-8) 3'b110: 2^(-9) 3'b111: 2^(-10)	RW	3'h0

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por_mxp_p1_qos_lat_range

Controls the minimum and maximum QoS values generated by the QoS regulator for devices connected to port 1.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hAB8

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

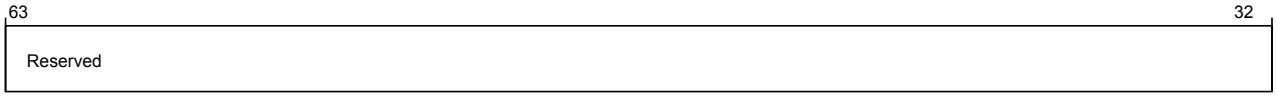

Figure 3-692 por_mxp_p1_qos_lat_range (high)

The following table shows the por_mxp_p1_qos_lat_range higher register bit assignments.

Table 3-706 por_mxp_p1_qos_lat_range (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

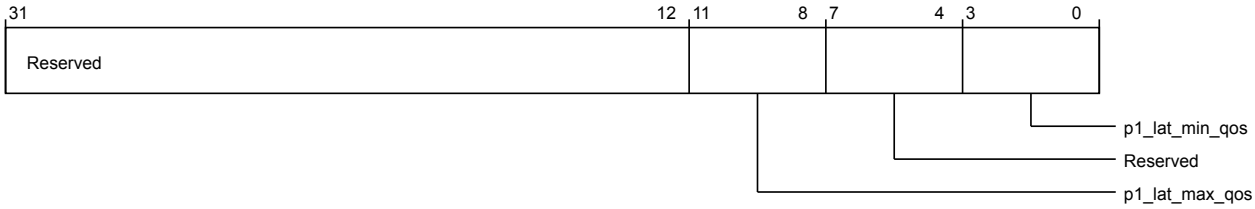

Figure 3-693 por_mxp_p1_qos_lat_range (low)

The following table shows the por_mxp_p1_qos_lat_range lower register bit assignments.

Table 3-707 por_mxp_p1_qos_lat_range (low)

Bits	Field name	Description	Type	Reset
31:12	Reserved	Reserved	RO	-
11:8	p1_lat_max_qos	Port 1 QoS maximum value	RW	4'h0
7:4	Reserved	Reserved	RO	-
3:0	p1_lat_min_qos	Port 1 QoS minimum value	RW	4'h0

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por_mxp_pmu_event_sel

Specifies the PMU event to be counted.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h2000
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

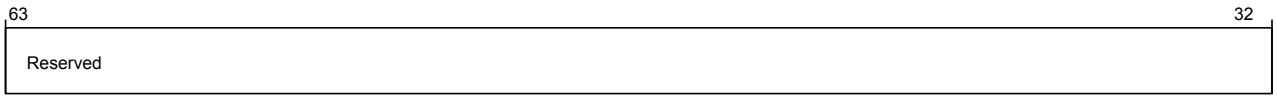

Figure 3-694 por_mxp_pmu_event_sel (high)

The following table shows the por_mxp_pmu_event_sel higher register bit assignments.

Table 3-708 por_mxp_pmu_event_sel (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

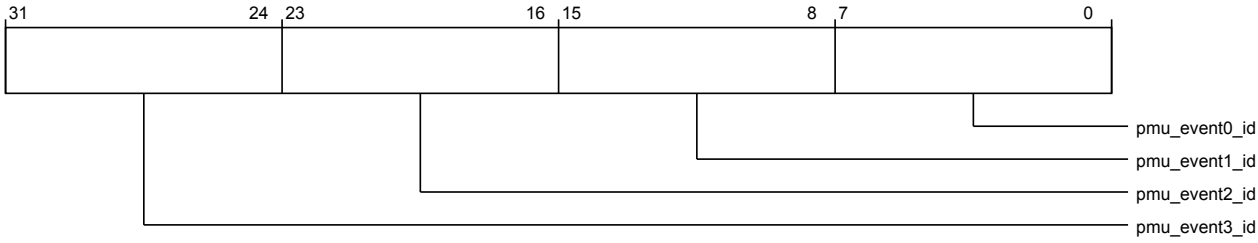

Figure 3-695 por_mxp_pmu_event_sel (low)

The following table shows the por_mxp_pmu_event_sel lower register bit assignments.

Table 3-709 por_mxp_pmu_event_sel (low)

Bits	Field name	Description	Type	Reset
31:24	pmu_event3_id	XP PMU Event 3 ID; see pmu_event0_id for encodings	RW	8'b0
23:16	pmu_event2_id	XP PMU Event 2 ID; see pmu_event0_id for encodings	RW	8'b0

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Table 3-709 por_mxp_pmu_event_sel (low) (continued)

Bits	Field name	Description	Type	Reset
15:8	pmu_event1_id	XP PMU Event 1 ID; see pmu_event0_id for encodings	RW	8'b0
7:0	pmu_event0_id	XP PMU Event 0 ID Bits [7:5]: PC 3'b000: REQ 3'b001: RSP 3'b010: SNP 3'b011: DAT Bits [4:2]: Interface 3'b000: East 3'b001: West 3'b010: North 3'b011: South 3'b100: Device port 0 3'b101: Device port 1 Bits [1:0]: Event specifier 2'b00: No event 2'b01: TX flit valid; signaled when a flit is successfully transmitted 2'b10: TX flit stall; signaled when flit transmission is stalled and waiting on credits 2'b11: Partial DAT flit; signaled when 128-bit DAT flits could not be merged into a 256-bit DAT flit; only applicable on the DAT PC on RN-F CHIA and RN-F CHIA ESAM ports	RW	8'b0

por_mxp_errfr

Functions as the error feature register.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h3000
Register reset 64'b0000010100101
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

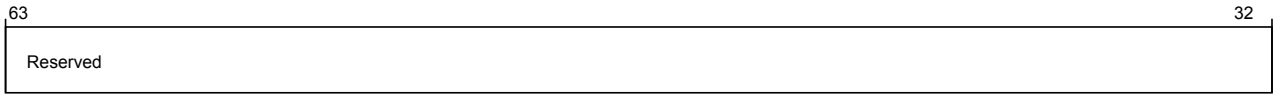

Figure 3-696 por_mxp_errfr (high)

The following table shows the por_mxp_errfr higher register bit assignments.

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Table 3-710 por_mxp_errfr (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

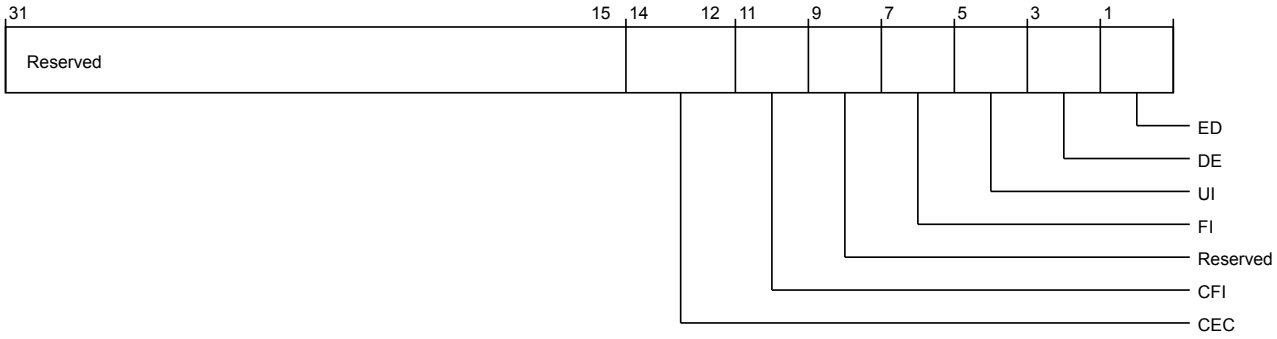

Figure 3-697 por_mxp_errfr (low)

The following table shows the por_mxp_errfr lower register bit assignments.

Table 3-711 por_mxp_errfr (low)

Bits	Field name	Description	Type	Reset
31:15	Reserved	Reserved	RO	-
14:12	CEC	Standard corrected error count mechanism 3'b000: Does not implement standardized error counter model	RO	3'b000
11:10	CFI	Corrected error interrupt	RO	2'b00
9:8	Reserved	Reserved	RO	-
7:6	FI	Fault handling interrupt	RO	2'b10
5:4	UI	Uncorrected error interrupt	RO	2'b10
3:2	DE	Deferred errors for data poison	RO	2'b01
1:0	ED	Error detection	RO	2'b01

por_mxp_errctlr

Functions as the error control register. Controls whether specific error-handling interrupts and error detection/deferment are enabled.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h3008

Register reset 64'b0

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Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

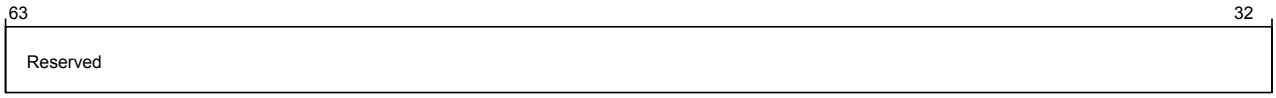

Figure 3-698 por_mxp_errctlr (high)

The following table shows the por_mxp_errctlr higher register bit assignments.

Table 3-712 por_mxp_errctlr (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

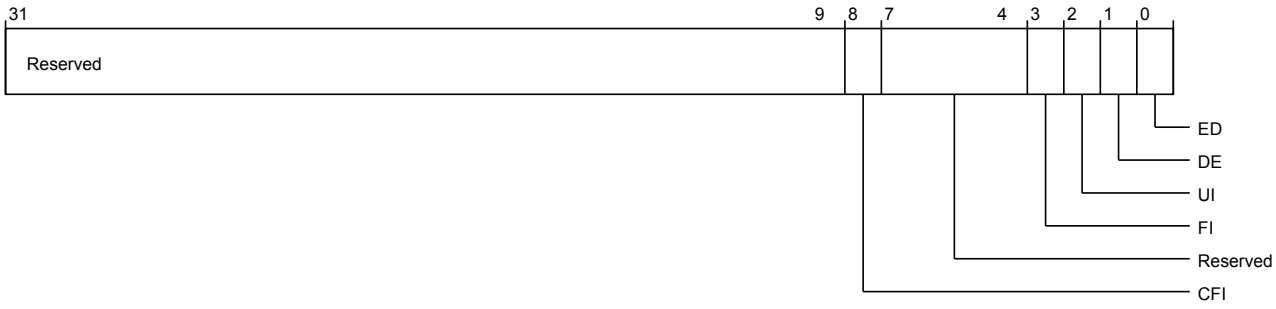

Figure 3-699 por_mxp_errctlr (low)

The following table shows the por_mxp_errctlr lower register bit assignments.

Table 3-713 por_mxp_errctlr (low)

Bits	Field name	Description	Type	Reset
31:9	Reserved	Reserved	RO	-
8	CFI	Enables corrected error interrupt as specified in por_mxp_errfr.CFI	RW	1'b0
7:4	Reserved	Reserved	RO	-
3	FI	Enables fault handling interrupt for all detected deferred errors as specified in por_mxp_errfr.FI	RW	1'b0
2	UI	Enables uncorrected error interrupt as specified in por_mxp_errfr.UI	RW	1'b0
1	DE	Enables error deferment as specified in por_mxp_errfr.DE	RW	1'b0
0	ED	Enables error detection as specified in por_mxp_errfr.ED	RW	1'b0

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por_mxp_errstatus

Functions as the error status register. AV and MV bits must be cleared in the same cycle, otherwise the error record does not have a consistent view.

Its characteristics are:

Type W1C

Register width (Bits) 64

Address offset 14'h3010

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

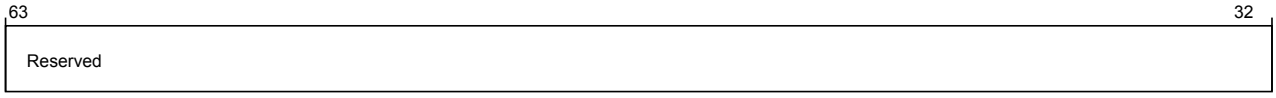

Figure 3-700 por_mxp_errstatus (high)

The following table shows the por_mxp_errstatus higher register bit assignments.

Table 3-714 por_mxp_errstatus (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

Figure 3-701 por_mxp_errstatus (low)

The following table shows the por_mxp_errstatus lower register bit assignments.

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Table 3-715 por_mxp_errstatus (low)

Bits	Field name	Description	Type	Reset
31	AV	Address register valid; writes to this bit are ignored if any of the UE, DE, or CE bits are set to 1, and the highest priority are not cleared to 0 in the same write; write a 1 to clear 1'b1: Address is valid 1'b0: Address is not valid	W1C	1'b0
30	V	Register valid; writes to this bit are ignored if any of the UE, DE, or CE bits are set to 1, and are not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one error recorded; register is valid 1'b0: No errors recorded	W1C	1'b0
29	UE	Uncorrected errors; writes to this bit are ignored if the OF bit is set to 1, and is not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one error detected that is not corrected and is not deferred to a slave 1'b0: No uncorrected errors detected	W1C	1'b0
28	Reserved	Reserved	RO	-
27	OF	Overflow; asserted when multiple errors of the highest priority type are detected; write a 1 to clear 1'b1: More than one error detected 1'b0: Only one error of the highest priority type detected as described by UE/DE/CE fields	W1C	1'b0
26	MV	por_mxp_errmisc valid; writes to this bit are ignored if any of the UE, DE, or CE bits are set to 1, and the highest priority are not cleared to 0 in the same write; write a 1 to clear 1'b1: Miscellaneous registers are valid 1'b0: Miscellaneous registers are not valid	W1C	1'b0
25	Reserved	Reserved	RO	-
24	CE	Corrected errors; writes to this bit are ignored if the OF bit is set to 1, and is not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one transient corrected error recorded 1'b0: No corrected errors recorded	W1C	1'b0
23	DE	Deferred errors; writes to this bit are ignored if the OF bit is set to 1, and is not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one error is not corrected and is deferred 1'b0: No errors deferred	W1C	1'b0
22:0	Reserved	Reserved	RO	-

por_mxp_errmisc

Functions as the miscellaneous error register. Contains miscellaneous information about deferred/uncorrected errors.

Its characteristics are:

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Type RW
Register width (Bits) 64
Address offset 14'h3028
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

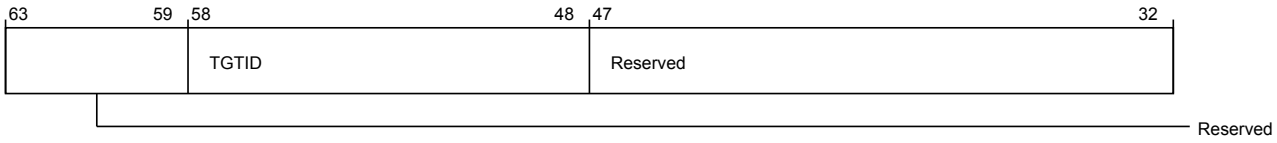

Figure 3-702 por_mxp_errmisc (high)

The following table shows the por_mxp_errmisc higher register bit assignments.

Table 3-716 por_mxp_errmisc (high)

Bits	Field name	Description	Type	Reset
63:59	Reserved	Reserved	RO	-
58:48	TGTID	Error flit target ID	RW	11'b0
47:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

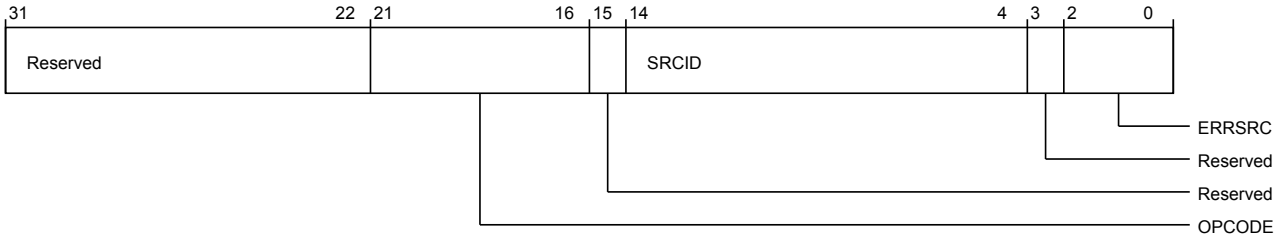

Figure 3-703 por_mxp_errmisc (low)

The following table shows the por_mxp_errmisc lower register bit assignments.

Table 3-717 por_mxp_errmisc (low)

Bits	Field name	Description	Type	Reset
31:22	Reserved	Reserved	RO	-
21:16	OPCODE	Error flit opcode	RW	6'b0
15	Reserved	Reserved	RO	-

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Table 3-717 por_mxp_errmisc (low) (continued)

Bits	Field name	Description	Type	Reset
14:4	SRCID	Error flit source ID	RW	11'b0
3	Reserved	Reserved	RO	-
2:0	ERRSRC	Error source Bits [2:1]: Transaction type 2'b00: REQ 2'b01: RSP 2'b10: SNP 2'b11: DAT Bit [0]: Port 1'b0: Port 0 1'b1: Port 1	RW	3'b0

por_mxp_p0_byte_par_err_inj

Functions as the byte parity error injection register for XP port 0.

Its characteristics are:

Type WO
Register width (Bits) 64
Address offset 14'h3030
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

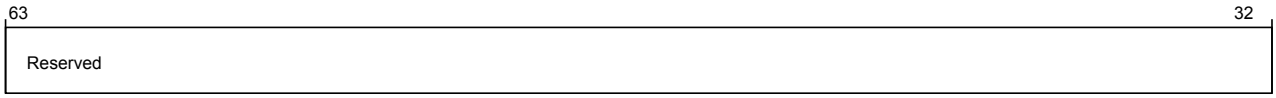

Figure 3-704 por_mxp_p0_byte_par_err_inj (high)

The following table shows the por_mxp_p0_byte_par_err_inj higher register bit assignments.

Table 3-718 por_mxp_p0_byte_par_err_inj (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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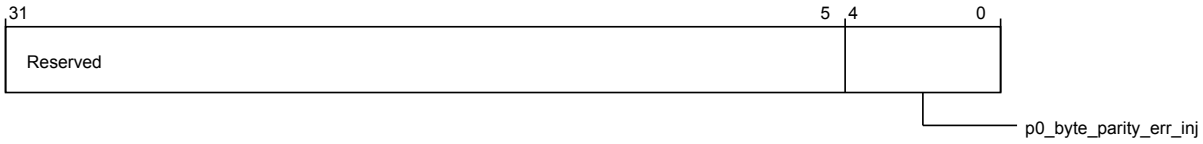

Figure 3-705 por_mxp_p0_byte_par_err_inj (low)

The following table shows the por_mxp_p0_byte_par_err_inj lower register bit assignments.

Table 3-719 por_mxp_p0_byte_par_err_inj (low)

Bits	Field name	Description	Type	Reset
31:5	Reserved	Reserved	RO	-
4:0	p0_byte_parity_err_inj	Specifies a byte lane; once this register is written, a byte parity error is injected in the specified byte lane on the next DAT flit upload ——— **Note** ——— Only applicable if an RN-F is attached to port 0. Byte parity error is only injected if the RN-F is configured to not support Datacheck. ———	WO	5'h00

por_mxp_p1_byte_par_err_inj

Functions as the byte parity error injection register for XP port 1.

Its characteristics are:

Type WO
Register width (Bits) 64
Address offset 14'h3038
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

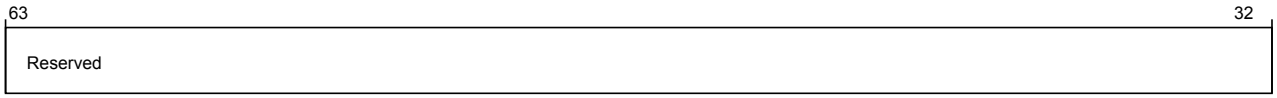

Figure 3-706 por_mxp_p1_byte_par_err_inj (high)

The following table shows the por_mxp_p1_byte_par_err_inj higher register bit assignments.

Table 3-720 por_mxp_p1_byte_par_err_inj (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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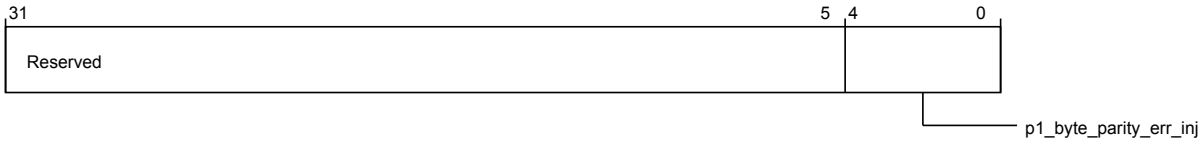

Figure 3-707 por_mxp_p1_byte_par_err_inj (low)

The following table shows the por_mxp_p1_byte_par_err_inj lower register bit assignments.

Table 3-721 por_mxp_p1_byte_par_err_inj (low)

Bits	Field name	Description	Type	Reset
31:5	Reserved	Reserved	RO	-
4:0	p1_byte_parity_err_inj	Specifies a byte lane; once this register is written, a byte parity error is injected in the specified byte lane on the next DAT flit upload ——— **Note** ——— Only applicable if an RN-F is attached to port 0. Byte parity error is only injected if the RN-F is configured to not support Datacheck. ———	WO	5'h00

por_mxp_errfr_NS

Functions as the non-secure error feature register.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h3100
Register reset 64'b0000010100101
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

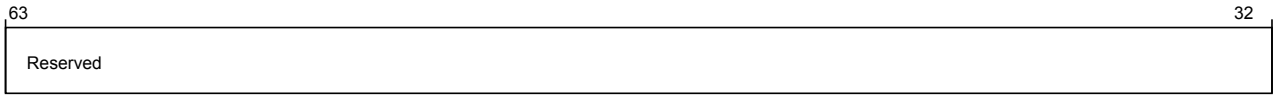

Figure 3-708 por_mxp_errfr_ns (high)

The following table shows the por_mxp_errfr_NS higher register bit assignments.

Table 3-722 por_mxp_errfr_ns (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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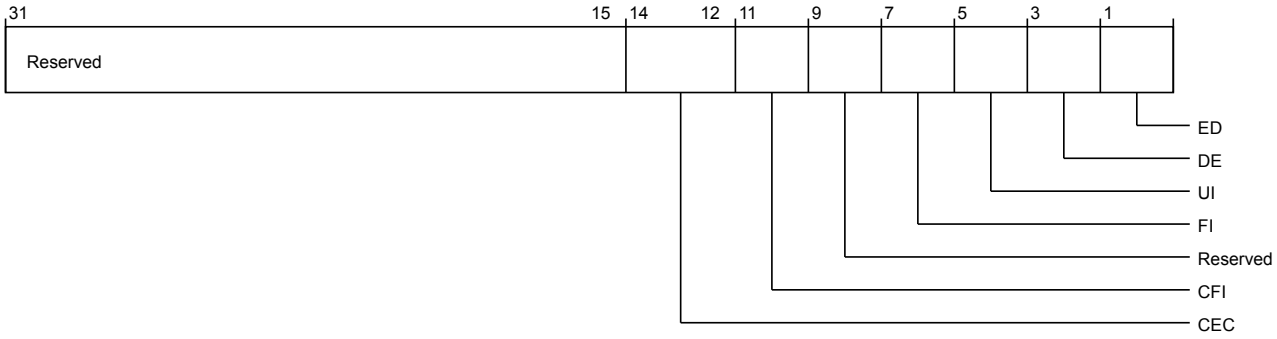

Figure 3-709 por_mxp_errfr_ns (low)

The following table shows the por_mxp_errfr_NS lower register bit assignments.

Table 3-723 por_mxp_errfr_ns (low)

Bits	Field name	Description	Type	Reset
31:15	Reserved	Reserved	RO	-
14:12	CEC	Standard corrected error count mechanism 3'b000: Does not implement standardized error counter model	RO	3'b000
11:10	CFI	Corrected error interrupt	RO	2'b00
9:8	Reserved	Reserved	RO	-
7:6	FI	Fault handling interrupt	RO	2'b10
5:4	UI	Uncorrected error interrupt	RO	2'b10
3:2	DE	Deferred errors for data poison	RO	2'b01
1:0	ED	Error detection	RO	2'b01

por_mxp_errctlr_NS

Functions as the non-secure error control register. Controls whether specific error-handling interrupts and error detection/deferment are enabled.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h3108

Register reset 64'b0

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

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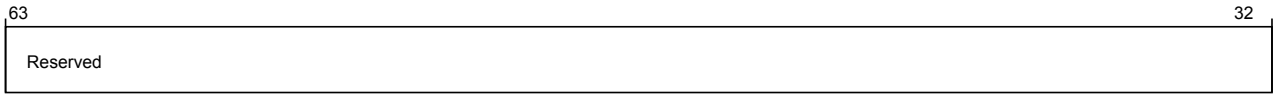

Figure 3-710 por_mxp_errctlr_ns (high)

The following table shows the por_mxp_errctlr_NS higher register bit assignments.

Table 3-724 por_mxp_errctlr_ns (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

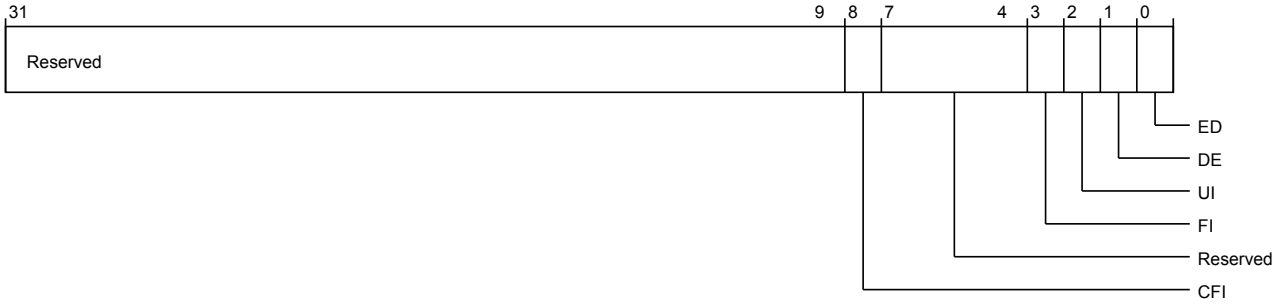

Figure 3-711 por_mxp_errctlr_ns (low)

The following table shows the por_mxp_errctlr_NS lower register bit assignments.

Table 3-725 por_mxp_errctlr_ns (low)

Bits	Field name	Description	Type	Reset
31:9	Reserved	Reserved	RO	-
8	CFI	Enables corrected error interrupt as specified in por_mxp_errfr_NS.CFI	RW	1'b0
7:4	Reserved	Reserved	RO	-
3	FI	Enables fault handling interrupt for all detected deferred errors as specified in por_mxp_errfr_NS.FI	RW	1'b0
2	UI	Enables uncorrected error interrupt as specified in por_mxp_errfr_NS.UI	RW	1'b0
1	DE	Enables error deferment as specified in por_mxp_errfr_NS.DE	RW	1'b0
0	ED	Enables error detection as specified in por_mxp_errfr_NS.ED	RW	1'b0

por_mxp_errstatus_NS

Functions as the non-secure error status register.

Its characteristics are:

Type W1C

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Register width (Bits) 64

Address offset 14'h3110

Register reset 64'b0

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

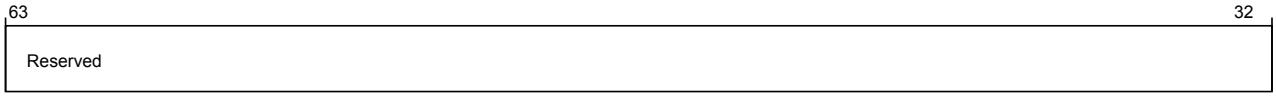

Figure 3-712 por_mxp_errstatus_ns (high)

The following table shows the por_mxp_errstatus_NS higher register bit assignments.

Table 3-726 por_mxp_errstatus_ns (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

Figure 3-713 por_mxp_errstatus_ns (low)

The following table shows the por_mxp_errstatus_NS lower register bit assignments.

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Table 3-727 por_mxp_errstatus_ns (low)

Bits	Field name	Description	Type	Reset
31	AV	Address register valid; writes to this bit are ignored if any of the UE, DE, or CE bits are set to 1, and the highest priority are not cleared to 0 in the same write; write a 1 to clear 1'b1: Address is valid 1'b0: Address is not valid	W1C	1'b0
30	V	Register valid; writes to this bit are ignored if any of the UE, DE, or CE bits are set to 1, and are not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one error recorded; register is valid 1'b0: No errors recorded	W1C	1'b0
29	UE	Uncorrected errors; writes to this bit are ignored if the OF bit is set to 1, and is not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one error detected that is not corrected and is not deferred to a slave 1'b0: No uncorrected errors detected	W1C	1'b0
28	Reserved	Reserved	RO	-
27	OF	Overflow; asserted when multiple errors of the highest priority type are detected; write a 1 to clear 1'b1: More than one error detected 1'b0: Only one error of the highest priority type detected as described by UE/DE/CE fields	W1C	1'b0
26	MV	por_mxp_errmisc_NS valid; writes to this bit are ignored if any of the UE, DE, or CE bits are set to 1, and the highest priority are not cleared to 0 in the same write; write a 1 to clear 1'b1: Miscellaneous registers are valid 1'b0: Miscellaneous registers are not valid	W1C	1'b0
25	Reserved	Reserved	RO	-
24	CE	Corrected errors; writes to this bit are ignored if the OF bit is set to 1, and is not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one transient corrected error recorded 1'b0: No corrected errors recorded	W1C	1'b0
23	DE	Deferred errors; writes to this bit are ignored if the OF bit is set to 1, and is not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one error is not corrected and is deferred 1'b0: No errors deferred	W1C	1'b0
22:0	Reserved	Reserved	RO	-

por_mxp_errmisc_NS

Functions as the non-secure miscellaneous error register. Contains miscellaneous information about deferred/uncorrected errors.

Its characteristics are:

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Type RW

Register width (Bits) 64

Address offset 14'h3128

Register reset 64'b0

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

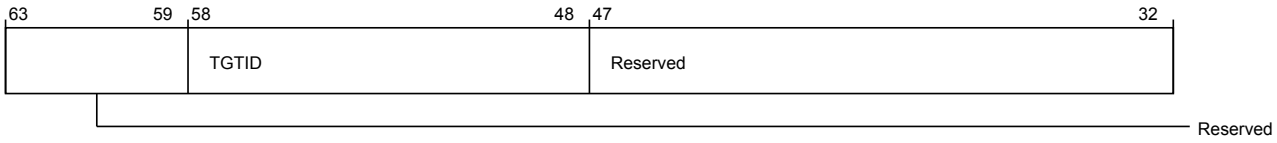

Figure 3-714 por_mxp_errmisc_ns (high)

The following table shows the por_mxp_errmisc_NS higher register bit assignments.

Table 3-728 por_mxp_errmisc_ns (high)

Bits	Field name	Description	Type	Reset
63:59	Reserved	Reserved	RO	-
58:48	TGTID	Error flit target ID	RW	11'b0
47:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

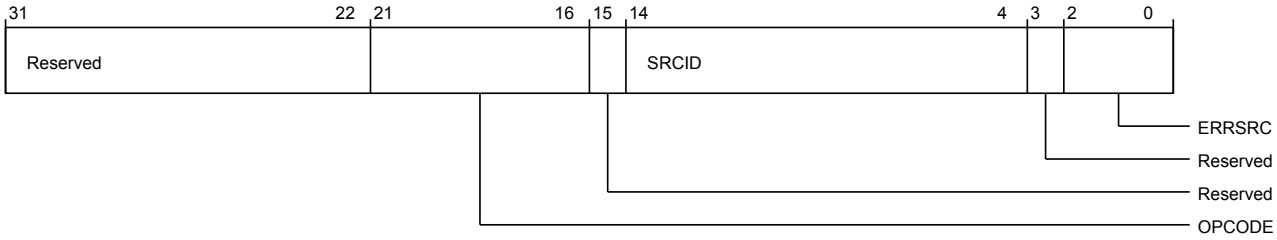

Figure 3-715 por_mxp_errmisc_ns (low)

The following table shows the por_mxp_errmisc_NS lower register bit assignments.

Table 3-729 por_mxp_errmisc_ns (low)

Bits	Field name	Description	Type	Reset
31:22	Reserved	Reserved	RO	-
21:16	OPCODE	Error flit opcode	RW	6'b0
15	Reserved	Reserved	RO	-

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Table 3-729 por_mxp_errmisc_ns (low) (continued)

Bits	Field name	Description	Type	Reset
14:4	SRCID	Error flit source ID	RW	11'b0
3	Reserved	Reserved	RO	-
2:0	ERRSRC	Error source Bits [2:1]: Transaction type 2'b00: REQ 2'b01: RSP 2'b10: SNP 2'b11: DAT Bit [0]: Port 1'b0: Port 0 1'b1: Port 1	RW	3'b0

por_mxp_p0_syscoreq_ctl

Functions as the port 0 snoop and DVM domain control register. Provides a software alternative to hardware SYSCOREQ/SYSCOACK handshake. Works with por_mxp_p0_syscoack_status. NOTE: Only valid on RN-F ports.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h1000

Register reset 64'b0

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

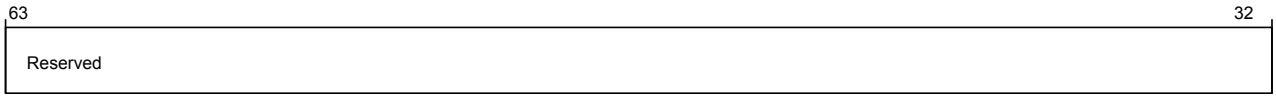

Figure 3-716 por_mxp_p0_syscoreq_ctl (high)

The following table shows the por_mxp_p0_syscoreq_ctl higher register bit assignments.

Table 3-730 por_mxp_p0_syscoreq_ctl (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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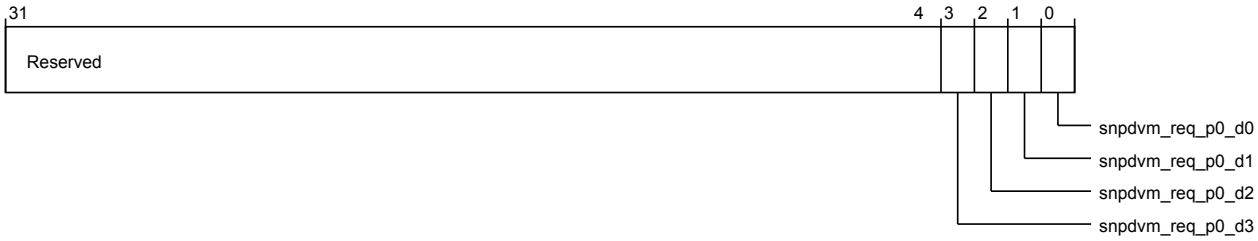

Figure 3-717 por_mxp_p0_syscoreq_ctl (low)

The following table shows the por_mxp_p0_syscoreq_ctl lower register bit assignments.

Table 3-731 por_mxp_p0_syscoreq_ctl (low)

Bits	Field name	Description	Type	Reset
31:4	Reserved	Reserved	RO	-
3	snpdvm_req_p0_d3	When set, initiates the process of enabling snoop and DVM dispatches (SYSCOREQ) to device 3 on port 0	RW	1'b0
2	snpdvm_req_p0_d2	When set, initiates the process of enabling snoop and DVM dispatches (SYSCOREQ) to device 2 on port 0	RW	1'b0
1	snpdvm_req_p0_d1	When set, initiates the process of enabling snoop and DVM dispatches (SYSCOREQ) to device 1 on port 0	RW	1'b0
0	snpdvm_req_p0_d0	When set, initiates the process of enabling snoop and DVM dispatches (SYSCOREQ) to device 0 on port 0	RW	1'b0

por_mxp_p1_syscoreq_ctl

Functions as the port 1 snoop and DVM domain control register. Provides a software alternative to hardware SYSCOREQ/SYSCOACK handshake. Works with por_mxp_p1_syscoack_status. NOTE: Only valid on RN-F ports.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h1008

Register reset 64'b0

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

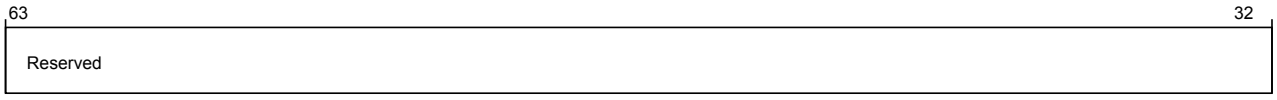

Figure 3-718 por_mxp_p1_syscoreq_ctl (high)

The following table shows the por_mxp_p1_syscoreq_ctl higher register bit assignments.

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Table 3-732 por_mxp_p1_syscoreq_ctl (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

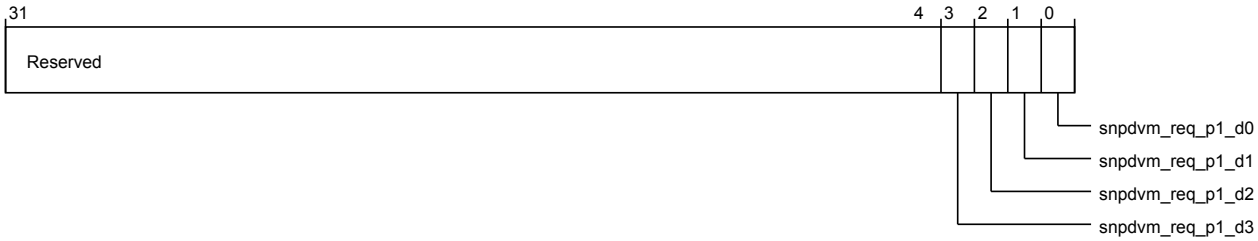

Figure 3-719 por_mxp_p1_syscoreq_ctl (low)

The following table shows the por_mxp_p1_syscoreq_ctl lower register bit assignments.

Table 3-733 por_mxp_p1_syscoreq_ctl (low)

Bits	Field name	Description	Type	Reset
31:4	Reserved	Reserved	RO	-
3	snpdvm_req_p1_d3	When set, initiates the process of enabling snoop and DVM dispatches (SYSCOREQ) to device 3 on port 1	RW	1'b0
2	snpdvm_req_p1_d2	When set, initiates the process of enabling snoop and DVM dispatches (SYSCOREQ) to device 2 on port 1	RW	1'b0
1	snpdvm_req_p1_d1	When set, initiates the process of enabling snoop and DVM dispatches (SYSCOREQ) to device 1 on port 1	RW	1'b0
0	snpdvm_req_p1_d0	When set, initiates the process of enabling snoop and DVM dispatches (SYSCOREQ) to device 0 on port 1	RW	1'b0

por_mxp_p0_syscoack_status

Functions as the port 0 snoop and DVM domain status register. Provides a software alternative to hardware SYSCOREQ/SYSCOACK handshake. Works with por_mxp_p0_syscoreq_ctl. NOTE: Only valid on RN-F ports.

Its characteristics are:

Type RO

Register width (Bits) 64

Address offset 14'h1010

Register reset 64'b0

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

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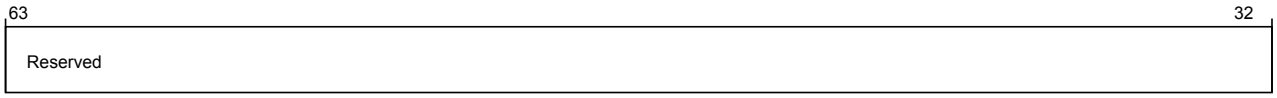

Figure 3-720 por_mxp_p0_syscoack_status (high)

The following table shows the por_mxp_p0_syscoack_status higher register bit assignments.

Table 3-734 por_mxp_p0_syscoack_status (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

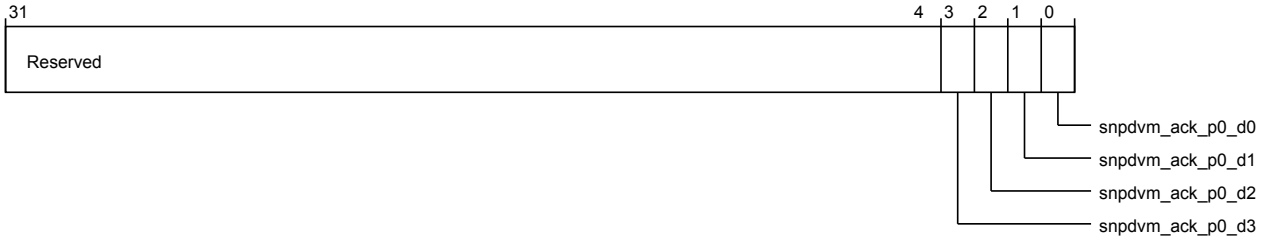

Figure 3-721 por_mxp_p0_syscoack_status (low)

The following table shows the por_mxp_p0_syscoack_status lower register bit assignments.

Table 3-735 por_mxp_p0_syscoack_status (low)

Bits	Field name	Description	Type	Reset
31:4	Reserved	Reserved	RO	-
3	snpdvm_ack_p0_d3	When set, indicates snoop and DVM dispatches are enabled (SYSCOACK) for device 3 on port 0	RO	1'b0
2	snpdvm_ack_p0_d2	When set, indicates snoop and DVM dispatches are enabled (SYSCOACK) for device 2 on port 0	RO	1'b0
1	snpdvm_ack_p0_d1	When set, indicates snoop and DVM dispatches are enabled (SYSCOACK) for device 1 on port 0	RO	1'b0
0	snpdvm_ack_p0_d0	When set, indicates snoop and DVM dispatches are enabled (SYSCOACK) for device 0 on port 0	RO	1'b0

por_mxp_p1_syscoack_status

Functions as the port 1 snoop and DVM domain status register. Provides a software alternative to hardware SYSCOREQ/SYSCOACK handshake. Works with por_mxp_p1_syscoreq_ctl. NOTE: Only valid on RN-F ports.

Its characteristics are:

Type RO

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Register width (Bits) 64

Address offset 14'h1018

Register reset 64'b0

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

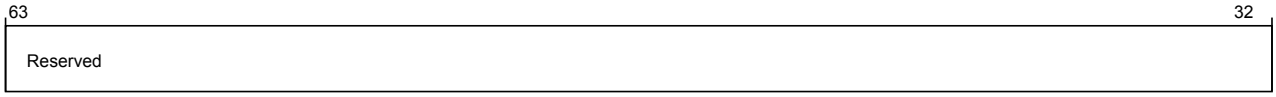

Figure 3-722 por_mxp_p1_syscoack_status (high)

The following table shows the por_mxp_p1_syscoack_status higher register bit assignments.

Table 3-736 por_mxp_p1_syscoack_status (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

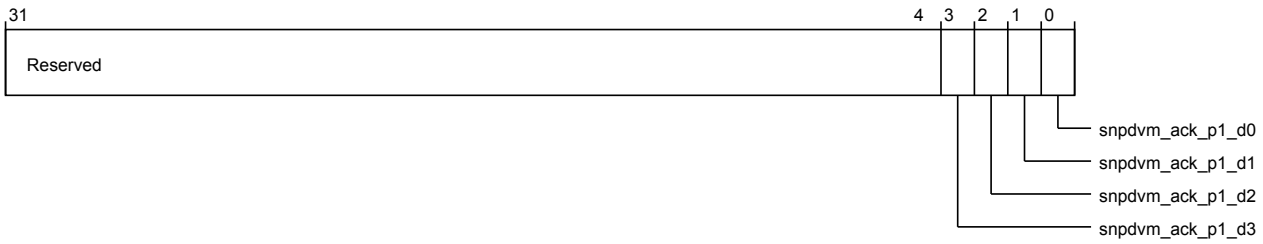

Figure 3-723 por_mxp_p1_syscoack_status (low)

The following table shows the por_mxp_p1_syscoack_status lower register bit assignments.

Table 3-737 por_mxp_p1_syscoack_status (low)

Bits	Field name	Description	Type	Reset
31:4	Reserved	Reserved	RO	-
3	snpdvm_ack_p1_d3	When set, indicates snoop and DVM dispatches are enabled (SYSCOACK) for device 3 on port 1	RO	1'b0
2	snpdvm_ack_p1_d2	When set, indicates snoop and DVM dispatches are enabled (SYSCOACK) for device 2 on port 1	RO	1'b0
1	snpdvm_ack_p1_d1	When set, indicates snoop and DVM dispatches are enabled (SYSCOACK) for device 1 on port 1	RO	1'b0
0	snpdvm_ack_p1_d0	When set, indicates snoop and DVM dispatches are enabled (SYSCOACK) for device 0 on port 1	RO	1'b0

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por_dtm_control

Functions as the DTM control register.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h2100
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

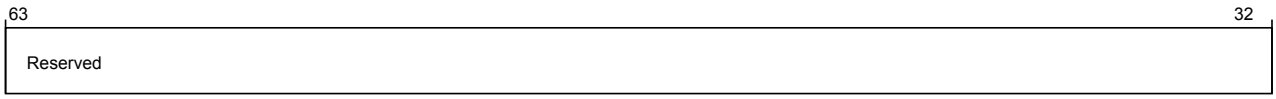

Figure 3-724 por_mxp_por_dtm_control (high)

The following table shows the por_dtm_control higher register bit assignments.

Table 3-738 por_mxp_por_dtm_control (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

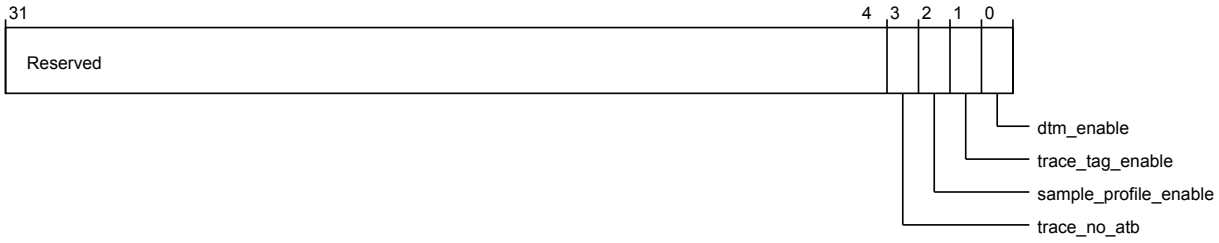

Figure 3-725 por_mxp_por_dtm_control (low)

The following table shows the por_dtm_control lower register bit assignments.

Table 3-739 por_mxp_por_dtm_control (low)

Bits	Field name	Description	Type	Reset
31:4	Reserved	Reserved	RO	-
3	trace_no_atb	When set, trace packet is not delivered out of ATB, and FIFO entry holds the first trace packet	RW	1'b0
2	sample_profile_enable	Enables sample profile function	RW	1'b0

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Table 3-739 por_mxp_por_dtm_control (low) (continued)

Bits	Field name	Description	Type	Reset
1	trace_tag_enable	Watchpoint trace tag enable 1'b1: Trace tag enabled 1'b0: No trace tag	RW	1'b0
0	dtm_enable	Enables debug watchpoint and PMU function; prior to writing this bit, all other DT configuration registers must be programmed; once this bit is set, other DT configuration registers must not be modified	RW	1'b0

por_dtm_fifo_entry_ready

Controls status of DTM FIFO entries.

Its characteristics are:

Type W1C
Register width (Bits) 64
Address offset 14'h2118
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

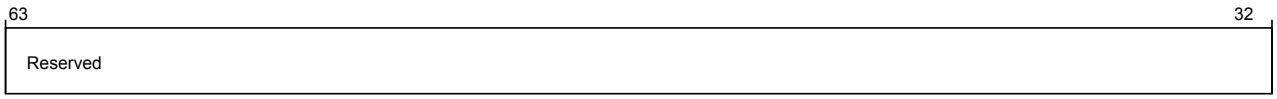

Figure 3-726 por_mxp_por_dtm_fifo_entry_ready (high)

The following table shows the por_dtm_fifo_entry_ready higher register bit assignments.

Table 3-740 por_mxp_por_dtm_fifo_entry_ready (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

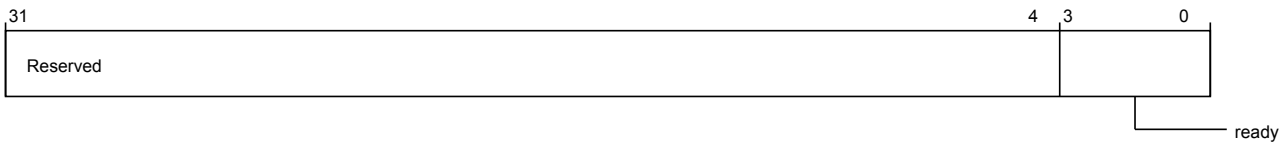

Figure 3-727 por_mxp_por_dtm_fifo_entry_ready (low)

The following table shows the por_dtm_fifo_entry_ready lower register bit assignments.

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Table 3-741 por_mxp_por_dtm_fifo_entry_ready (low)

Bits	Field name	Description	Type	Reset
31:4	Reserved	Reserved	RO	-
3:0	ready	Indicates which DTM FIFO entries are ready; write a 1 to clear Bit [3]: Entry 3 ready when set Bit [2]: Entry 2 ready when set Bit [1]: Entry 1 ready when set Bit [0]: Entry 0 ready when set	W1C	4'b0

por_dtm_fifo_entry0_0

Contains DTM FIFO entry 0 data.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h2120
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

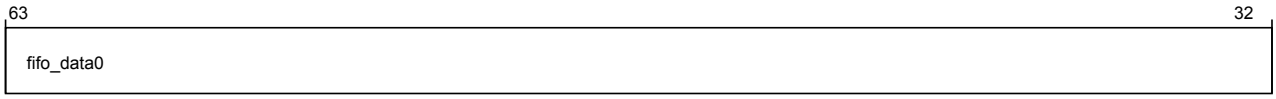

Figure 3-728 por_mxp_por_dtm_fifo_entry0_0 (high)

The following table shows the por_dtm_fifo_entry0_0 higher register bit assignments.

Table 3-742 por_mxp_por_dtm_fifo_entry0_0 (high)

Bits	Field name	Description	Type	Reset
63:32	fifo_data0	Entry data bit vector 63:0	RO	64'b0

The following image shows the lower register bit assignments.

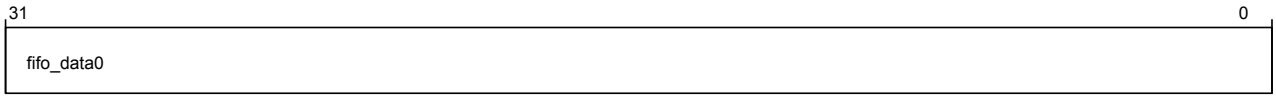

Figure 3-729 por_mxp_por_dtm_fifo_entry0_0 (low)

The following table shows the por_dtm_fifo_entry0_0 lower register bit assignments.

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Table 3-743 por_mxp_por_dtm_fifo_entry0_0 (low)

Bits	Field name	Description	Type	Reset
31:0	fifo_data0	Entry data bit vector 63:0	RO	64'b0

por_dtm_fifo_entry0_1

Contains DTM FIFO entry 0 data.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h2128
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

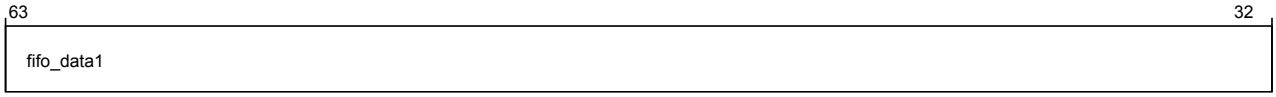

Figure 3-730 por_mxp_por_dtm_fifo_entry0_1 (high)

The following table shows the por_dtm_fifo_entry0_1 higher register bit assignments.

Table 3-744 por_mxp_por_dtm_fifo_entry0_1 (high)

Bits	Field name	Description	Type	Reset
63:32	fifo_data1	Entry data bit vector 127:64	RO	64'b0

The following image shows the lower register bit assignments.

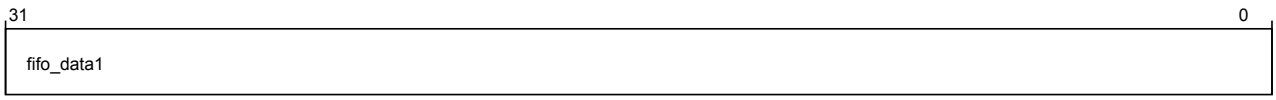

Figure 3-731 por_mxp_por_dtm_fifo_entry0_1 (low)

The following table shows the por_dtm_fifo_entry0_1 lower register bit assignments.

Table 3-745 por_mxp_por_dtm_fifo_entry0_1 (low)

Bits	Field name	Description	Type	Reset
31:0	fifo_data1	Entry data bit vector 127:64	RO	64'b0

por_dtm_fifo_entry0_2

Contains DTM FIFO entry 0 data.

Its characteristics are:

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Type RO
Register width (Bits) 64
Address offset 14'h2130
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

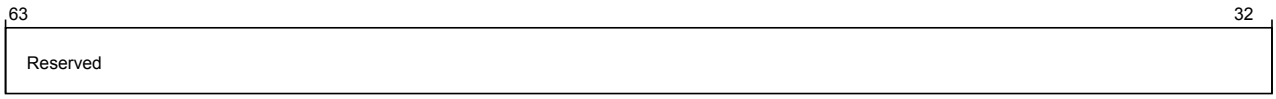

Figure 3-732 por_mxp_por_dtm_fifo_entry0_2 (high)

The following table shows the por_dtm_fifo_entry0_2 higher register bit assignments.

Table 3-746 por_mxp_por_dtm_fifo_entry0_2 (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

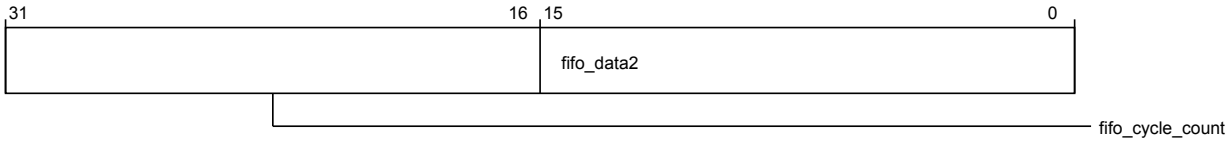

Figure 3-733 por_mxp_por_dtm_fifo_entry0_2 (low)

The following table shows the por_dtm_fifo_entry0_2 lower register bit assignments.

Table 3-747 por_mxp_por_dtm_fifo_entry0_2 (low)

Bits	Field name	Description	Type	Reset
31:16	fifo_cycle_count	Entry cycle count bit vector 15:0	RO	16'b0
15:0	fifo_data2	Entry data bit vector 143:128	RO	16'b0

por_dtm_fifo_entry1_0

Contains DTM FIFO entry 1 data.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h2138
Register reset 64'b0
Usage constraints There are no usage constraints.

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The following image shows the higher register bit assignments.

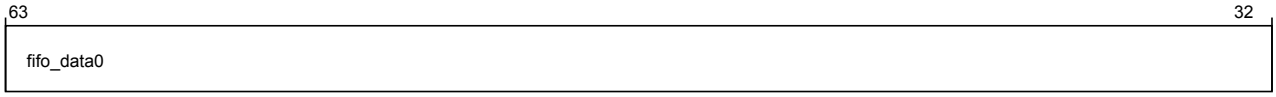

Figure 3-734 por_mxp_por_dtm_fifo_entry1_0 (high)

The following table shows the por_dtm_fifo_entry1_0 higher register bit assignments.

Table 3-748 por_mxp_por_dtm_fifo_entry1_0 (high)

Bits	Field name	Description	Type	Reset
63:32	fifo_data0	Entry data bit vector 63:0	RO	64'b0

The following image shows the lower register bit assignments.

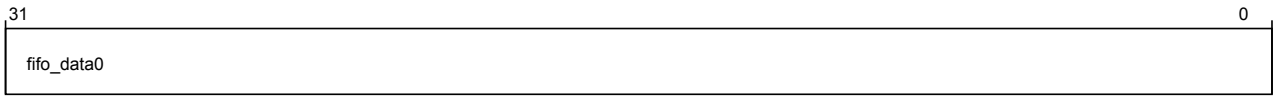

Figure 3-735 por_mxp_por_dtm_fifo_entry1_0 (low)

The following table shows the por_dtm_fifo_entry1_0 lower register bit assignments.

Table 3-749 por_mxp_por_dtm_fifo_entry1_0 (low)

Bits	Field name	Description	Type	Reset
31:0	fifo_data0	Entry data bit vector 63:0	RO	64'b0

por_dtm_fifo_entry1_1

Contains DTM FIFO entry 1 data.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h2140
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

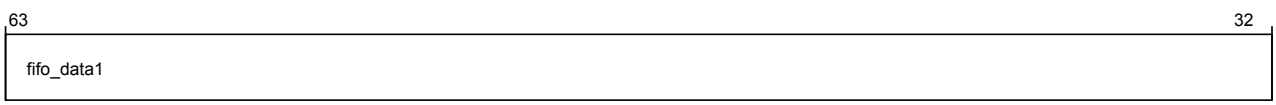

Figure 3-736 por_mxp_por_dtm_fifo_entry1_1 (high)

The following table shows the por_dtm_fifo_entry1_1 higher register bit assignments.

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Table 3-750 por_mxp_por_dtm_fifo_entry1_1 (high)

Bits	Field name	Description	Type	Reset
63:32	fifo_data1	Entry data bit vector 127:64	RO	64'b0

The following image shows the lower register bit assignments.

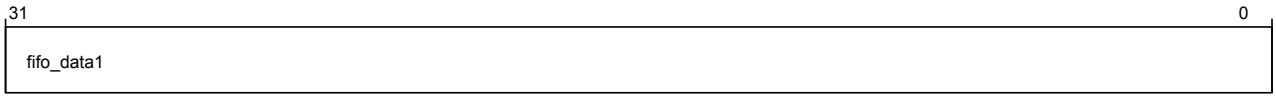

Figure 3-737 por_mxp_por_dtm_fifo_entry1_1 (low)

The following table shows the por_dtm_fifo_entry1_1 lower register bit assignments.

Table 3-751 por_mxp_por_dtm_fifo_entry1_1 (low)

Bits	Field name	Description	Type	Reset
31:0	fifo_data1	Entry data bit vector 127:64	RO	64'b0

por_dtm_fifo_entry1_2

Contains DTM FIFO entry 1 data.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h2148
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

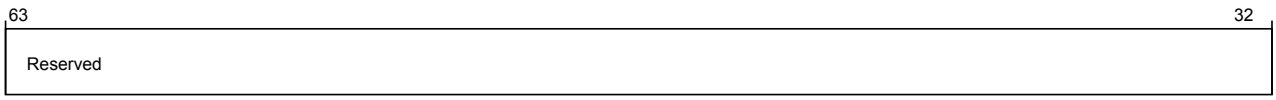

Figure 3-738 por_mxp_por_dtm_fifo_entry1_2 (high)

The following table shows the por_dtm_fifo_entry1_2 higher register bit assignments.

Table 3-752 por_mxp_por_dtm_fifo_entry1_2 (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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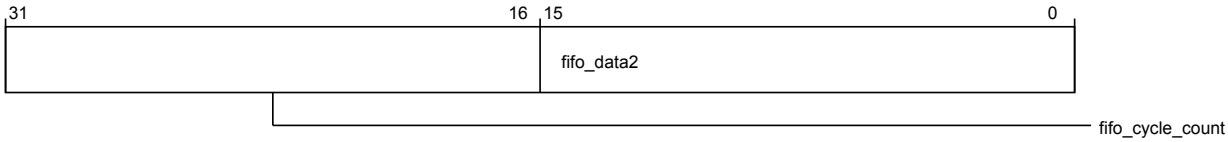

Figure 3-739 por_mxp_por_dtm_fifo_entry1_2 (low)

The following table shows the por_dtm_fifo_entry1_2 lower register bit assignments.

Table 3-753 por_mxp_por_dtm_fifo_entry1_2 (low)

Bits	Field name	Description	Type	Reset
31:16	fifo_cycle_count	Entry cycle count bit vector 15:0	RO	16'b0
15:0	fifo_data2	Entry data bit vector 143:128	RO	16'b0

por_dtm_fifo_entry2_0

Contains DTM FIFO entry 2 data.

Its characteristics are:

Type RO

Register width (Bits) 64

Address offset 14'h2150

Register reset 64'b0

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

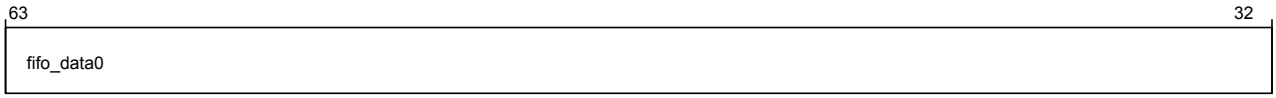

Figure 3-740 por_mxp_por_dtm_fifo_entry2_0 (high)

The following table shows the por_dtm_fifo_entry2_0 higher register bit assignments.

Table 3-754 por_mxp_por_dtm_fifo_entry2_0 (high)

Bits	Field name	Description	Type	Reset
63:32	fifo_data0	Entry data bit vector 63:0	RO	64'b0

The following image shows the lower register bit assignments.

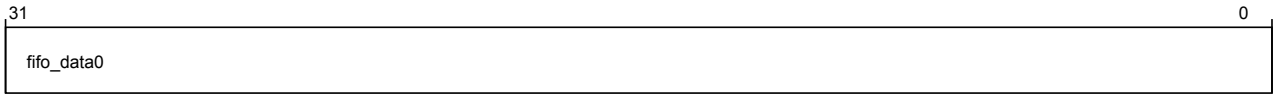

Figure 3-741 por_mxp_por_dtm_fifo_entry2_0 (low)

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The following table shows the por_dtm_fifo_entry2_0 lower register bit assignments.

Table 3-755 por_mxp_por_dtm_fifo_entry2_0 (low)

Bits	Field name	Description	Type	Reset
31:0	fifo_data0	Entry data bit vector 63:0	RO	64'b0

por_dtm_fifo_entry2_1

Contains DTM FIFO entry 2 data.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h2158
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

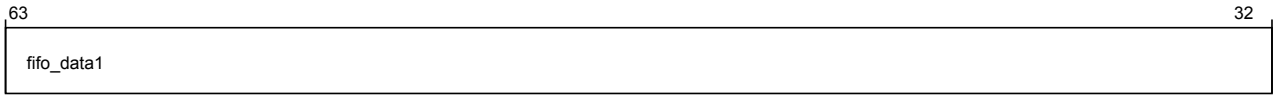

Figure 3-742 por_mxp_por_dtm_fifo_entry2_1 (high)

The following table shows the por_dtm_fifo_entry2_1 higher register bit assignments.

Table 3-756 por_mxp_por_dtm_fifo_entry2_1 (high)

Bits	Field name	Description	Type	Reset
63:32	fifo_data1	Entry data bit vector 127:64	RO	64'b0

The following image shows the lower register bit assignments.

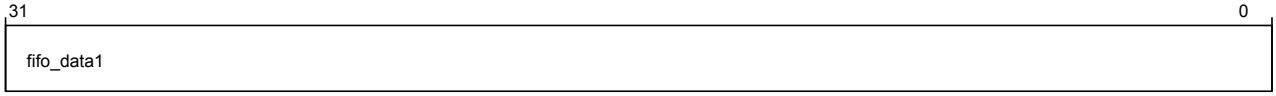

Figure 3-743 por_mxp_por_dtm_fifo_entry2_1 (low)

The following table shows the por_dtm_fifo_entry2_1 lower register bit assignments.

Table 3-757 por_mxp_por_dtm_fifo_entry2_1 (low)

Bits	Field name	Description	Type	Reset
31:0	fifo_data1	Entry data bit vector 127:64	RO	64'b0

por_dtm_fifo_entry2_2

Contains DTM FIFO entry 2 data.

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Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h2160
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

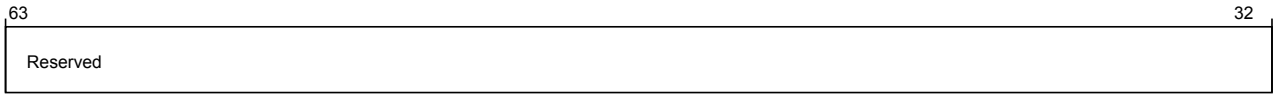

Figure 3-744 por_mxp_por_dtm_fifo_entry2_2 (high)

The following table shows the por_dtm_fifo_entry2_2 higher register bit assignments.

Table 3-758 por_mxp_por_dtm_fifo_entry2_2 (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

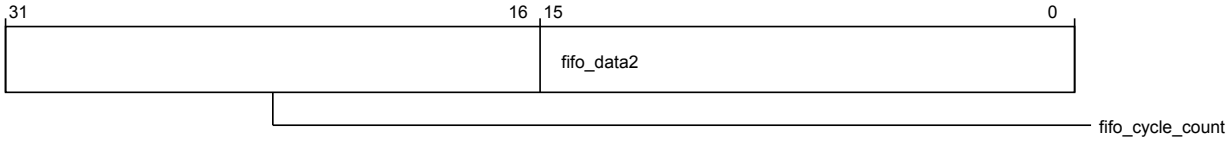

Figure 3-745 por_mxp_por_dtm_fifo_entry2_2 (low)

The following table shows the por_dtm_fifo_entry2_2 lower register bit assignments.

Table 3-759 por_mxp_por_dtm_fifo_entry2_2 (low)

Bits	Field name	Description	Type	Reset
31:16	fifo_cycle_count	Entry cycle count bit vector 15:0	RO	16'b0
15:0	fifo_data2	Entry data bit vector 143:128	RO	16'b0

por_dtm_fifo_entry3_0

Contains DTM FIFO entry 3 data.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h2168
Register reset 64'b0

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Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

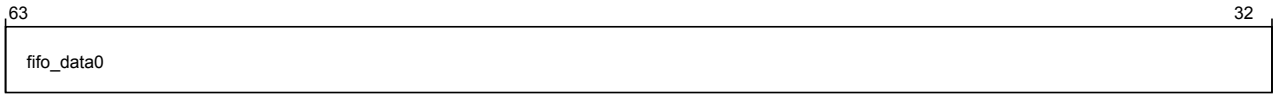

Figure 3-746 por_mxp_por_dtm_fifo_entry3_0 (high)

The following table shows the por_dtm_fifo_entry3_0 higher register bit assignments.

Table 3-760 por_mxp_por_dtm_fifo_entry3_0 (high)

Bits	Field name	Description	Type	Reset
63:32	fifo_data0	Entry data bit vector 63:0	RO	64'b0

The following image shows the lower register bit assignments.

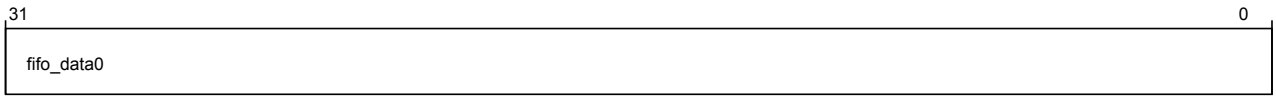

Figure 3-747 por_mxp_por_dtm_fifo_entry3_0 (low)

The following table shows the por_dtm_fifo_entry3_0 lower register bit assignments.

Table 3-761 por_mxp_por_dtm_fifo_entry3_0 (low)

Bits	Field name	Description	Type	Reset
31:0	fifo_data0	Entry data bit vector 63:0	RO	64'b0

por_dtm_fifo_entry3_1

Contains DTM FIFO entry 3 data.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h2170
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

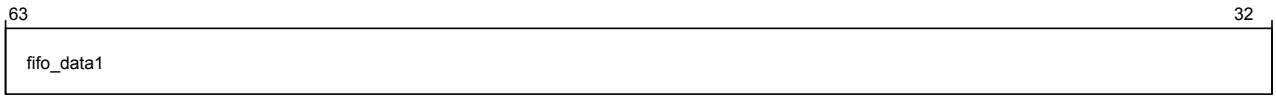

Figure 3-748 por_mxp_por_dtm_fifo_entry3_1 (high)

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The following table shows the por_dtm_fifo_entry3_1 higher register bit assignments.

Table 3-762 por_mxp_por_dtm_fifo_entry3_1 (high)

Bits	Field name	Description	Type	Reset
63:32	fifo_data1	Entry data bit vector 127:64	RO	64'b0

The following image shows the lower register bit assignments.

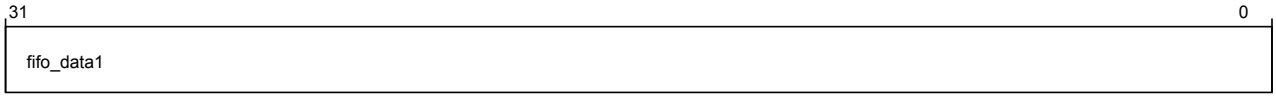

Figure 3-749 por_mxp_por_dtm_fifo_entry3_1 (low)

The following table shows the por_dtm_fifo_entry3_1 lower register bit assignments.

Table 3-763 por_mxp_por_dtm_fifo_entry3_1 (low)

Bits	Field name	Description	Type	Reset
31:0	fifo_data1	Entry data bit vector 127:64	RO	64'b0

por_dtm_fifo_entry3_2

Contains DTM FIFO entry 3 data.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h2178
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

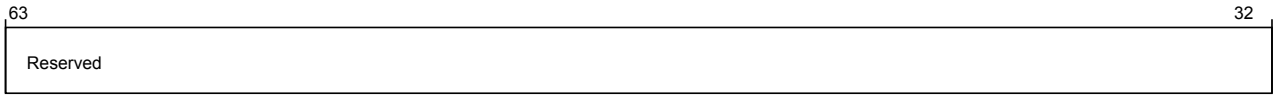

Figure 3-750 por_mxp_por_dtm_fifo_entry3_2 (high)

The following table shows the por_dtm_fifo_entry3_2 higher register bit assignments.

Table 3-764 por_mxp_por_dtm_fifo_entry3_2 (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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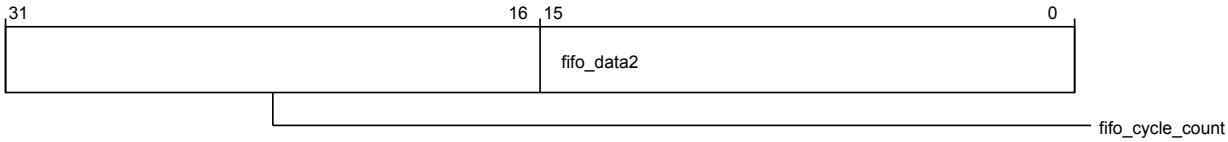

Figure 3-751 por_mxp_por_dtm_fifo_entry3_2 (low)

The following table shows the por_dtm_fifo_entry3_2 lower register bit assignments.

Table 3-765 por_mxp_por_dtm_fifo_entry3_2 (low)

Bits	Field name	Description	Type	Reset
31:16	fifo_cycle_count	Entry cycle count bit vector 15:0	RO	16'b0
15:0	fifo_data2	Entry data bit vector 143:128	RO	16'b0

por_dtm_wp0_config

Configures watchpoint 0.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h21A0
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

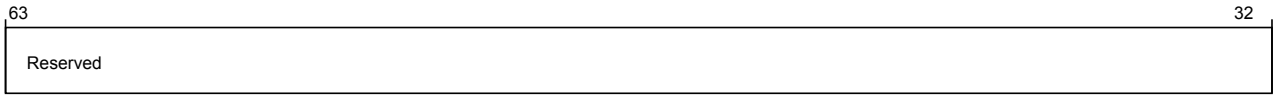

Figure 3-752 por_mxp_por_dtm_wp0_config (high)

The following table shows the por_dtm_wp0_config higher register bit assignments.

Table 3-766 por_mxp_por_dtm_wp0_config (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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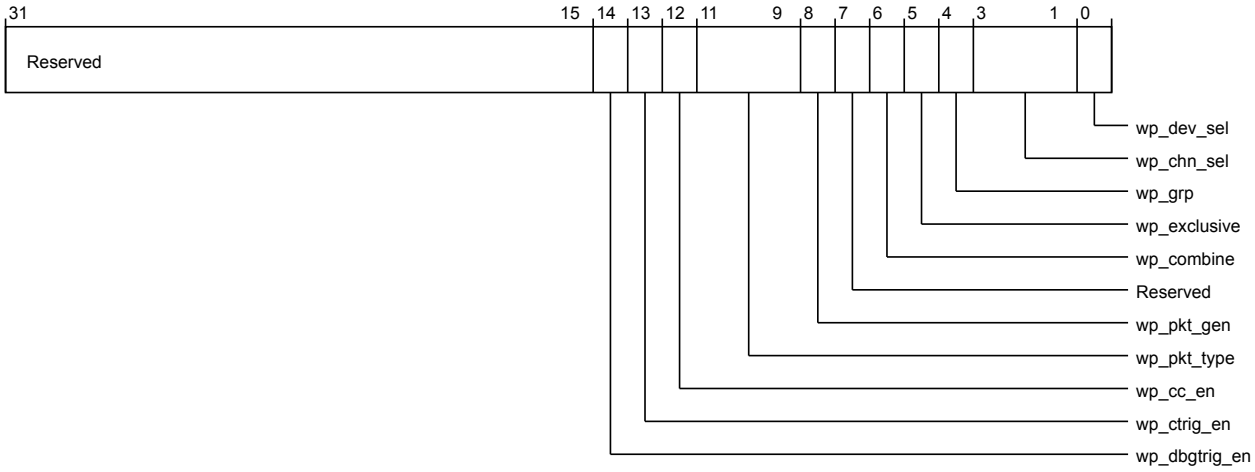

Figure 3-753 por_mxp_por_dtm_wp0_config (low)

The following table shows the por_dtm_wp0_config lower register bit assignments.

Table 3-767 por_mxp_por_dtm_wp0_config (low)

Bits	Field name	Description	Type	Reset
31:15	Reserved	Reserved	RO	-
14	wp_dbgtrig_en	Enables watchpoint debug trigger packet generation	RW	1'b0
13	wp_ctrig_en	Enables watchpoint cross trigger packet generation	RW	1'b0
12	wp_cc_en	Enables inclusion of cycle count in watchpoint track packet generation	RW	1'b0
11:9	wp_pkt_type	Trace packet type 3'b000: TXNID (up to X18) 3'b001: TXNID + opcode (up to X9) 3'b010: TXNID + opcode + source ID + target ID (up to X4) 3'b011: Reserved 3'b100: Control flit 3'b101: Reserved 3'b110: Reserved 3'b111: Reserved	RW	3'b000
8	wp_pkt_gen	Enables watchpoint trace packet generation	RW	1'b0
7	Reserved	Reserved	RO	-
6	wp_combine	Enables combination of watchpoints 0 and 1	RW	1'b0
5	wp_exclusive	Watchpoint mode 1'b0: Regular mode 1'b1: Exclusive mode	RW	1'b0

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Table 3-767 por_mxp_por_dtm_wp0_config (low) (continued)

Bits	Field name	Description	Type	Reset
4	wp_grp	Watchpoint register format group 1'b0: Select primary group 1'b1: Select secondary group	RW	1'b0
3:1	wp_chn_sel	VC selection 3'b000: Select REQ VC 3'b001: Select RSP VC 3'b010: Select SNP VC 3'b011: Select DATA VC **Note** All other values are reserved.	RW	3'b000
0	wp_dev_sel	Device port selection in specified SMXP 1'b0: Select device port 0 1'b1: Select device port 1	RW	1'b0

por_dtm_wp0_val

Configures watchpoint 0 comparison value.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h21A8
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

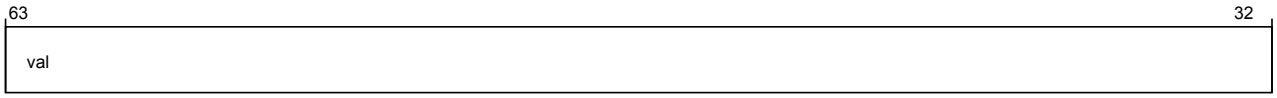

Figure 3-754 por_mxp_por_dtm_wp0_val (high)

The following table shows the por_dtm_wp0_val higher register bit assignments.

Table 3-768 por_mxp_por_dtm_wp0_val (high)

Bits	Field name	Description	Type	Reset
63:32	val	Refer to DTM watchpoint section for details	RW	64'b0

The following image shows the lower register bit assignments.

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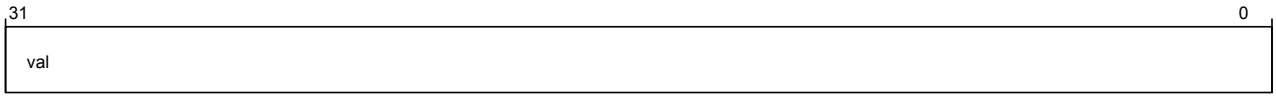

Figure 3-755 por_mxp_por_dtm_wp0_val (low)

The following table shows the por_dtm_wp0_val lower register bit assignments.

Table 3-769 por_mxp_por_dtm_wp0_val (low)

Bits	Field name	Description	Type	Reset
31:0	val	Refer to DTM watchpoint section for details	RW	64'b0

por_dtm_wp0_mask

Configures watchpoint0 comparison mask.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h21B0
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

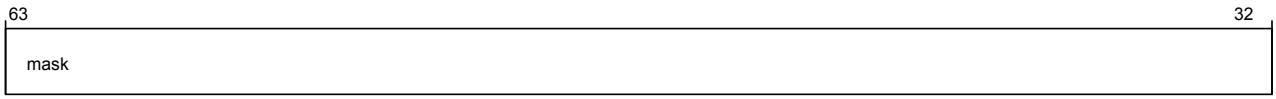

Figure 3-756 por_mxp_por_dtm_wp0_mask (high)

The following table shows the por_dtm_wp0_mask higher register bit assignments.

Table 3-770 por_mxp_por_dtm_wp0_mask (high)

Bits	Field name	Description	Type	Reset
63:32	mask	Refer to DTM watchpoint section for details	RW	64'b0

The following image shows the lower register bit assignments.

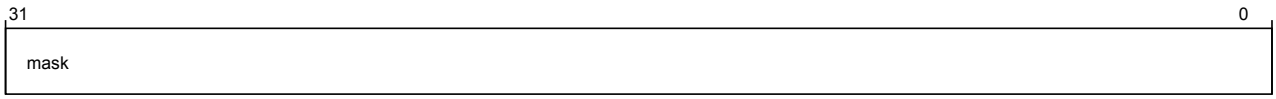

Figure 3-757 por_mxp_por_dtm_wp0_mask (low)

The following table shows the por_dtm_wp0_mask lower register bit assignments.

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Table 3-771 por_mxp_por_dtm_wp0_mask (low)

Bits	Field name	Description	Type	Reset
31:0	mask	Refer to DTM watchpoint section for details	RW	64'b0

por_dtm_wp1_config

Configures watchpoint 1.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h21B8
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

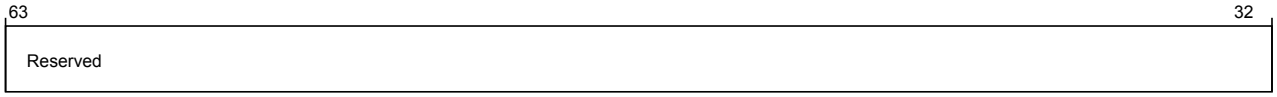

Figure 3-758 por_mxp_por_dtm_wp1_config (high)

The following table shows the por_dtm_wp1_config higher register bit assignments.

Table 3-772 por_mxp_por_dtm_wp1_config (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

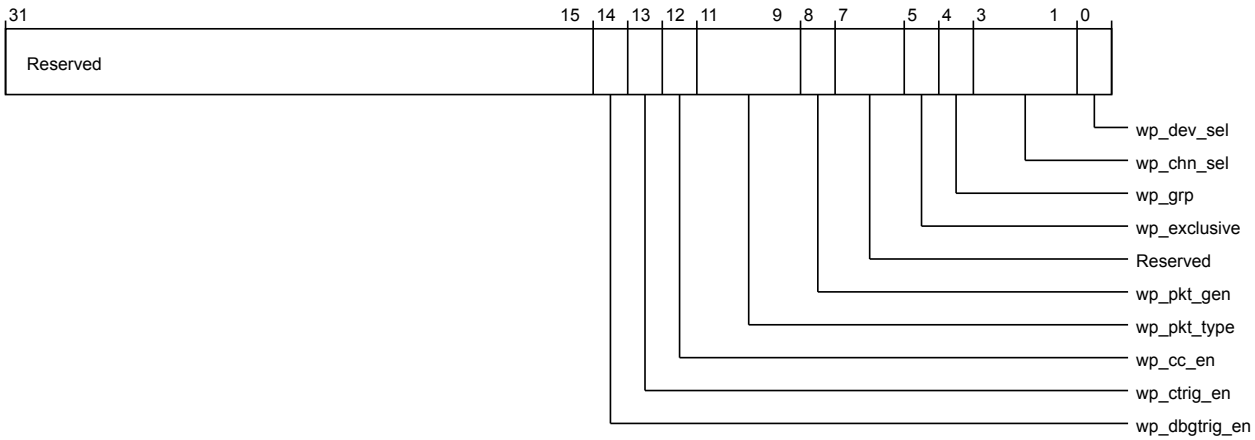

Figure 3-759 por_mxp_por_dtm_wp1_config (low)

The following table shows the por_dtm_wp1_config lower register bit assignments.

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Table 3-773 por_mxp_por_dtm_wp1_config (low)

Bits	Field name	Description	Type	Reset
31:15	Reserved	Reserved	RO	-
14	wp_dbgtrig_en	Enables watchpoint debug trigger packet generation	RW	1'b0
13	wp_ctrig_en	Enables watchpoint cross trigger packet generation	RW	1'b0
12	wp_cc_en	Enables inclusion of cycle count in watchpoint track packet generation	RW	1'b0
11:9	wp_pkt_type	Trace packet type 3'b000: TXNID (up to X18) 3'b001: TXNID + opcode (up to X9) 3'b010: TXNID + opcode + source ID + target ID (up to X4) 3'b011: Reserved 3'b100: Control flit 3'b101: Reserved 3'b110: Reserved 3'b111: Reserved	RW	3'b000
8	wp_pkt_gen	Enables watchpoint trace packet generation	RW	1'b0
7:6	Reserved	Reserved	RO	-
5	wp_exclusive	Watchpoint mode 1'b0: Regular mode 1'b1: Exclusive mode	RW	1'b0
4	wp_grp	Watchpoint register format group 1'b0: Select primary group 1'b1: Select secondary group	RW	1'b0
3:1	wp_chn_sel	VC selection 3'b000: Select REQ VC 3'b001: Select RSP VC 3'b010: Select SNP VC 3'b011: Select DATA VC ——— **Note** ——— All other values are reserved. ———	RW	3'b000
0	wp_dev_sel	Device port selection in specified SMXP 1'b0: Select device port 0 1'b1: Select device port 1	RW	1'b0

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por_dtm_wp1_val

Configures watchpoint 1 comparison value.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h21C0
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

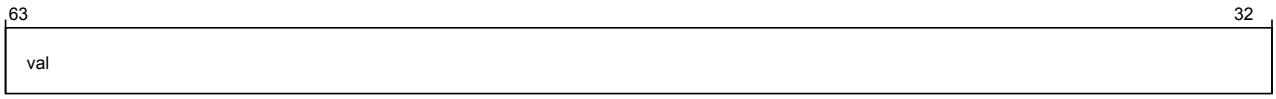

Figure 3-760 por_mxp_por_dtm_wp1_val (high)

The following table shows the por_dtm_wp1_val higher register bit assignments.

Table 3-774 por_mxp_por_dtm_wp1_val (high)

Bits	Field name	Description	Type	Reset
63:32	val	Refer to DTM watchpoint section for details	RW	64'b0

The following image shows the lower register bit assignments.

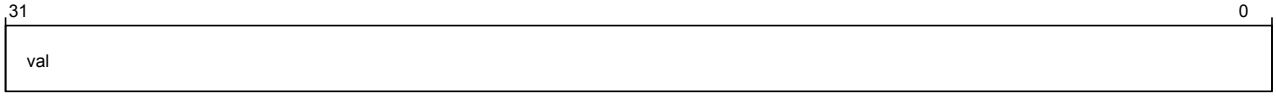

Figure 3-761 por_mxp_por_dtm_wp1_val (low)

The following table shows the por_dtm_wp1_val lower register bit assignments.

Table 3-775 por_mxp_por_dtm_wp1_val (low)

Bits	Field name	Description	Type	Reset
31:0	val	Refer to DTM watchpoint section for details	RW	64'b0

por_dtm_wp1_mask

Configures watchpoint 1 comparison mask.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h21C8
Register reset 64'b0

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Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

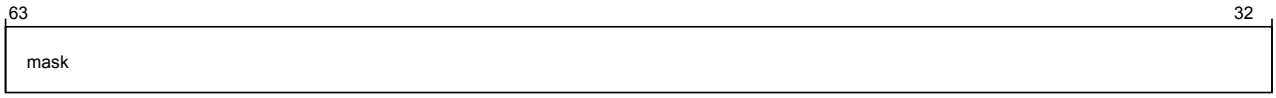

Figure 3-762 por_mxp_por_dtm_wp1_mask (high)

The following table shows the por_dtm_wp1_mask higher register bit assignments.

Table 3-776 por_mxp_por_dtm_wp1_mask (high)

Bits	Field name	Description	Type	Reset
63:32	mask	Refer to DTM watchpoint section for details	RW	64'b0

The following image shows the lower register bit assignments.

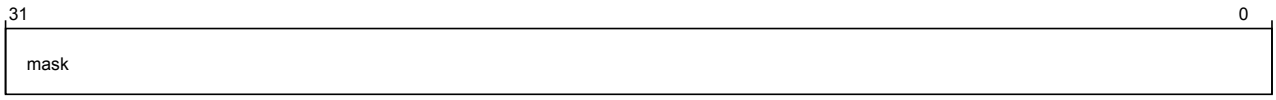

Figure 3-763 por_mxp_por_dtm_wp1_mask (low)

The following table shows the por_dtm_wp1_mask lower register bit assignments.

Table 3-777 por_mxp_por_dtm_wp1_mask (low)

Bits	Field name	Description	Type	Reset
31:0	mask	Refer to DTM watchpoint section for details	RW	64'b0

por_dtm_wp2_config

Configures watchpoint 2.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h21D0
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

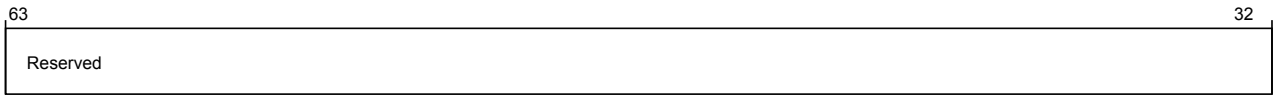

Figure 3-764 por_mxp_por_dtm_wp2_config (high)

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The following table shows the por_dtm_wp2_config higher register bit assignments.

Table 3-778 por_mxp_por_dtm_wp2_config (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

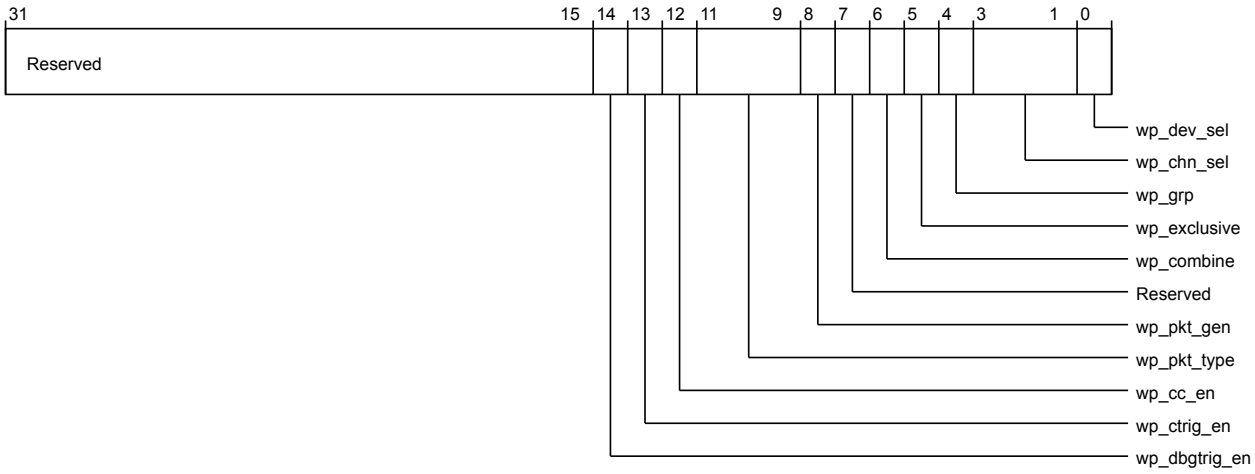

Figure 3-765 por_mxp_por_dtm_wp2_config (low)

The following table shows the por_dtm_wp2_config lower register bit assignments.

Table 3-779 por_mxp_por_dtm_wp2_config (low)

Bits	Field name	Description	Type	Reset
31:15	Reserved	Reserved	RO	-
14	wp_dbgtrig_en	Enables watchpoint debug trigger packet generation	RW	1'b0
13	wp_ctrig_en	Enables watchpoint cross trigger packet generation	RW	1'b0
12	wp_cc_en	Enables inclusion of cycle count in watchpoint track packet generation	RW	1'b0
11:9	wp_pkt_type	Trace packet type 3'b000: TXNID (up to X18) 3'b001: TXNID + opcode (up to X9) 3'b010: TXNID + opcode + source ID + target ID (up to X4) 3'b011: Reserved 3'b100: Control flit 3'b101: Reserved 3'b110: Reserved 3'b111: Reserved	RW	3'b000
8	wp_pkt_gen	Enables watchpoint trace packet generation	RW	1'b0

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Table 3-779 por_mxp_por_dtm_wp2_config (low) (continued)

Bits	Field name	Description	Type	Reset
7	Reserved	Reserved	RO	-
6	wp_combine	Enables combination of watchpoints 2 and 3	RW	1'b0
5	wp_exclusive	Watchpoint mode 1'b0: Regular mode 1'b1: Exclusive mode	RW	1'b0
4	wp_grp	Watchpoint register format group 1'b0: Select primary group 1'b1: Select secondary group	RW	1'b0
3:1	wp_chn_sel	VC selection 3'b000: Select REQ VC 3'b001: Select RSP VC 3'b010: Select SNP VC 3'b011: Select DATA VC **Note** All other values are reserved.	RW	3'b000
0	wp_dev_sel	Device port selection in specified SMXP 1'b0: Select device port 0 1'b1: Select device port 1	RW	1'b0

por_dtm_wp2_val

Configures watchpoint 2 comparison value.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h21D8
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

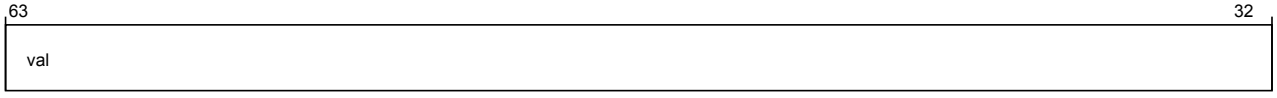

Figure 3-766 por_mxp_por_dtm_wp2_val (high)

The following table shows the por_dtm_wp2_val higher register bit assignments.

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Table 3-780 por_mxp_por_dtm_wp2_val (high)

Bits	Field name	Description	Type	Reset
63:32	val	Refer to DTM watchpoint section for details	RW	64'b0

The following image shows the lower register bit assignments.

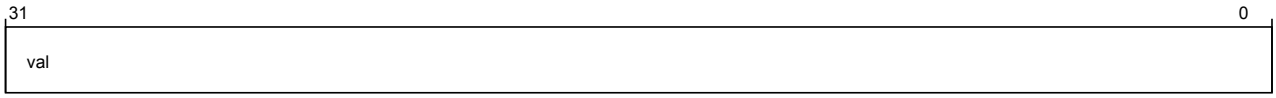

Figure 3-767 por_mxp_por_dtm_wp2_val (low)

The following table shows the por_dtm_wp2_val lower register bit assignments.

Table 3-781 por_mxp_por_dtm_wp2_val (low)

Bits	Field name	Description	Type	Reset
31:0	val	Refer to DTM watchpoint section for details	RW	64'b0

por_dtm_wp2_mask

Configures watchpoint 2 comparison mask.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h21E0
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

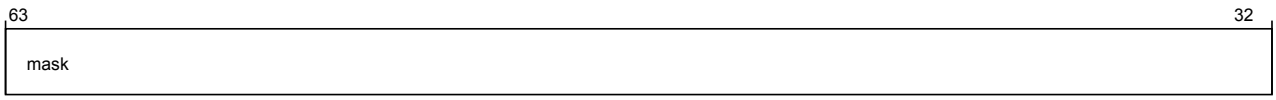

Figure 3-768 por_mxp_por_dtm_wp2_mask (high)

The following table shows the por_dtm_wp2_mask higher register bit assignments.

Table 3-782 por_mxp_por_dtm_wp2_mask (high)

Bits	Field name	Description	Type	Reset
63:32	mask	Refer to DTM watchpoint section for details	RW	64'b0

The following image shows the lower register bit assignments.

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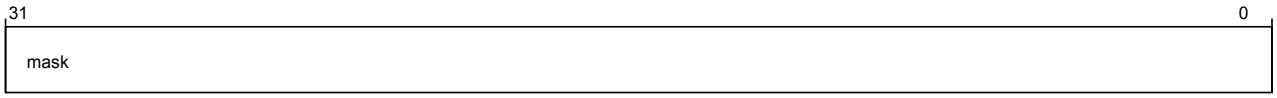

Figure 3-769 por_mxp_por_dtm_wp2_mask (low)

The following table shows the por_dtm_wp2_mask lower register bit assignments.

Table 3-783 por_mxp_por_dtm_wp2_mask (low)

Bits	Field name	Description	Type	Reset
31:0	mask	Refer to DTM watchpoint section for details	RW	64'b0

por_dtm_wp3_config

Configures watchpoint 3.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h21E8
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

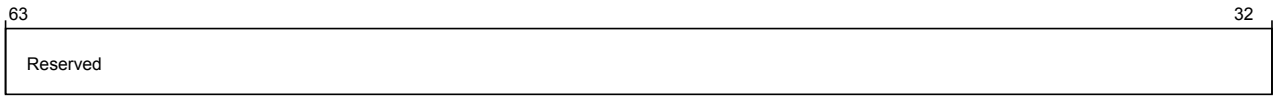

Figure 3-770 por_mxp_por_dtm_wp3_config (high)

The following table shows the por_dtm_wp3_config higher register bit assignments.

Table 3-784 por_mxp_por_dtm_wp3_config (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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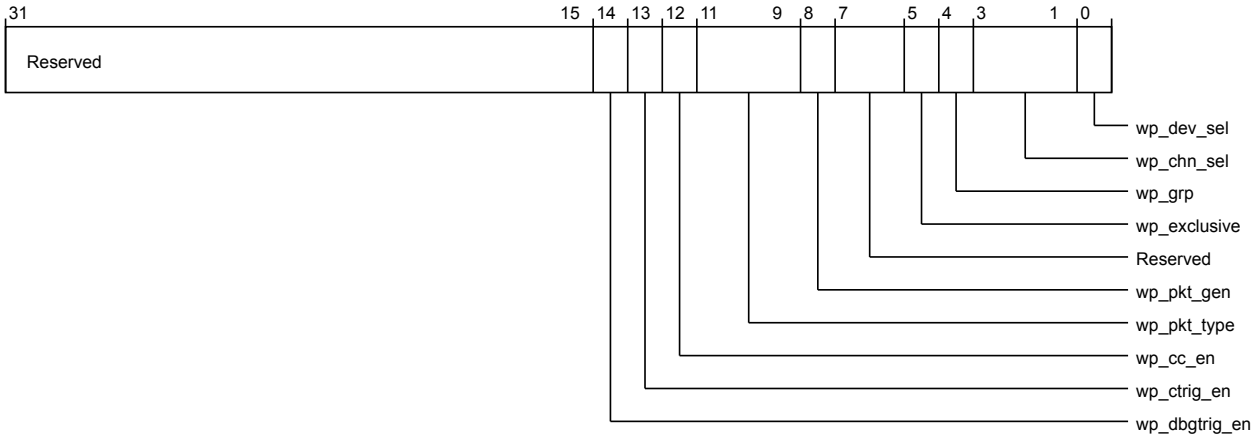

Figure 3-771 por_mxp_por_dtm_wp3_config (low)

The following table shows the por_dtm_wp3_config lower register bit assignments.

Table 3-785 por_mxp_por_dtm_wp3_config (low)

Bits	Field name	Description	Type	Reset
31:15	Reserved	Reserved	RO	-
14	wp_dbgtrig_en	Enables watchpoint debug trigger packet generation	RW	1'b0
13	wp_ctrig_en	Enables watchpoint cross trigger packet generation	RW	1'b0
12	wp_cc_en	Enables inclusion of cycle count in watchpoint track packet generation	RW	1'b0
11:9	wp_pkt_type	Trace packet type 3'b000: TXNID (up to X18) 3'b001: TXNID + opcode (up to X9) 3'b010: TXNID + opcode + source ID + target ID (up to X4) 3'b011: Reserved 3'b100: Control flit 3'b101: Reserved 3'b110: Reserved 3'b111: Reserved	RW	3'b000
8	wp_pkt_gen	Enables watchpoint trace packet generation	RW	1'b0
7:6	Reserved	Reserved	RO	-
5	wp_exclusive	Watchpoint mode 1'b0: Regular mode 1'b1: Exclusive mode	RW	1'b0

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Table 3-785 por_mxp_por_dtm_wp3_config (low) (continued)

Bits	Field name	Description	Type	Reset
4	wp_grp	Watchpoint register format group 1'b0: Select primary group 1'b1: Select secondary group	RW	1'b0
3:1	wp_chn_sel	VC selection 3'b000: Select REQ VC 3'b001: Select RSP VC 3'b010: Select SNP VC 3'b011: Select DATA VC **Note** All other values are reserved.	RW	3'b000
0	wp_dev_sel	Device port selection in specified SMXP 1'b0: Select device port 0 1'b1: Select device port 1	RW	1'b0

por_dtm_wp3_val

Configures watchpoint 3 comparison value.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h21F0
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

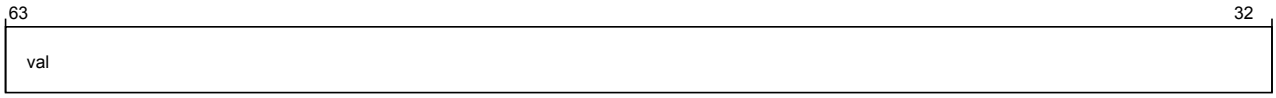

Figure 3-772 por_mxp_por_dtm_wp3_val (high)

The following table shows the por_dtm_wp3_val higher register bit assignments.

Table 3-786 por_mxp_por_dtm_wp3_val (high)

Bits	Field name	Description	Type	Reset
63:32	val	Refer to DTM watchpoint section for details	RW	64'b0

The following image shows the lower register bit assignments.

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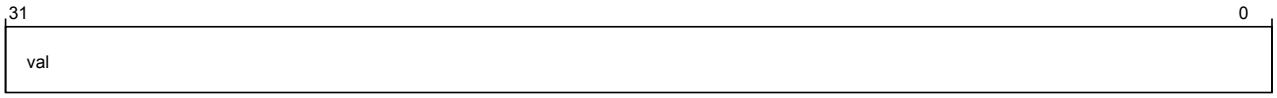

Figure 3-773 por_mxp_por_dtm_wp3_val (low)

The following table shows the por_dtm_wp3_val lower register bit assignments.

Table 3-787 por_mxp_por_dtm_wp3_val (low)

Bits	Field name	Description	Type	Reset
31:0	val	Refer to DTM watchpoint section for details	RW	64'b0

por_dtm_wp3_mask

Configures watchpoint 3 comparison mask.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h21F8
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

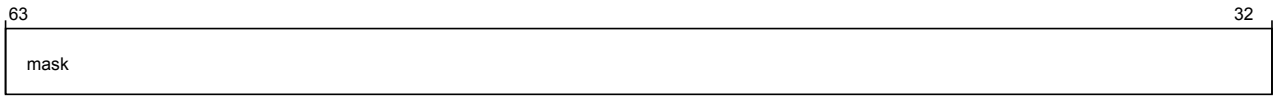

Figure 3-774 por_mxp_por_dtm_wp3_mask (high)

The following table shows the por_dtm_wp3_mask higher register bit assignments.

Table 3-788 por_mxp_por_dtm_wp3_mask (high)

Bits	Field name	Description	Type	Reset
63:32	mask	Refer to DTM watchpoint section for details	RW	64'b0

The following image shows the lower register bit assignments.

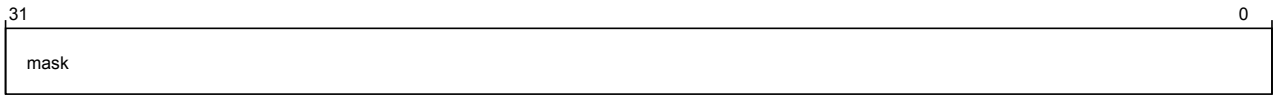

Figure 3-775 por_mxp_por_dtm_wp3_mask (low)

The following table shows the por_dtm_wp3_mask lower register bit assignments.

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Table 3-789 por_mxp_por_dtm_wp3_mask (low)

Bits	Field name	Description	Type	Reset
31:0	mask	Refer to DTM watchpoint section for details	RW	64'b0

por_dtm_pmsicr

Functions as the sampling interval counter register.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h2200
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

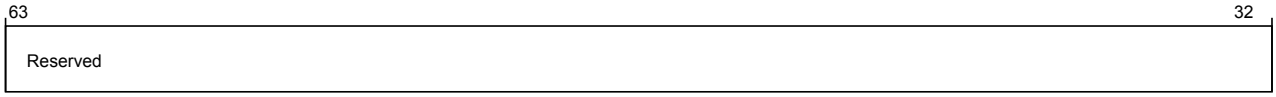

Figure 3-776 por_mxp_por_dtm_pmsicr (high)

The following table shows the por_dtm_pmsicr higher register bit assignments.

Table 3-790 por_mxp_por_dtm_pmsicr (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

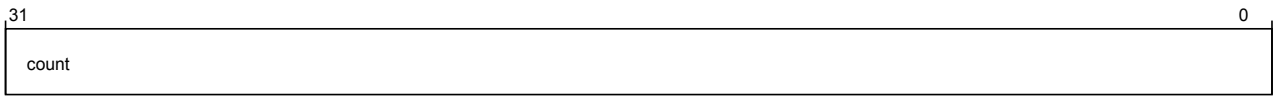

Figure 3-777 por_mxp_por_dtm_pmsicr (low)

The following table shows the por_dtm_pmsicr lower register bit assignments.

Table 3-791 por_mxp_por_dtm_pmsicr (low)

Bits	Field name	Description	Type	Reset
31:0	count	Current value of sample counter	RW	32'b0

por_dtm_pmsirr

Functions as the sampling interval reload register.

Its characteristics are:

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Type RW
Register width (Bits) 64
Address offset 14'h2208
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

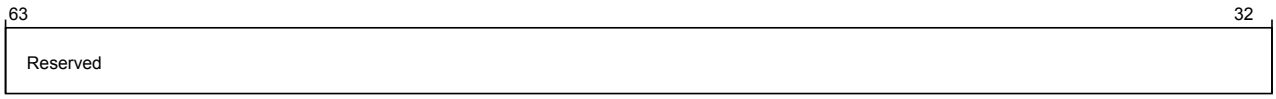

Figure 3-778 por_mxp_por_dtm_pmsirr (high)

The following table shows the por_dtm_pmsirr higher register bit assignments.

Table 3-792 por_mxp_por_dtm_pmsirr (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

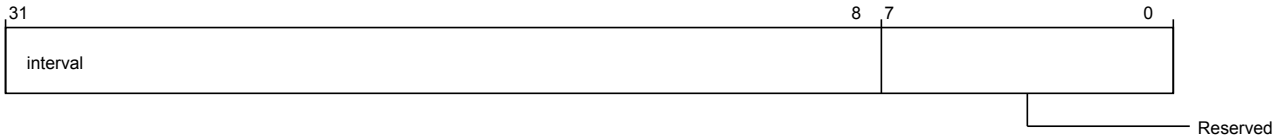

Figure 3-779 por_mxp_por_dtm_pmsirr (low)

The following table shows the por_dtm_pmsirr lower register bit assignments.

Table 3-793 por_mxp_por_dtm_pmsirr (low)

Bits	Field name	Description	Type	Reset
31:8	interval	Sampling interval to be reloaded	RW	24'b0
7:0	Reserved	Reserved	RO	-

por_dtm_pmu_config

Configures the DTM PMU.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h2210
Register reset 64'b0
Usage constraints There are no usage constraints.

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The following image shows the higher register bit assignments.

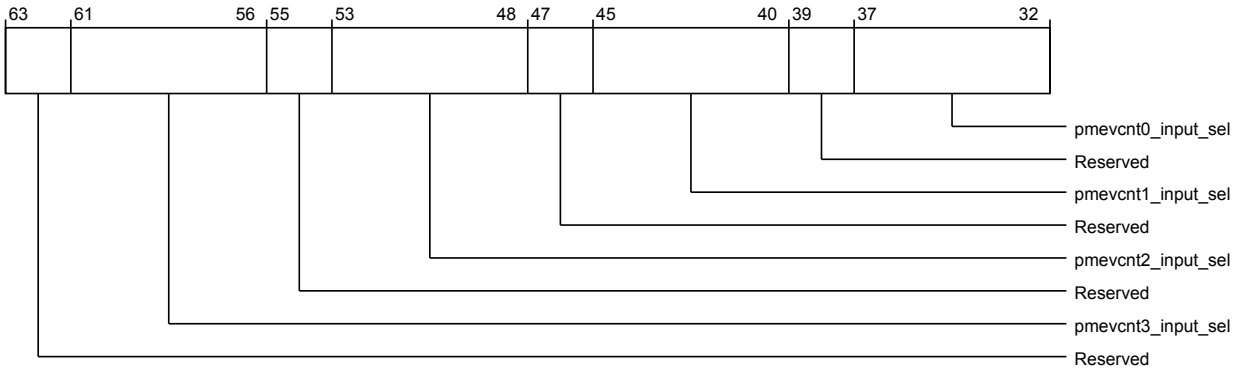

Figure 3-780 por_mxp_por_dtm_pmu_config (high)

The following table shows the por_dtm_pmu_config higher register bit assignments.

Table 3-794 por_mxp_por_dtm_pmu_config (high)

Bits	Field name	Description	Type	Reset
63:62	Reserved	Reserved	RO	-
61:56	pmevcnt3_input_sel	Source to be counted in PMU counter 3; see pmevcnt0_input_sel for encodings	RW	6'b0
55:54	Reserved	Reserved	RO	-
53:48	pmevcnt2_input_sel	Source to be counted in PMU counter 2; see pmevcnt0_input_sel for encodings	RW	6'b0
47:46	Reserved	Reserved	RO	-
45:40	pmevcnt1_input_sel	Source to be counted in PMU counter 1; see pmevcnt0_input_sel for encodings	RW	6'b0
39:38	Reserved	Reserved	RO	-

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Table 3-794 por_mxp_por_dtm_pmu_config (high) (continued)

Bits	Field name	Description	Type	Reset
37:32	pmevcnt0_input_sel	Source to be counted in PMU counter 0 6'h00: Watchpoint 0 6'h01: Watchpoint 1 6'h02: Watchpoint 2 6'h03: Watchpoint 3 6'h04: XP PMU Event 0 6'h05: XP PMU Event 1 6'h06: XP PMU Event 2 6'h07: XP PMU Event 3 6'h10: Port 0 Device 0 PMU Event 0 6'h11: Port 0 Device 0 PMU Event 1 6'h12: Port 0 Device 0 PMU Event 2 6'h13: Port 0 Device 0 PMU Event 3 6'h14: Port 0 Device 1 PMU Event 0 6'h15: Port 0 Device 1 PMU Event 1 6'h16: Port 0 Device 1 PMU Event 2 6'h17: Port 0 Device 1 PMU Event 3 6'h18: Port 0 Device 2 PMU Event 0 6'h19: Port 0 Device 2 PMU Event 1 6'h1A: Port 0 Device 2 PMU Event 2 6'h1B: Port 0 Device 2 PMU Event 3 6'h1C: Port 0 Device 3 PMU Event 0 6'h1D: Port 0 Device 3 PMU Event 1 6'h1E: Port 0 Device 3 PMU Event 2 6'h1F: Port 0 Device 3 PMU Event 3	RW	6'b0

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Table 3-794 por_mxp_por_dtm_pmu_config (high) (continued)

Bits	Field name	Description	Type	Reset
37:32	pmevcnt0_input_sel	6'h20: Port 1 Device 0 PMU Event 0 6'h21: Port 1 Device 0 PMU Event 1 6'h22: Port 1 Device 0 PMU Event 2 6'h23: Port 1 Device 0 PMU Event 3 6'h24: Port 1 Device 1 PMU Event 0 6'h25: Port 1 Device 1 PMU Event 1 6'h26: Port 1 Device 1 PMU Event 2 6'h27: Port 1 Device 1 PMU Event 3 6'h28: Port 1 Device 2 PMU Event 0 6'h29: Port 1 Device 2 PMU Event 1 6'h2A: Port 1 Device 2 PMU Event 2 6'h2B: Port 1 Device 2 PMU Event 3 6'h2C: Port 1 Device 3 PMU Event 0 6'h2D: Port 1 Device 3 PMU Event 1 6'h2E: Port 1 Device 3 PMU Event 2 6'h2F: Port 1 Device 3 PMU Event 3	RW	6'b0

The following image shows the lower register bit assignments.

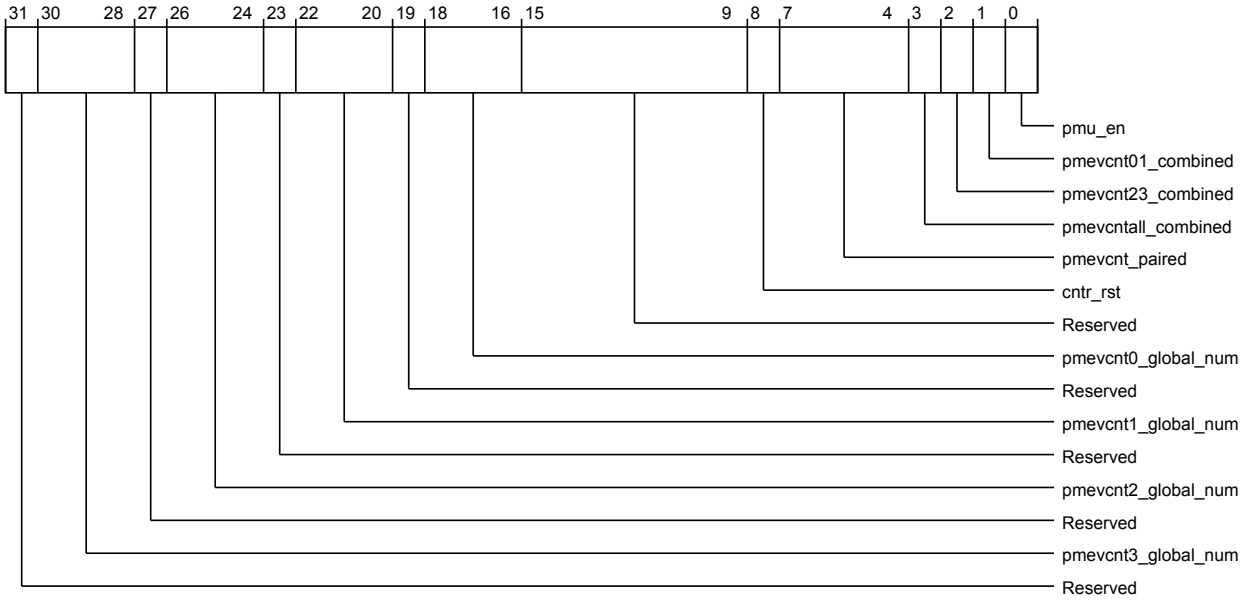

Figure 3-781 por_mxp_por_dtm_pmu_config (low)

The following table shows the por_dtm_pmu_config lower register bit assignments.

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Table 3-795 por_mxp_por_dtm_pmu_config (low)

Bits	Field name	Description	Type	Reset
31	Reserved	Reserved	RO	-
30:28	pmevcnt3_global_num	Global counter to pair with PMU counter 3; see pmevcnt0_global_num for encodings	RW	3'b0
27	Reserved	Reserved	RO	-
26:24	pmevcnt2_global_num	Global counter to pair with PMU counter 2; see pmevcnt0_global_num for encodings	RW	3'b0
23	Reserved	Reserved	RO	-
22:20	pmevcnt1_global_num	Global counter to pair with PMU counter 1; see pmevcnt0_global_num for encodings	RW	3'b0
19	Reserved	Reserved	RO	-
18:16	pmevcnt0_global_num	Global counter to pair with PMU counter 0 3'b000: Global PMU event counter A 3'b001: Global PMU event counter B 3'b010: Global PMU event counter C 3'b011: Global PMU event counter D 3'b100: Global PMU event counter E 3'b101: Global PMU event counter F 3'b110: Global PMU event counter G 3'b111: Global PMU event counter H	RW	3'b0
15:9	Reserved	Reserved	RO	-
8	cntr_rst	Enables clearing of live counters upon assertion of snapshot	RW	1'b0
7:4	pmevcnt_paired	PMU local counter paired with global counter	RW	4'b0
3	pmevcntall_combined	Enables combination of all PMU counters (0, 1, 2, 3) ——— **Note** ——— When set, pmevcnt01_combined and pmevcnt23_combined have no effect. ———	RW	1'b0
2	pmevcnt23_combined	Enables combination of PMU counters 2 and 3	RW	1'b0
1	pmevcnt01_combined	Enables combination of PMU counters 0 and 1	RW	1'b0
0	pmu_en	DTM PMU enable ——— **Note** ——— All other fields in this register are valid only if this bit is set. ———	RW	1'b0

por_dtm_pmevcnt

Contains all PMU event counters (0, 1, 2, 3).

Its characteristics are:

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Type RW
Register width (Bits) 64
Address offset 14'h2220
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

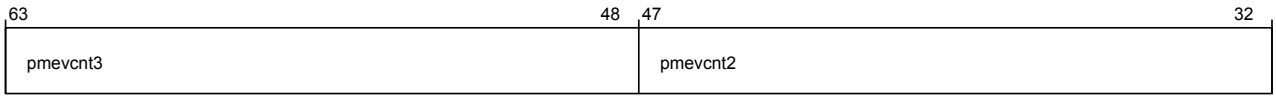

Figure 3-782 por_mxp_por_dtm_pmevcnt (high)

The following table shows the por_dtm_pmevcnt higher register bit assignments.

Table 3-796 por_mxp_por_dtm_pmevcnt (high)

Bits	Field name	Description	Type	Reset
63:48	pmevcnt3	PMU event counter 3	RW	16'h0000
47:32	pmevcnt2	PMU event counter 2	RW	16'h0000

The following image shows the lower register bit assignments.

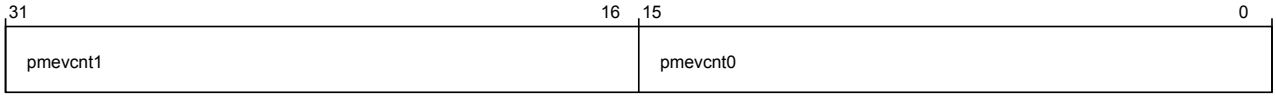

Figure 3-783 por_mxp_por_dtm_pmevcnt (low)

The following table shows the por_dtm_pmevcnt lower register bit assignments.

Table 3-797 por_mxp_por_dtm_pmevcnt (low)

Bits	Field name	Description	Type	Reset
31:16	pmevcnt1	PMU event counter 1	RW	16'h0000
15:0	pmevcnt0	PMU event counter 0	RW	16'h0000

por_dtm_pmevcntsr

Functions as the PMU event counter shadow register for all counters (0, 1, 2, 3).

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h2240

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Register reset 64'b0

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

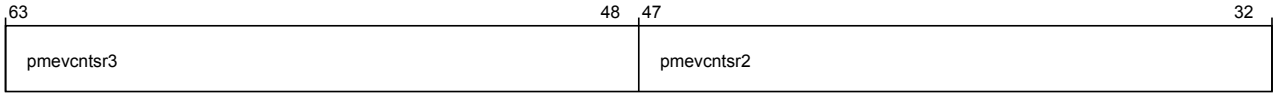

Figure 3-784 por_mxp_por_dtm_pmevcntsr (high)

The following table shows the por_dtm_pmevcntsr higher register bit assignments.

Table 3-798 por_mxp_por_dtm_pmevcntsr (high)

Bits	Field name	Description	Type	Reset
63:48	pmevcntsr3	PMU event counter 3 shadow register	RW	16'h0000
47:32	pmevcntsr2	PMU event counter 2 shadow register	RW	16'h0000

The following image shows the lower register bit assignments.

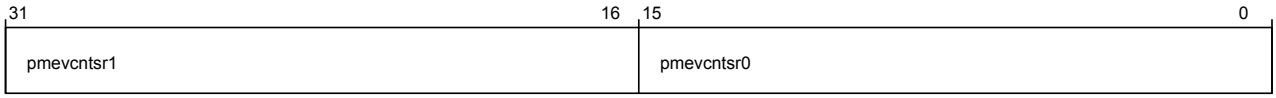

Figure 3-785 por_mxp_por_dtm_pmevcntsr (low)

The following table shows the por_dtm_pmevcntsr lower register bit assignments.

Table 3-799 por_mxp_por_dtm_pmevcntsr (low)

Bits	Field name	Description	Type	Reset
31:16	pmevcntsr1	PMU event counter 1 shadow register	RW	16'h0000
15:0	pmevcntsr0	PMU event counter 0 shadow register	RW	16'h0000

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3.3.7 RN-D register descriptions

Lists the RN-D registers.

por_rnd_node_info

Provides component identification information.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h0
Register reset Configuration dependent
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

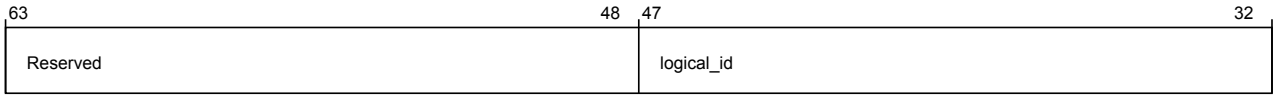

Figure 3-786 por_rnd_node_info (high)

The following table shows the por_rnd_node_info higher register bit assignments.

Table 3-800 por_rnd_node_info (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	logical_id	Component logical ID	RO	Configuration dependent

The following image shows the lower register bit assignments.

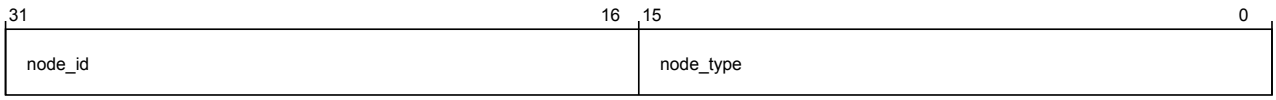

Figure 3-787 por_rnd_node_info (low)

The following table shows the por_rnd_node_info lower register bit assignments.

Table 3-801 por_rnd_node_info (low)

Bits	Field name	Description	Type	Reset
31:16	node_id	Component node ID	RO	Configuration dependent
15:0	node_type	CMN-600 node type identifier	RO	16'h000D

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por_rnd_child_info

Provides component child identification information.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h80
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

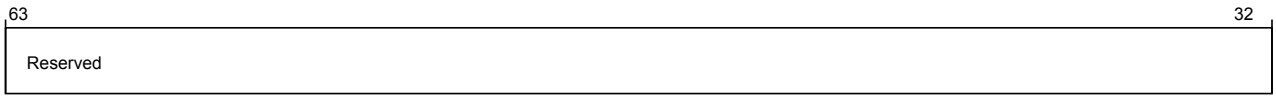

Figure 3-788 por_rnd_child_info (high)

The following table shows the por_rnd_child_info higher register bit assignments.

Table 3-802 por_rnd_child_info (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

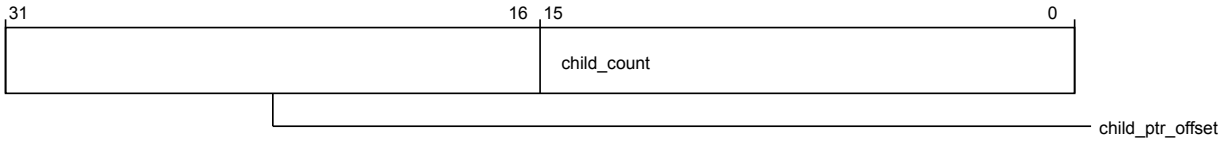

Figure 3-789 por_rnd_child_info (low)

The following table shows the por_rnd_child_info lower register bit assignments.

Table 3-803 por_rnd_child_info (low)

Bits	Field name	Description	Type	Reset
31:16	child_ptr_offset	Starting register offset which contains pointers to the child nodes	RO	16'h0
15:0	child_count	Number of child nodes; used in discovery process	RO	16'h0

por_rnd_secure_register_groups_override

Allows non-secure access to predefined groups of secure registers.

Its characteristics are:

Type RW
Register width (Bits) 64

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Address offset 14'h980

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

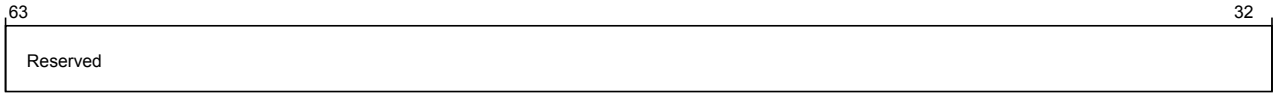

Figure 3-790 por_rnd_secure_register_groups_override (high)

The following table shows the por_rnd_secure_register_groups_override higher register bit assignments.

Table 3-804 por_rnd_secure_register_groups_override (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

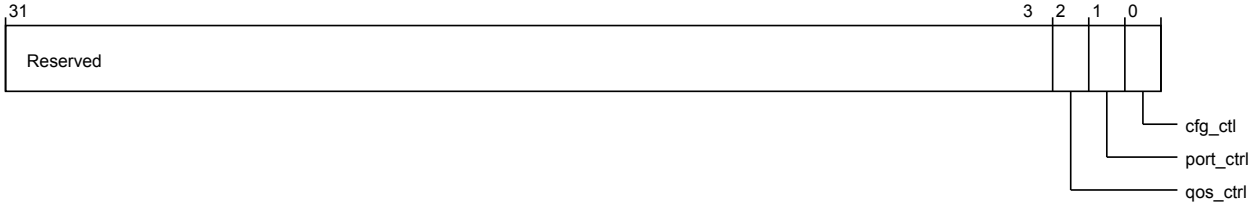

Figure 3-791 por_rnd_secure_register_groups_override (low)

The following table shows the por_rnd_secure_register_groups_override lower register bit assignments.

Table 3-805 por_rnd_secure_register_groups_override (low)

Bits	Field name	Description	Type	Reset
31:3	Reserved	Reserved	RO	-
2	qos_ctrl	Allows non-secure access to secure QoS control registers	RW	1'b0
1	port_ctrl	Allows non-secure access to secure AXI port control registers	RW	1'b0
0	cfg_ctl	Allows non-secure access to secure configuration control register	RW	1'b0

por_rnd_unit_info

Provides component identification information for RN-D.

Its characteristics are:

Type RO

Register width (Bits) 64

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Address offset 14'h900

Register reset Configuration dependent

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

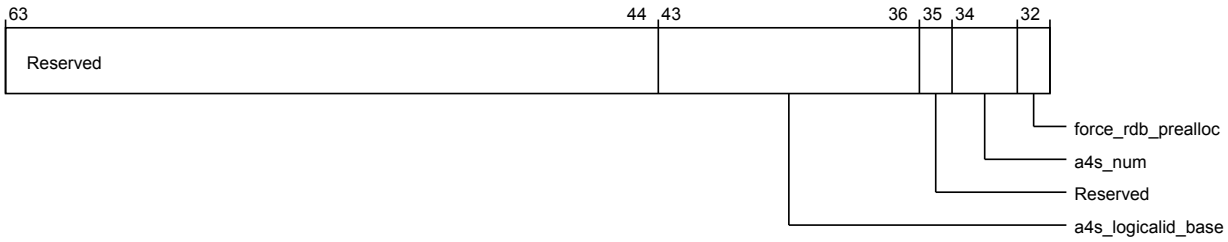

Figure 3-792 por_rnd_unit_info (high)

The following table shows the por_rnd_unit_info higher register bit assignments.

Table 3-806 por_rnd_unit_info (high)

Bits	Field name	Description	Type	Reset
63:44	Reserved	Reserved	RO	-
43:36	a4s_logicalid_base	AXI4Stream interfaces logical ID base	RO	Configuration dependent
35	Reserved	Reserved	RO	-
34:33	a4s_num	Number of AXI4Stream interfaces present	RO	Configuration dependent
32	force_rdb_prealloc	Force read data buffer preallocation 1'b1: yes 1'b0: no	RO	Configuration dependent

The following image shows the lower register bit assignments.

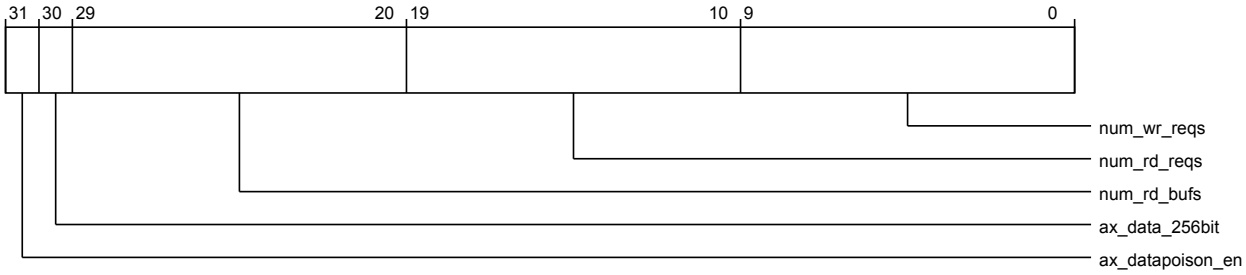

Figure 3-793 por_rnd_unit_info (low)

The following table shows the por_rnd_unit_info lower register bit assignments.

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Table 3-807 por_rnd_unit_info (low)

Bits	Field name	Description	Type	Reset
31	ax_datapoison_en	Data Poison enable on ACE-Lite/AXI4 interface 1'b1: Enabled 1'b0: Not enabled	RO	Configuration dependent
30	ax_data_256bit	AXI interface data width 1'b1: 256 bits 1'b0: 128 bits	RO	Configuration dependent
29:20	num_rd_bufs	Number of read data buffers	RO	Configuration dependent
19:10	num_rd_reqs	Number of outstanding read requests	RO	Configuration dependent
9:0	num_wr_reqs	Number of outstanding write requests	RO	Configuration dependent

por_rnd_cfg_ctl

Functions as the configuration control register. Specifies the current mode.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hA00

Register reset Configuration dependent

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rnd_secure_register_groups_override.cfg_ctl

The following image shows the higher register bit assignments.

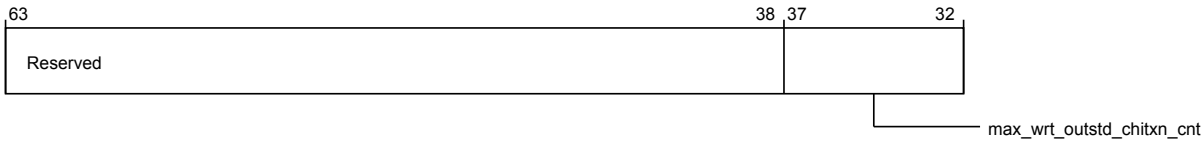

Figure 3-794 por_rnd_cfg_ctl (high)

The following table shows the por_rnd_cfg_ctl higher register bit assignments.

Table 3-808 por_rnd_cfg_ctl (high)

Bits	Field name	Description	Type	Reset
63:38	Reserved	Reserved	RO	-
37:32	max_wrt_outstd_chitxn_cnt	Maximum number of outstanding writes allowed on CHI-side	RW	Configuration dependent

The following image shows the lower register bit assignments.

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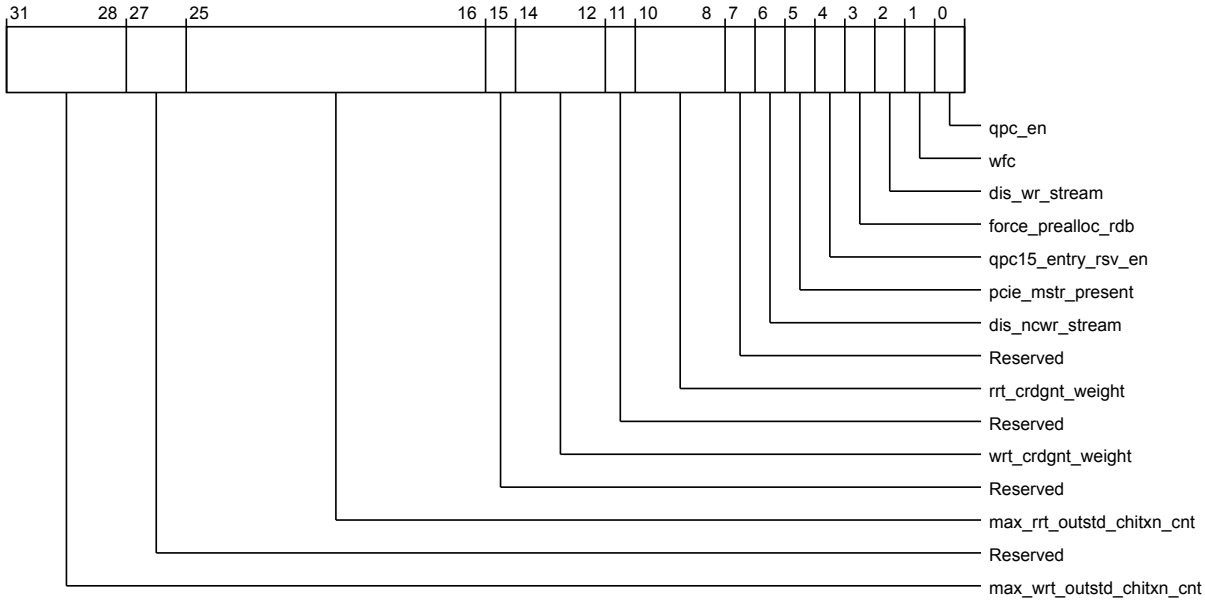

Figure 3-795 por_rnd_cfg_ctl (low)

The following table shows the por_rnd_cfg_ctl lower register bit assignments.

Table 3-809 por_rnd_cfg_ctl (low)

Bits	Field name	Description	Type	Reset
31:28	max_wrt_outstd_chitxn_cnt	Maximum number of outstanding writes allowed on CHI-side	RW	Configuration dependent
27:26	Reserved	Reserved	RO	-
25:16	max_rrt_outstd_chitxn_cnt	Maximum number of outstanding reads allowed on CHI-side	RW	Configuration dependent
15	Reserved	Reserved	RO	-
14:12	wrt_crdgnt_weight	Determines weight of credit grant allocated to retried writes in presence of pending retried reads	RW	3'b001
11	Reserved	Reserved	RO	-
10:8	rrt_crdgnt_weight	Determines weight of credit grant allocated to retried reads in presence of pending retried writes	RW	3'b100
7	Reserved	Reserved	RO	-
6	dis_ncwr_stream	Disables streaming of ordered non-cacheable writes when set	RW	1'b0
5	pcie_mstr_present	Indicates PCIe master is present; must be set if PCIe master is present upstream of RN-I or RN-D	RW	1'b0

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Table 3-809 por_rnd_cfg_ctl (low) (continued)

Bits	Field name	Description	Type	Reset
4	qpc15_entry_rsv_en	Enables QPC15 entry reservation 1'b1: Reserves tracker entry for QoS15 requests 1'b0: Does not reserve tracker entry for QoS15 requests ——— **Note** ——— Only valid and applicable when por_rnd_qpc_en is set ———	RW	1'b0
3	force_prealloc_rdb	When set, all reads from the RN-D are sent with a preallocated read data buffer	RW	Configuration dependent
2	dis_wr_stream	Disables streaming of ordered writes when set	RW	1'b0
1	wfc	When set, enables waiting for completion (COMP) before dispatching dependent transaction (TXN)	RW	1'b0
0	qpc_en	When set, enables QPC-based scheduling using two QoS priority classes (QoS15 and non-QoS15)	RW	1'b1

por_rnd_aux_ctl

Functions as the auxiliary control register for RN-D.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hA08
Register reset Configuration dependent
Usage constraints Only accessible by secure accesses. This register can be modified only with prior written permission from Arm.

The following image shows the higher register bit assignments.

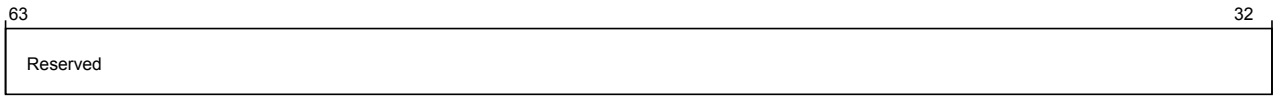

Figure 3-796 por_rnd_aux_ctl (high)

The following table shows the por_rnd_aux_ctl higher register bit assignments.

Table 3-810 por_rnd_aux_ctl (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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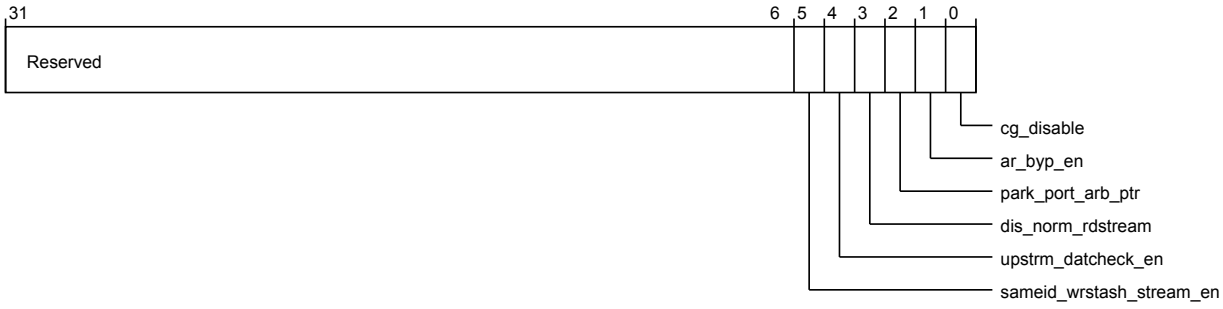

Figure 3-797 por_rnd_aux_ctl (low)

The following table shows the por_rnd_aux_ctl lower register bit assignments.

Table 3-811 por_rnd_aux_ctl (low)

Bits	Field name	Description	Type	Reset
31:6	Reserved	Reserved	RO	-
5	sameid_wrstash_stream_en	Enables streaming of same-ID WrUniqStash	RW	Configuration dependent
4	upstrm_datcheck_en	Upstream supports Datacheck	RW	Configuration dependent
3	dis_norm_rdstream	Disables streaming of same ARID normal memory reads to different address	RW	1'b0
2	park_port_arb_ptr	Parks the AXI port arbitration pointer for Burst	RW	1'b0
1	ar_byp_en	AR bypass enable; enables bypass path in the AR pipeline	RW	1'b1
0	cg_disable	Disables clock gating when set	RW	1'b0

por_rnd_s0_port_control

Controls port S0 AXI/ACE slave interface settings.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hA10

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rnd_secure_register_groups_override.port_ctrl

The following image shows the higher register bit assignments.

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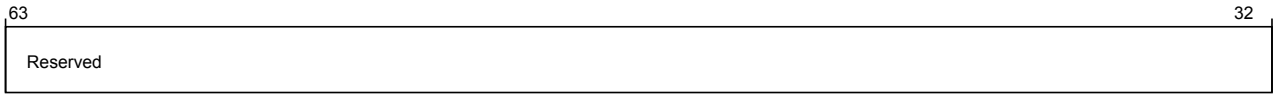

Figure 3-798 por_rnd_s0_port_control (high)

The following table shows the por_rnd_s0_port_control higher register bit assignments.

Table 3-812 por_rnd_s0_port_control (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

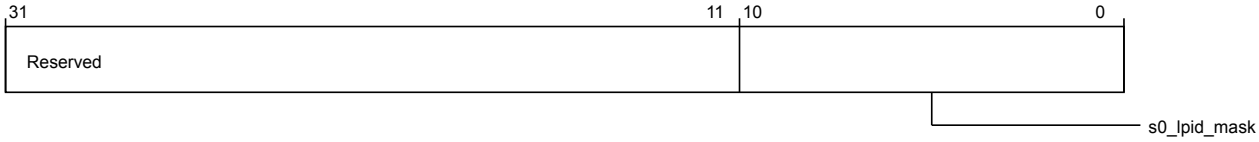

Figure 3-799 por_rnd_s0_port_control (low)

The following table shows the por_rnd_s0_port_control lower register bit assignments.

Table 3-813 por_rnd_s0_port_control (low)

Bits	Field name	Description	Type	Reset
31:11	Reserved	Reserved	RO	-
10:0	s0_lpid_mask	Port S0 LPID mask LPID[0]: Equal to the result of UnaryOR of BitwiseAND of LPID mask and AXID (LPID[0] = (AXID and mask)); specifies which AXID bit is reflected in the LSB of LPID LPID[2:1]: Equal to port ID[1:0]; the MSB of LPID contains port ID	RW	11'b000_0000_0000

por_rnd_s1_port_control

Controls port S1 AXI/ACE slave interface settings.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hA18

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rnd_secure_register_groups_override.port_ctrl

The following image shows the higher register bit assignments.

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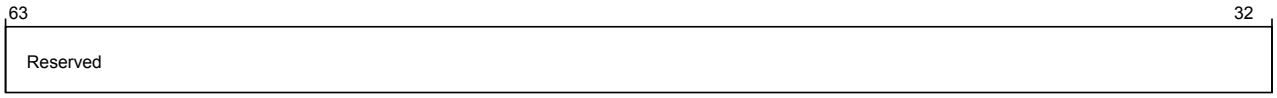

Figure 3-800 por_rnd_s1_port_control (high)

The following table shows the por_rnd_s1_port_control higher register bit assignments.

Table 3-814 por_rnd_s1_port_control (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

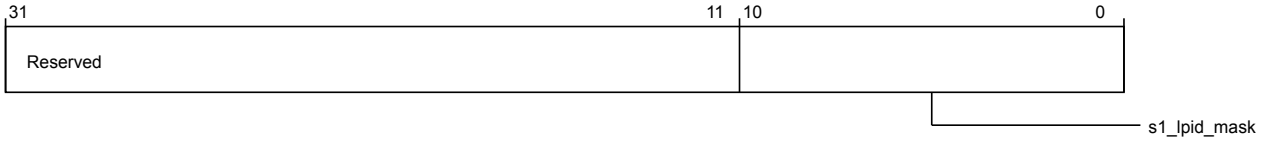

Figure 3-801 por_rnd_s1_port_control (low)

The following table shows the por_rnd_s1_port_control lower register bit assignments.

Table 3-815 por_rnd_s1_port_control (low)

Bits	Field name	Description	Type	Reset
31:11	Reserved	Reserved	RO	-
10:0	s1_lpid_mask	Port S1 LPID mask LPID[0]: Equal to the result of UnaryOR of BitwiseAND of LPID mask and AXID (LPID[0] = (AXID and mask)); specifies which AXID bit is reflected in the LSB of LPID LPID[2:1]: Equal to port ID[1:0]; the MSB of LPID contains port ID	RW	11'b000_0000_0000

por_rnd_s2_port_control

Controls port S2 AXI/ACE slave interface settings.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hA20

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rnd_secure_register_groups_override.port_ctrl

The following image shows the higher register bit assignments.

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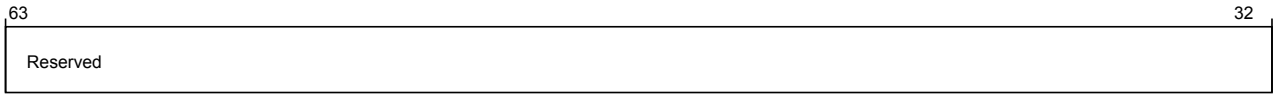

Figure 3-802 por_rnd_s2_port_control (high)

The following table shows the por_rnd_s2_port_control higher register bit assignments.

Table 3-816 por_rnd_s2_port_control (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

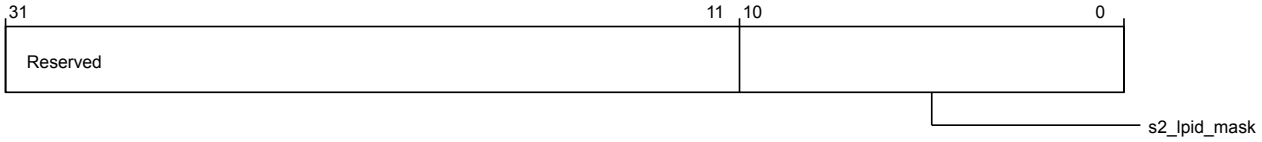

Figure 3-803 por_rnd_s2_port_control (low)

The following table shows the por_rnd_s2_port_control lower register bit assignments.

Table 3-817 por_rnd_s2_port_control (low)

Bits	Field name	Description	Type	Reset
31:11	Reserved	Reserved	RO	-
10:0	s2_lpid_mask	Port S2 LPID mask LPID[0]: Equal to the result of UnaryOR of BitwiseAND of LPID mask and AXID (LPID[0] = (AXID and mask)); specifies which AXID bit is reflected in the LSB of LPID LPID[2:1]: Equal to port ID[1:0]; the MSB of LPID contains port ID	RW	11'b000_0000_0000

por_rnd_s0_qos_control

Controls QoS settings for port S0 AXI/ACE slave interface.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hA80

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rnd_secure_register_groups_override.qos_ctrl

The following image shows the higher register bit assignments.

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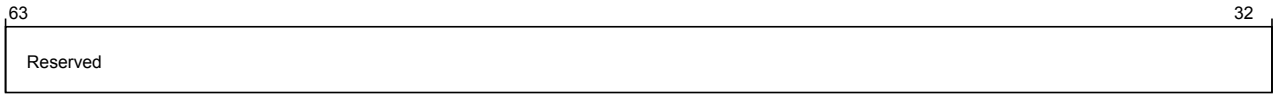

Figure 3-804 por_rnd_s0_qos_control (high)

The following table shows the por_rnd_s0_qos_control higher register bit assignments.

Table 3-818 por_rnd_s0_qos_control (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

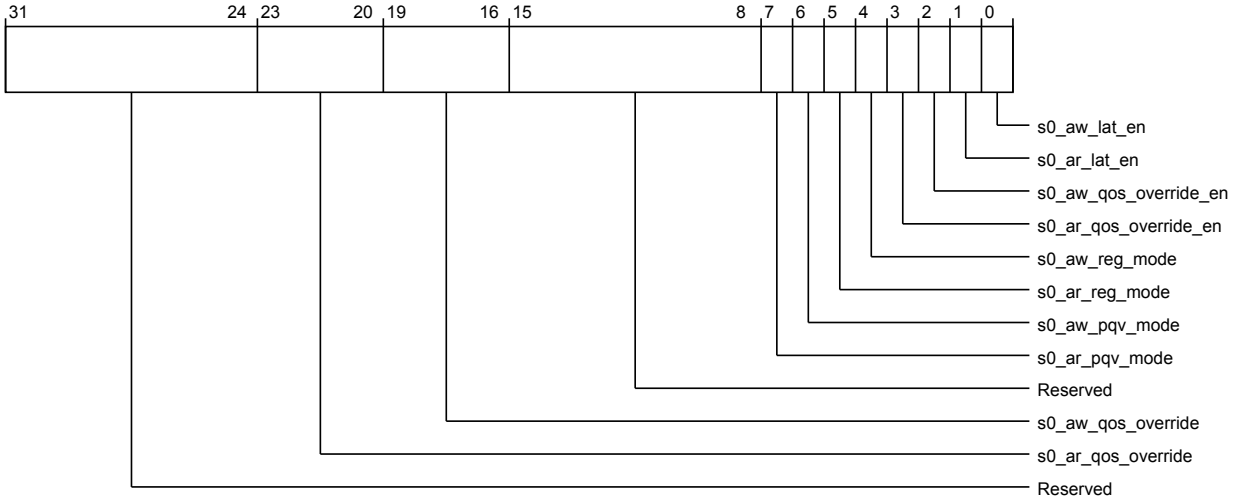

Figure 3-805 por_rnd_s0_qos_control (low)

The following table shows the por_rnd_s0_qos_control lower register bit assignments.

Table 3-819 por_rnd_s0_qos_control (low)

Bits	Field name	Description	Type	Reset
31:24	Reserved	Reserved	RO	-
23:20	s0_ar_qos_override	AR QoS override value for port S0	RW	4'b0000
19:16	s0_aw_qos_override	AW QoS override value for port S0	RW	4'b0000
15:8	Reserved	Reserved	RO	-
7	s0_ar_pqv_mode	Configures the QoS regulator mode for read transactions during period mode 1'b0: Normal mode; QoS value is stable when the master is idle 1'b1: Quiesce high mode; QoS value tends to the maximum value when the master is idle	RW	1'b0

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Table 3-819 por_rnd_s0_qos_control (low) (continued)

Bits	Field name	Description	Type	Reset
6	s0_aw_pqv_mode	Configures the QoS regulator mode for write transactions during period mode 1'b0: Normal mode; QoS value is stable when the master is idle 1'b1: Quiesce high mode; QoS value tends to the maximum value when the master is idle	RW	1'b0
5	s0_ar_reg_mode	Configures the QoS regulator mode for read transactions 1'b0: Latency mode 1'b1: Period mode; used for bandwidth regulation	RW	1'b0
4	s0_aw_reg_mode	Configures the QoS regulator mode for write transactions 1'b0: Latency mode 1'b1: Period mode; used for bandwidth regulation	RW	1'b0
3	s0_ar_qos_override_en	Enables port S0 AR QoS override; when set, allows QoS value on inbound AR transactions to be overridden	RW	1'b0
2	s0_aw_qos_override_en	Enables port S0 AW QoS override; when set, allows QoS value on inbound AW transactions to be overridden	RW	1'b0
1	s0_ar_lat_en	Enables port S0 AR QoS regulation when set	RW	1'b0
0	s0_aw_lat_en	Enables port S0 AW QoS regulation when set	RW	1'b0

por_rnd_s0_qos_lat_tgt

Controls QoS target latency (in cycles) for regulations of port S0 read and write transactions.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hA88

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rnd_secure_register_groups_override.qos_ctrl

The following image shows the higher register bit assignments.

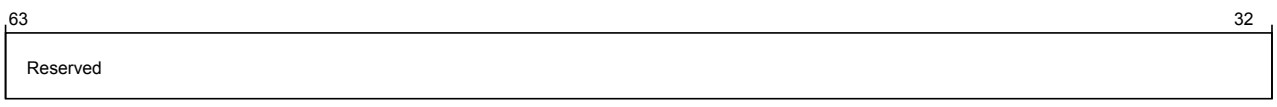

Figure 3-806 por_rnd_s0_qos_lat_tgt (high)

The following table shows the por_rnd_s0_qos_lat_tgt higher register bit assignments.

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Table 3-820 por_rnd_s0_qos_lat_tgt (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

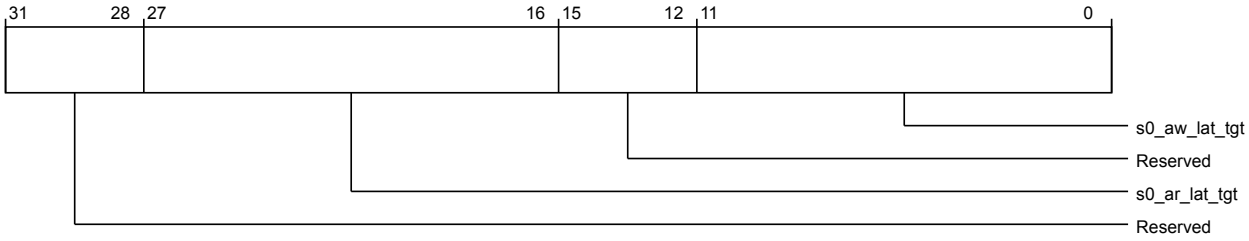

Figure 3-807 por_rnd_s0_qos_lat_tgt (low)

The following table shows the por_rnd_s0_qos_lat_tgt lower register bit assignments.

Table 3-821 por_rnd_s0_qos_lat_tgt (low)

Bits	Field name	Description	Type	Reset
31:28	Reserved	Reserved	RO	-
27:16	s0_ar_lat_tgt	Port S0 AR channel target latency; a value of 0 corresponds to no regulation	RW	12'h000
15:12	Reserved	Reserved	RO	-
11:0	s0_aw_lat_tgt	Port S0 AW channel target latency; a value of 0 corresponds to no regulation	RW	12'h000

por_rnd_s0_qos_lat_scale

Controls the QoS target latency scale factor for port S0 read and write transactions. This register represents powers of two from the range 2^(-5) to 2^(-12); it is used to match a 16-bit integrator.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hA90

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rnd_secure_register_groups_override.qos_ctrl

The following image shows the higher register bit assignments.

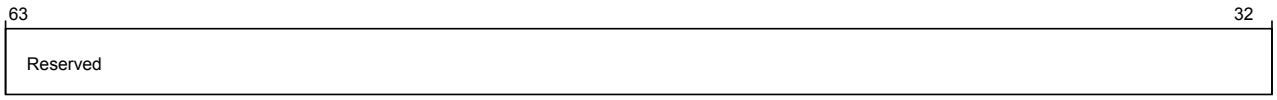

Figure 3-808 por_rnd_s0_qos_lat_scale (high)

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The following table shows the por_rnd_s0_qos_lat_scale higher register bit assignments.

Table 3-822 por_rnd_s0_qos_lat_scale (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

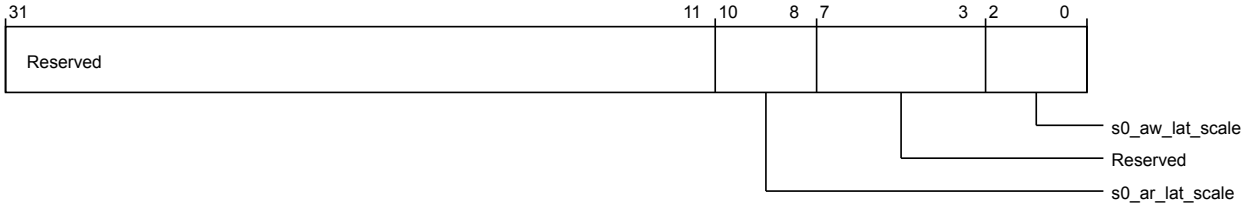

Figure 3-809 por_rnd_s0_qos_lat_scale (low)

The following table shows the por_rnd_s0_qos_lat_scale lower register bit assignments.

Table 3-823 por_rnd_s0_qos_lat_scale (low)

Bits	Field name	Description	Type	Reset
31:11	Reserved	Reserved	RO	-
10:8	s0_ar_lat_scale	Port S0 AR QoS scale factor 3'b000: 2^(-5) 3'b001: 2^(-6) 3'b010: 2^(-7) 3'b011: 2^(-8) 3'b100: 2^(-9) 3'b101: 2^(-10) 3'b110: 2^(-11) 3'b111: 2^(-12)	RW	3'h0
7:3	Reserved	Reserved	RO	-
2:0	s0_aw_lat_scale	Port S0 AW QoS scale factor 3'b000: 2^(-5) 3'b001: 2^(-6) 3'b010: 2^(-7) 3'b011: 2^(-8) 3'b100: 2^(-9) 3'b101: 2^(-10) 3'b110: 2^(-11) 3'b111: 2^(-12)	RW	3'h0

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por_rnd_s0_qos_lat_range

Controls the minimum and maximum QoS values generated by the QoS latency regulator for port S0 read and write transactions.

Its characteristics are:

Type	RW
Register width (Bits)	64
Address offset	14'hA98
Register reset	64'b0
Usage constraints	Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.
Secure group override	por_rnd_secure_register_groups_override.qos_ctrl

The following image shows the higher register bit assignments.

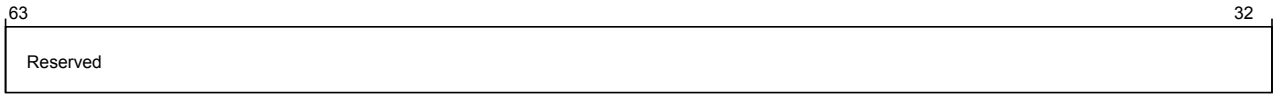

Figure 3-810 por_rnd_s0_qos_lat_range (high)

The following table shows the por_rnd_s0_qos_lat_range higher register bit assignments.

Table 3-824 por_rnd_s0_qos_lat_range (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

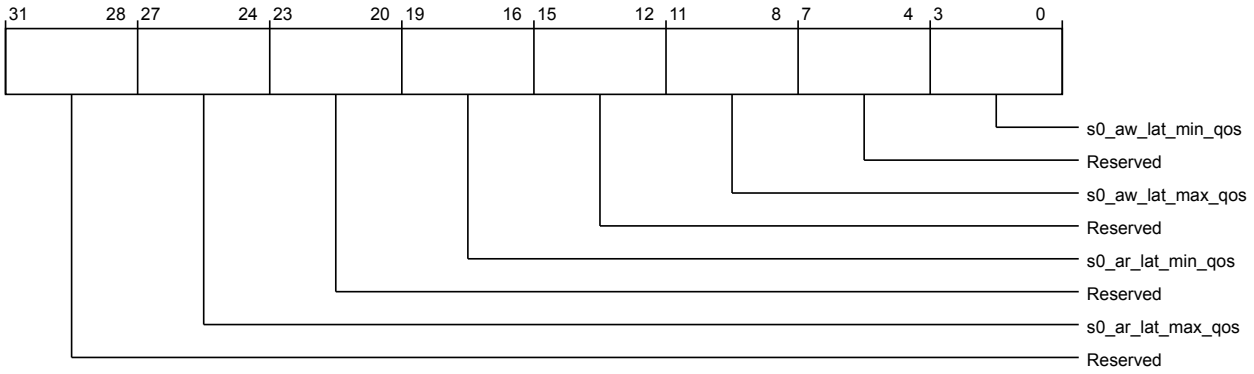

Figure 3-811 por_rnd_s0_qos_lat_range (low)

The following table shows the por_rnd_s0_qos_lat_range lower register bit assignments.

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Table 3-825 por_rnd_s0_qos_lat_range (low)

Bits	Field name	Description	Type	Reset
31:28	Reserved	Reserved	RO	-
27:24	s0_ar_lat_max_qos	Port S0 AR QoS maximum value	RW	4'h0
23:20	Reserved	Reserved	RO	-
19:16	s0_ar_lat_min_qos	Port S0 AR QoS minimum value	RW	4'h0
15:12	Reserved	Reserved	RO	-
11:8	s0_aw_lat_max_qos	Port S0 AW QoS maximum value	RW	4'h0
7:4	Reserved	Reserved	RO	-
3:0	s0_aw_lat_min_qos	Port S0 AW QoS minimum value	RW	4'h0

por_rnd_s1_qos_control

Controls QoS settings for port S1 AXI/ACE slave interface.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hAA0

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rnd_secure_register_groups_override.qos_ctrl

The following image shows the higher register bit assignments.

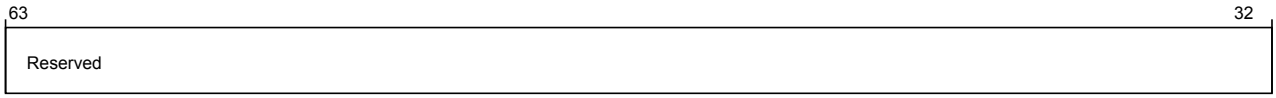

Figure 3-812 por_rnd_s1_qos_control (high)

The following table shows the por_rnd_s1_qos_control higher register bit assignments.

Table 3-826 por_rnd_s1_qos_control (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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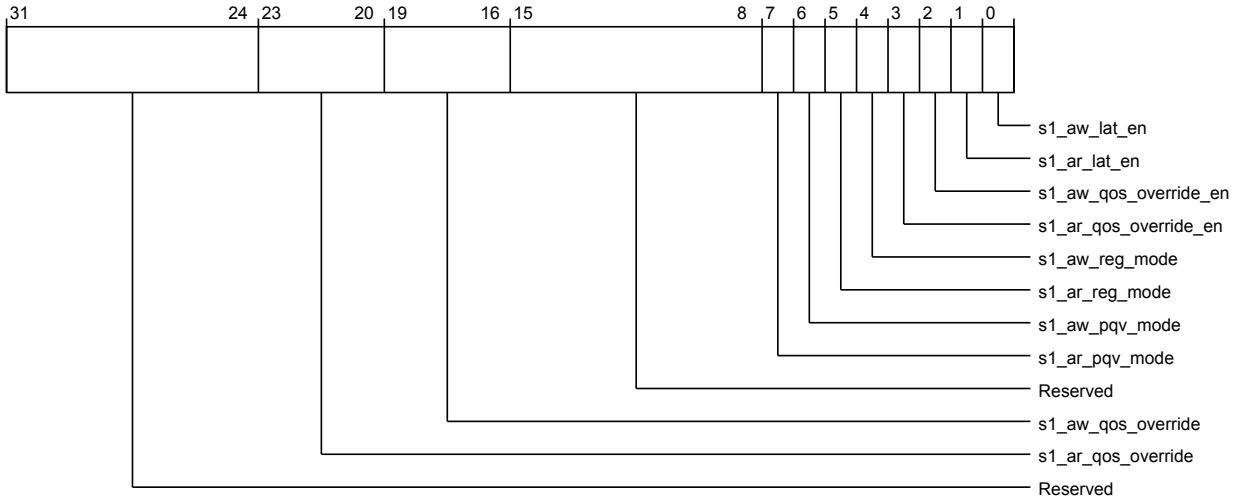

Figure 3-813 por_rnd_s1_qos_control (low)

The following table shows the por_rnd_s1_qos_control lower register bit assignments.

Table 3-827 por_rnd_s1_qos_control (low)

Bits	Field name	Description	Type	Reset
31:24	Reserved	Reserved	RO	-
23:20	s1_ar_qos_override	AR QoS override value for port S1	RW	4'b0000
19:16	s1_aw_qos_override	AW QoS override value for port S1	RW	4'b0000
15:8	Reserved	Reserved	RO	-
7	s1_ar_pqv_mode	Configures the QoS regulator mode for read transactions during period mode 1'b0: Normal mode; QoS value is stable when the master is idle 1'b1: Quiesce high mode; QoS value tends to the maximum value when the master is idle	RW	1'b0
6	s1_aw_pqv_mode	Configures the QoS regulator mode for write transactions during period mode 1'b0: Normal mode; QoS value is stable when the master is idle 1'b1: Quiesce high mode; QoS value tends to the maximum value when the master is idle	RW	1'b0
5	s1_ar_reg_mode	Configures the QoS regulator mode for read transactions 1'b0: Latency mode 1'b1: Period mode; used for bandwidth regulation	RW	1'b0
4	s1_aw_reg_mode	Configures the QoS regulator mode for write transactions 1'b0: Latency mode 1'b1: Period mode; used for bandwidth regulation	RW	1'b0
3	s1_ar_qos_override_en	Enables port S1 AR QoS override; when set, allows QoS value on inbound AR transactions to be overridden	RW	1'b0

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Table 3-827 por_rnd_s1_qos_control (low) (continued)

Bits	Field name	Description	Type	Reset
2	s1_aw_qos_override_en	Enables port S1 AW QoS override; when set, allows QoS value on inbound AW transactions to be overridden	RW	1'b0
1	s1_ar_lat_en	Enables port S1 AR QoS regulation when set	RW	1'b0
0	s1_aw_lat_en	Enables port S1 AW QoS regulation when set	RW	1'b0

por_rnd_s1_qos_lat_tgt

Controls QoS target latency (in cycles) for regulation of port S1 read and write transactions.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hAA8

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rnd_secure_register_groups_override.qos_ctrl

The following image shows the higher register bit assignments.

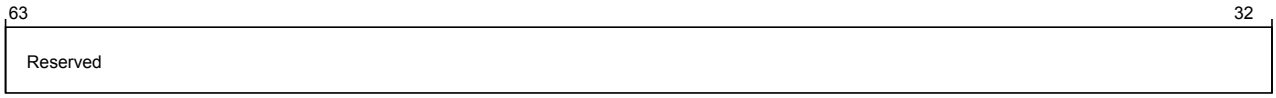

Figure 3-814 por_rnd_s1_qos_lat_tgt (high)

The following table shows the por_rnd_s1_qos_lat_tgt higher register bit assignments.

Table 3-828 por_rnd_s1_qos_lat_tgt (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

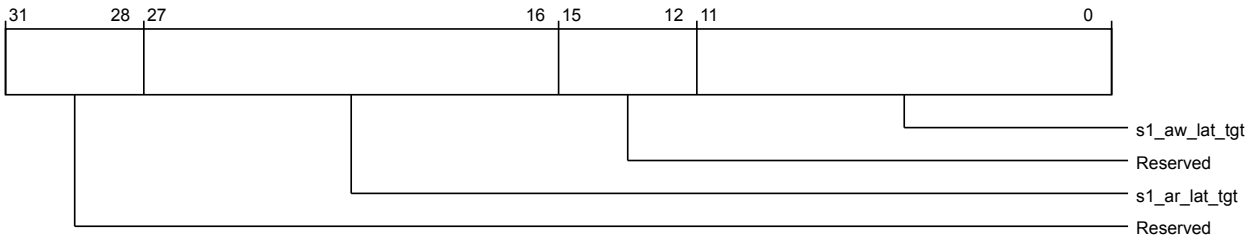

Figure 3-815 por_rnd_s1_qos_lat_tgt (low)

The following table shows the por_rnd_s1_qos_lat_tgt lower register bit assignments.

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Table 3-829 por_rnd_s1_qos_lat_tgt (low)

Bits	Field name	Description	Type	Reset
31:28	Reserved	Reserved	RO	-
27:16	s1_ar_lat_tgt	Port S1 AR channel target latency; a value of 0 corresponds to no regulation	RW	12'h000
15:12	Reserved	Reserved	RO	-
11:0	s1_aw_lat_tgt	Port S1 AW channel target latency; a value of 0 corresponds to no regulation	RW	12'h000

por_rnd_s1_qos_lat_scale

Controls the QoS target latency scale factor for port S1 read and write transactions. This register represents powers of two from the range 2^(-5) to 2^(-12); it is used to match a 16-bit integrator.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hAB0

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rnd_secure_register_groups_override.qos_ctrl

The following image shows the higher register bit assignments.

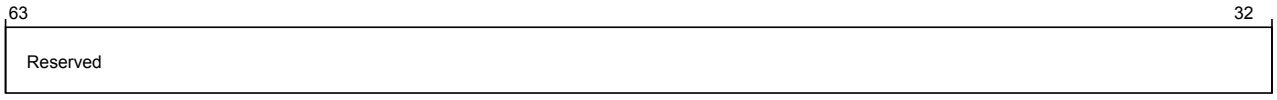

Figure 3-816 por_rnd_s1_qos_lat_scale (high)

The following table shows the por_rnd_s1_qos_lat_scale higher register bit assignments.

Table 3-830 por_rnd_s1_qos_lat_scale (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

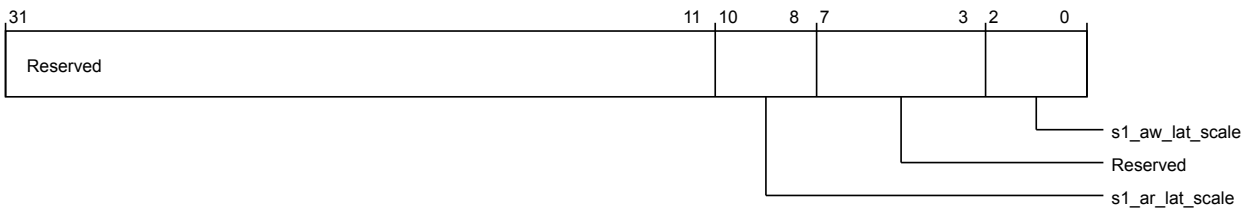

Figure 3-817 por_rnd_s1_qos_lat_scale (low)

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The following table shows the por_rnd_s1_qos_lat_scale lower register bit assignments.

Table 3-831 por_rnd_s1_qos_lat_scale (low)

Bits	Field name	Description	Type	Reset
31:11	Reserved	Reserved	RO	-
10:8	s1_ar_lat_scale	Port S1 AR QoS scale factor 3'b000: 2^(-5) 3'b001: 2^(-6) 3'b010: 2^(-7) 3'b011: 2^(-8) 3'b100: 2^(-9) 3'b101: 2^(-10) 3'b110: 2^(-11) 3'b111: 2^(-12)	RW	3'h0
7:3	Reserved	Reserved	RO	-
2:0	s1_aw_lat_scale	Port S1 AW QoS scale factor 3'b000: 2^(-5) 3'b001: 2^(-6) 3'b010: 2^(-7) 3'b011: 2^(-8) 3'b100: 2^(-9) 3'b101: 2^(-10) 3'b110: 2^(-11) 3'b111: 2^(-12)	RW	3'h0

por_rnd_s1_qos_lat_range

Controls the minimum and maximum QoS values generated by the QoS latency regulator for port S1 read and write transactions.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hAB8

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rnd_secure_register_groups_override.qos_ctrl

The following image shows the higher register bit assignments.

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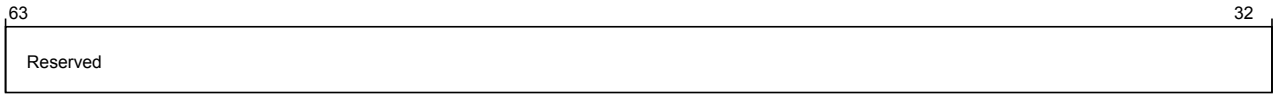

Figure 3-818 por_rnd_s1_qos_lat_range (high)

The following table shows the por_rnd_s1_qos_lat_range higher register bit assignments.

Table 3-832 por_rnd_s1_qos_lat_range (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

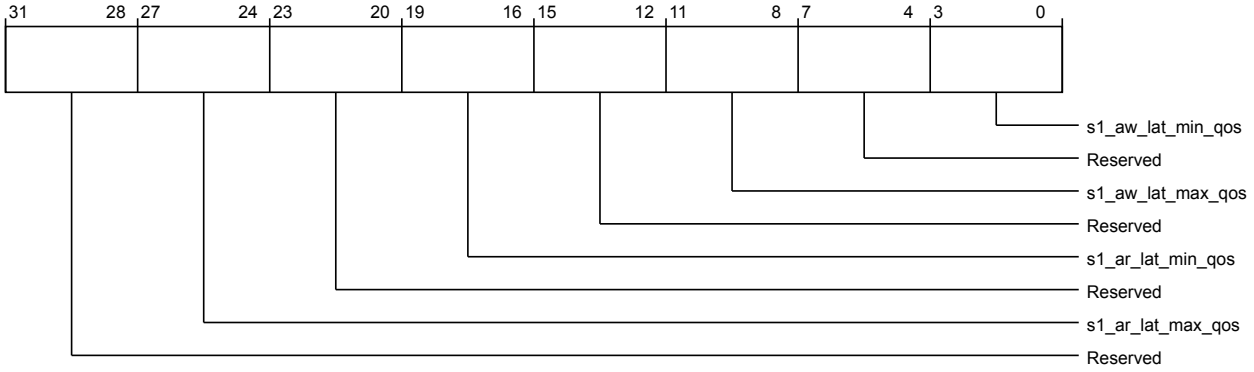

Figure 3-819 por_rnd_s1_qos_lat_range (low)

The following table shows the por_rnd_s1_qos_lat_range lower register bit assignments.

Table 3-833 por_rnd_s1_qos_lat_range (low)

Bits	Field name	Description	Type	Reset
31:28	Reserved	Reserved	RO	-
27:24	s1_ar_lat_max_qos	Port S1 AR QoS maximum value	RW	4'h0
23:20	Reserved	Reserved	RO	-
19:16	s1_ar_lat_min_qos	Port S1 AR QoS minimum value	RW	4'h0
15:12	Reserved	Reserved	RO	-
11:8	s1_aw_lat_max_qos	Port S1 AW QoS maximum value	RW	4'h0
7:4	Reserved	Reserved	RO	-
3:0	s1_aw_lat_min_qos	Port S1 AW QoS minimum value	RW	4'h0

por_rnd_s2_qos_control

Controls QoS settings for port S2 AXI/ACE slave interface.

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Its characteristics are:

Type	RW
Register width (Bits)	64
Address offset	14'hAC0
Register reset	64'b0
Usage constraints	Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.
Secure group override	por_rnd_secure_register_groups_override.qos_ctrl

The following image shows the higher register bit assignments.

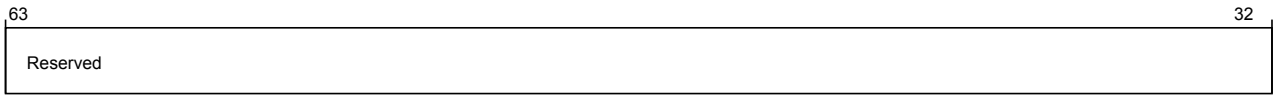

Figure 3-820 por_rnd_s2_qos_control (high)

The following table shows the por_rnd_s2_qos_control higher register bit assignments.

Table 3-834 por_rnd_s2_qos_control (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

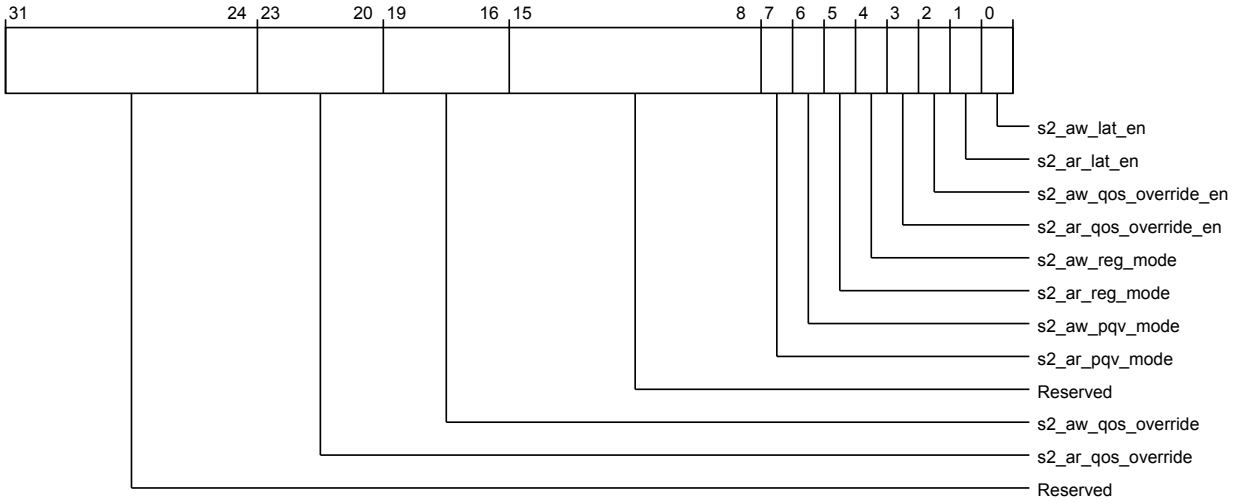

Figure 3-821 por_rnd_s2_qos_control (low)

The following table shows the por_rnd_s2_qos_control lower register bit assignments.

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Table 3-835 por_rnd_s2_qos_control (low)

Bits	Field name	Description	Type	Reset
31:24	Reserved	Reserved	RO	-
23:20	s2_ar_qos_override	AR QoS override value for port S2	RW	4'b0000
19:16	s2_aw_qos_override	AW QoS override value for port S2	RW	4'b0000
15:8	Reserved	Reserved	RO	-
7	s2_ar_pqv_mode	Configures the QoS regulator mode for read transactions during period mode 1'b0: Normal mode; QoS value is stable when the master is idle 1'b1: Quiesce high mode; QoS value tends to the maximum value when the master is idle	RW	1'b0
6	s2_aw_pqv_mode	Configures the QoS regulator mode for write transactions during period mode 1'b0: Normal mode; QoS value is stable when the master is idle 1'b1: Quiesce high mode; QoS value tends to the maximum value when the master is idle	RW	1'b0
5	s2_ar_reg_mode	Configures the QoS regulator mode for read transactions 1'b0: Latency mode 1'b1: Period mode; used for bandwidth regulation	RW	1'b0
4	s2_aw_reg_mode	Configures the QoS regulator mode for write transactions 1'b0: Latency mode 1'b1: Period mode; used for bandwidth regulation	RW	1'b0
3	s2_ar_qos_override_en	Enables port S2 AR QoS override; when set, allows QoS value on inbound AR transactions to be overridden	RW	1'b0
2	s2_aw_qos_override_en	Enables port S2 AW QoS override; when set, allows QoS value on inbound AW transactions to be overridden	RW	1'b0
1	s2_ar_lat_en	Enables port S2 AR QoS regulation when set	RW	1'b0
0	s2_aw_lat_en	Enables port S2 AW QoS regulation when set	RW	1'b0

por_rnd_s2_qos_lat_tgt

Controls QoS target latency (in cycles) for regulation of port S2 read and write transactions.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hAC8
Register reset 64'b0
Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

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Secure group override por_rnd_secure_register_groups_override.qos_ctrl

The following image shows the higher register bit assignments.

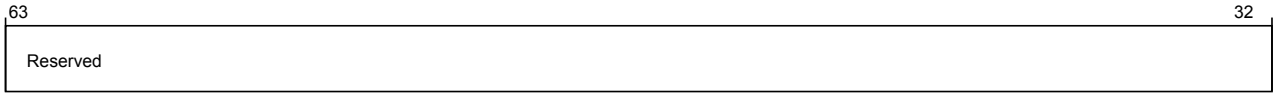

Figure 3-822 por_rnd_s2_qos_lat_tgt (high)

The following table shows the por_rnd_s2_qos_lat_tgt higher register bit assignments.

Table 3-836 por_rnd_s2_qos_lat_tgt (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

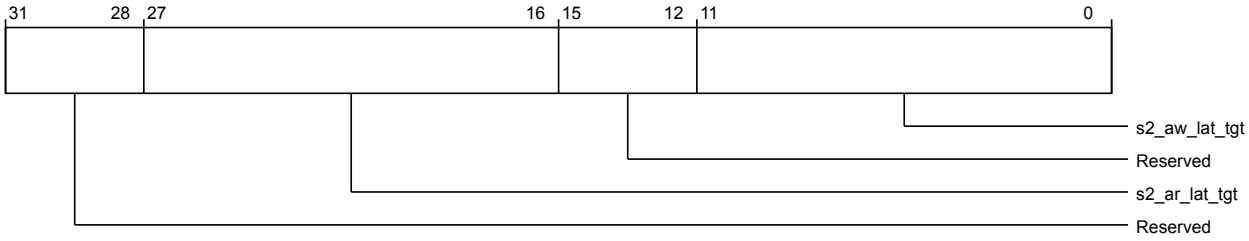

Figure 3-823 por_rnd_s2_qos_lat_tgt (low)

The following table shows the por_rnd_s2_qos_lat_tgt lower register bit assignments.

Table 3-837 por_rnd_s2_qos_lat_tgt (low)

Bits	Field name	Description	Type	Reset
31:28	Reserved	Reserved	RO	-
27:16	s2_ar_lat_tgt	Port S2 AR channel target latency; a value of 0 corresponds to no regulation	RW	12'h000
15:12	Reserved	Reserved	RO	-
11:0	s2_aw_lat_tgt	Port S2 AW channel target latency; a value of 0 corresponds to no regulation	RW	12'h000

por_rnd_s2_qos_lat_scale

Controls the QoS target latency scale factor for port S2 read and write transactions. This register represents powers of two from the range 2^(-5) to 2^(-12); it is used to match a 16-bit integrator.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hAD0

Register reset 64'b0

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Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rnd_secure_register_groups_override.qos_ctrl

The following image shows the higher register bit assignments.

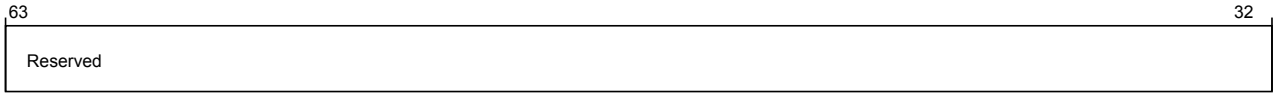

Figure 3-824 por_rnd_s2_qos_lat_scale (high)

The following table shows the por_rnd_s2_qos_lat_scale higher register bit assignments.

Table 3-838 por_rnd_s2_qos_lat_scale (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

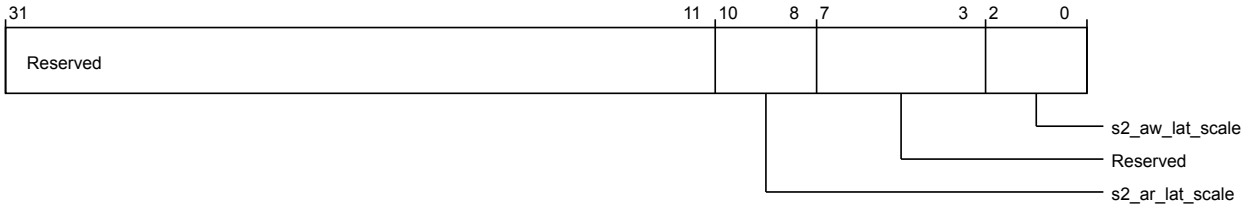

Figure 3-825 por_rnd_s2_qos_lat_scale (low)

The following table shows the por_rnd_s2_qos_lat_scale lower register bit assignments.

Table 3-839 por_rnd_s2_qos_lat_scale (low)

Bits	Field name	Description	Type	Reset
31:11	Reserved	Reserved	RO	-
10:8	s2_ar_lat_scale	Port S2 AR QoS scale factor 3'b000: 2^(-5) 3'b001: 2^(-6) 3'b010: 2^(-7) 3'b011: 2^(-8) 3'b100: 2^(-9) 3'b101: 2^(-10) 3'b110: 2^(-11) 3'b111: 2^(-12)	RW	3'h0

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Table 3-839 por_rnd_s2_qos_lat_scale (low) (continued)

Bits	Field name	Description	Type	Reset
7:3	Reserved	Reserved	RO	-
2:0	s2_aw_lat_scale	Port S2 AW QoS scale factor 3'b000: 2^(-5) 3'b001: 2^(-6) 3'b010: 2^(-7) 3'b011: 2^(-8) 3'b100: 2^(-9) 3'b101: 2^(-10) 3'b110: 2^(-11) 3'b111: 2^(-12)	RW	3'h0

por_rnd_s2_qos_lat_range

Controls the minimum and maximum QoS values generated by the QoS latency regulator for port S2 read and write transactions.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hAD8

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rnd_secure_register_groups_override.qos_ctrl

The following image shows the higher register bit assignments.

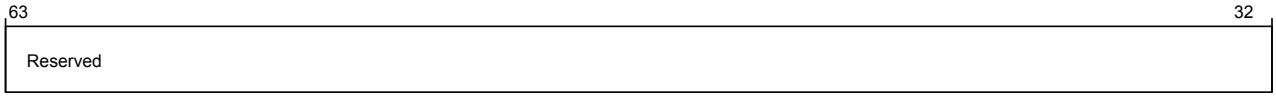

Figure 3-826 por_rnd_s2_qos_lat_range (high)

The following table shows the por_rnd_s2_qos_lat_range higher register bit assignments.

Table 3-840 por_rnd_s2_qos_lat_range (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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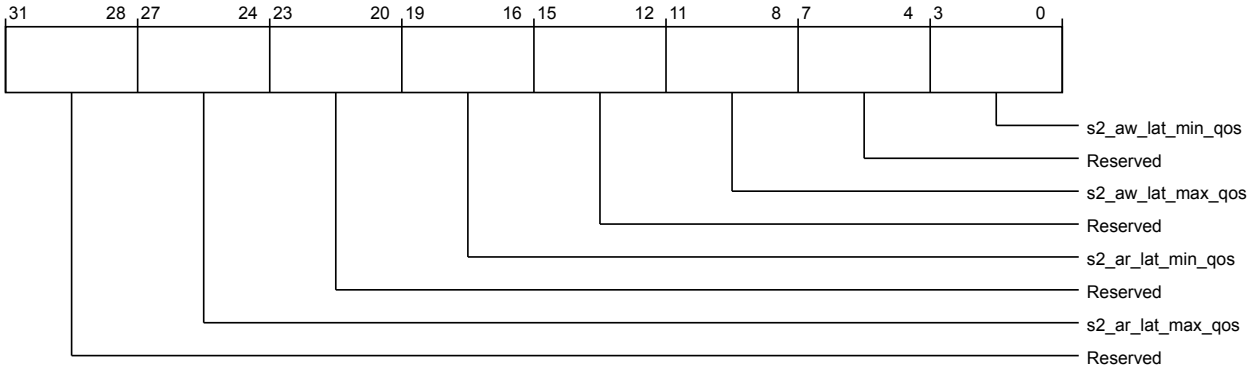

Figure 3-827 por_rnd_s2_qos_lat_range (low)

The following table shows the por_rnd_s2_qos_lat_range lower register bit assignments.

Table 3-841 por_rnd_s2_qos_lat_range (low)

Bits	Field name	Description	Type	Reset
31:28	Reserved	Reserved	RO	-
27:24	s2_ar_lat_max_qos	Port S2 AR QoS maximum value	RW	4'h0
23:20	Reserved	Reserved	RO	-
19:16	s2_ar_lat_min_qos	Port S2 AR QoS minimum value	RW	4'h0
15:12	Reserved	Reserved	RO	-
11:8	s2_aw_lat_max_qos	Port S2 AW QoS maximum value	RW	4'h0
7:4	Reserved	Reserved	RO	-
3:0	s2_aw_lat_min_qos	Port S2 AW QoS minimum value	RW	4'h0

por_rnd_pmu_event_sel

Specifies the PMU event to be counted.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h2000
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

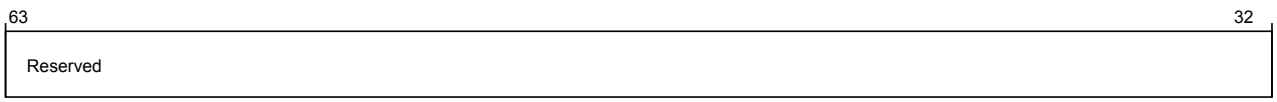

Figure 3-828 por_rnd_pmu_event_sel (high)

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The following table shows the por_rnd_pmu_event_sel higher register bit assignments.

Table 3-842 por_rnd_pmu_event_sel (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

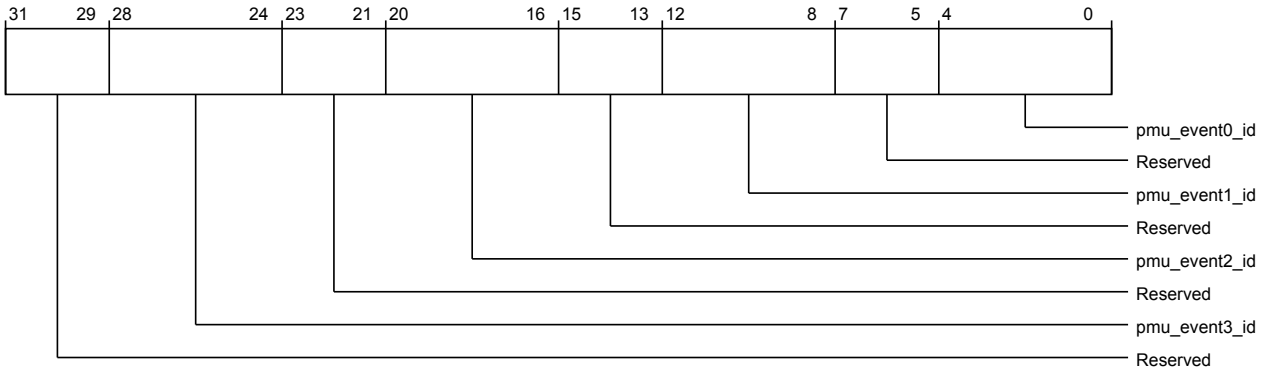

Figure 3-829 por_rnd_pmu_event_sel (low)

The following table shows the por_rnd_pmu_event_sel lower register bit assignments.

Table 3-843 por_rnd_pmu_event_sel (low)

Bits	Field name	Description	Type	Reset
31:29	Reserved	Reserved	RO	-
28:24	pmu_event3_id	RN-D PMU Event 3 ID; see pmu_event0_id for encodings	RW	5'b0
23:21	Reserved	Reserved	RO	-
20:16	pmu_event2_id	RN-D PMU Event 2 ID; see pmu_event0_id for encodings	RW	5'b0
15:13	Reserved	Reserved	RO	-
12:8	pmu_event1_id	RN-D PMU Event 1 ID; see pmu_event0_id for encodings	RW	5'b0

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Table 3-843 por_rnd_pmu_event_sel (low) (continued)

Bits	Field name	Description	Type	Reset
7:5	Reserved	Reserved	RO	-
4:0	pmu_event0_id	RN-D PMU Event 0 ID 5'h00: No event 5'h01: Port S0 RDataBeats 5'h02: Port S1 RDataBeats 5'h03: Port S2 RDataBeats 5'h04: RXDAT flits received 5'h05: TXDAT flits sent 5'h06: Total TXREQ flits sent 5'h07: Retried TXREQ flits sent 5'h08: RRT occupancy count overflow 5'h09: WRT occupancy count overflow 5'h0A: Replayed TXREQ flits 5'h0B: WriteCancel sent 5'h0C: Port S0 WDataBeats 5'h0D: Port S1 WDataBeats 5'h0E: Port S2 WDataBeats 5'h0F: RRT allocation 5'h10: WRT allocation 5'h11: RDB pool state is all unordered 5'h12: RDB pool state is replay 5'h13: RDB pool state is hybrid 5'h14: RDB pool state is all ordered	RW	5'b0

por_rnd_syscoreq_ctl

Functions as the RN-D DVM domain control register. Provides a software alternative to hardware SYSCOREQ/SYSCOACK handshake. Works with por_rnd_syscoack_status.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h1000
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

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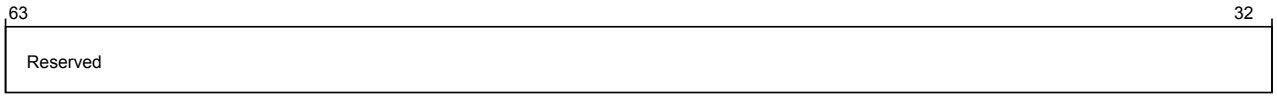

Figure 3-830 por_rnd_syscoreq_ctl (high)

The following table shows the por_rnd_syscoreq_ctl higher register bit assignments.

Table 3-844 por_rnd_syscoreq_ctl (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

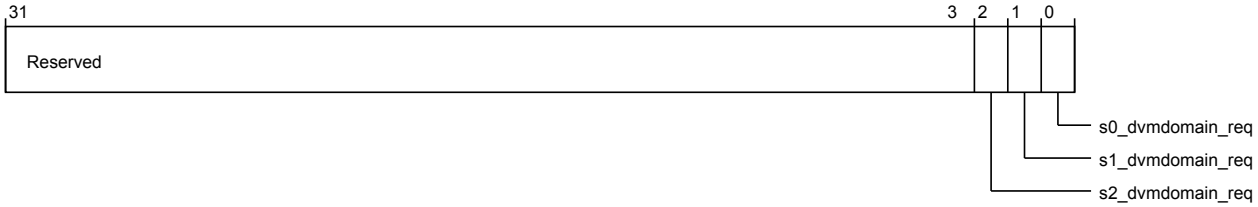

Figure 3-831 por_rnd_syscoreq_ctl (low)

The following table shows the por_rnd_syscoreq_ctl lower register bit assignments.

Table 3-845 por_rnd_syscoreq_ctl (low)

Bits	Field name	Description	Type	Reset
31:3	Reserved	Reserved	RO	-
2	s2_dvmdomain_req	Controls DVM domain enable (SYSCOREQ) for port S2	RW	1'b0
1	s1_dvmdomain_req	Controls DVM domain enable (SYSCOREQ) for port S1	RW	1'b0
0	s0_dvmdomain_req	Controls DVM domain enable (SYSCOREQ) for port S0	RW	1'b0

por_rnd_syscoack_status

Functions as the RN-D DVM domain status register. Provides a software alternative to hardware SYSCOREQ/SYSCOACK handshake. Works with por_rnd_syscoreq_ctl.

Its characteristics are:

Type RO

Register width (Bits) 64

Address offset 14'h1008

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

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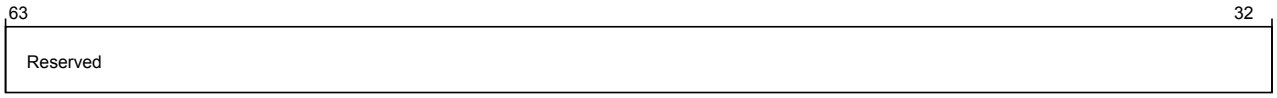

Figure 3-832 por_rnd_syscoack_status (high)

The following table shows the por_rnd_syscoack_status higher register bit assignments.

Table 3-846 por_rnd_syscoack_status (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

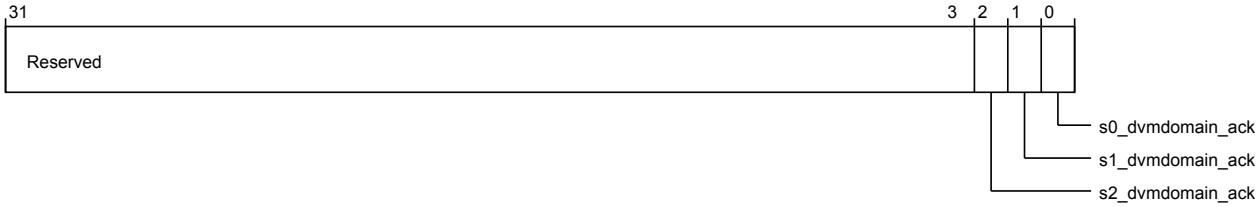

Figure 3-833 por_rnd_syscoack_status (low)

The following table shows the por_rnd_syscoack_status lower register bit assignments.

Table 3-847 por_rnd_syscoack_status (low)

Bits	Field name	Description	Type	Reset
31:3	Reserved	Reserved	RO	-
2	s2_dvmdomain_ack	Provides DVM domain status (SYSCOACK) for port S2	RO	1'b0
1	s1_dvmdomain_ack	Provides DVM domain status (SYSCOACK) for port S1	RO	1'b0
0	s0_dvmdomain_ack	Provides DVM domain status (SYSCOACK) for port S0	RO	1'b0

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3.3.8 RN-I register descriptions

Lists the RN-I registers.

por_rni_node_info

Provides component identification information.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h0
Register reset Configuration dependent
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

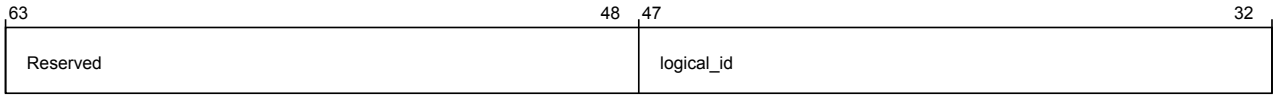

Figure 3-834 por_rni_node_info (high)

The following table shows the por_rni_node_info higher register bit assignments.

Table 3-848 por_rni_node_info (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	logical_id	Component logical ID	RO	Configuration dependent

The following image shows the lower register bit assignments.

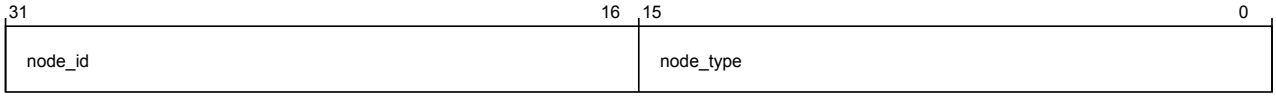

Figure 3-835 por_rni_node_info (low)

The following table shows the por_rni_node_info lower register bit assignments.

Table 3-849 por_rni_node_info (low)

Bits	Field name	Description	Type	Reset
31:16	node_id	Component node ID	RO	Configuration dependent
15:0	node_type	CMN-600 node type identifier	RO	16'h000A

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por_rni_child_info

Provides component child identification information.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h80
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

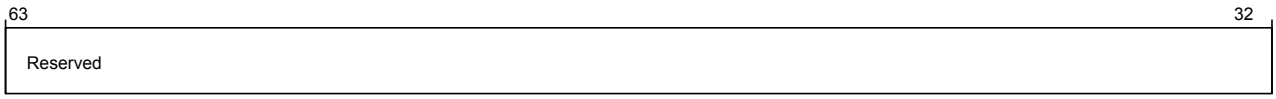

Figure 3-836 por_rni_child_info (high)

The following table shows the por_rni_child_info higher register bit assignments.

Table 3-850 por_rni_child_info (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

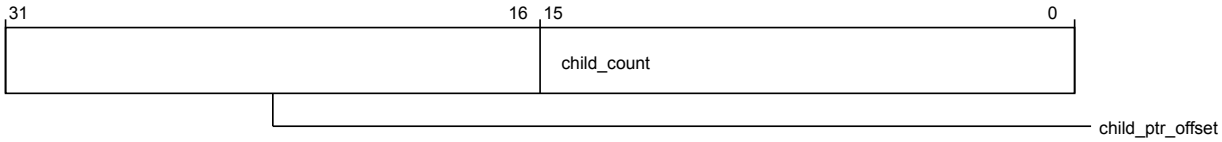

Figure 3-837 por_rni_child_info (low)

The following table shows the por_rni_child_info lower register bit assignments.

Table 3-851 por_rni_child_info (low)

Bits	Field name	Description	Type	Reset
31:16	child_ptr_offset	Starting register offset which contains pointers to the child nodes	RO	16'h0
15:0	child_count	Number of child nodes; used in discovery process	RO	16'h0

por_rni_secure_register_groups_override

Allows non-secure access to predefined groups of secure registers.

Its characteristics are:

Type RW
Register width (Bits) 64

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Address offset 14'h980

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

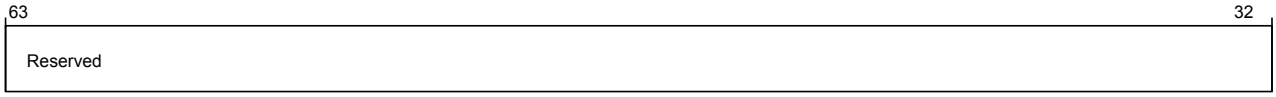

Figure 3-838 por_rni_secure_register_groups_override (high)

The following table shows the por_rni_secure_register_groups_override higher register bit assignments.

Table 3-852 por_rni_secure_register_groups_override (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

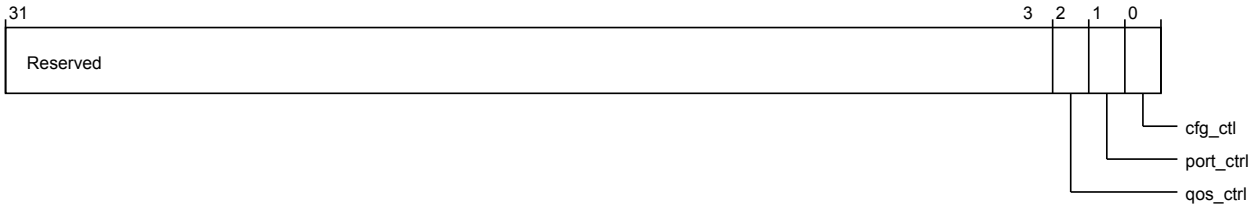

Figure 3-839 por_rni_secure_register_groups_override (low)

The following table shows the por_rni_secure_register_groups_override lower register bit assignments.

Table 3-853 por_rni_secure_register_groups_override (low)

Bits	Field name	Description	Type	Reset
31:3	Reserved	Reserved	RO	-
2	qos_ctrl	Allows non-secure access to secure QoS control registers	RW	1'b0
1	port_ctrl	Allows non-secure access to secure AXI port control registers	RW	1'b0
0	cfg_ctl	Allows non-secure access to secure configuration control register	RW	1'b0

por_rni_unit_info

Provides component identification information for RN-I.

Its characteristics are:

Type RO

Register width (Bits) 64

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Address offset 14'h900

Register reset Configuration dependent

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

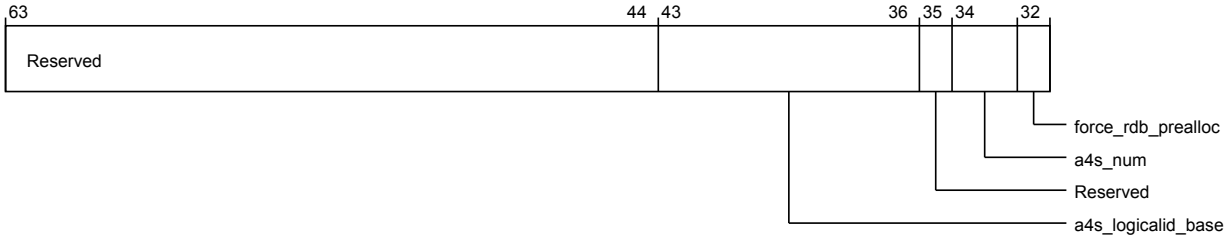

Figure 3-840 por_rni_unit_info (high)

The following table shows the por_rni_unit_info higher register bit assignments.

Table 3-854 por_rni_unit_info (high)

Bits	Field name	Description	Type	Reset
63:44	Reserved	Reserved	RO	-
43:36	a4s_logicalid_base	AXI4Stream interfaces logical ID base	RO	Configuration dependent
35	Reserved	Reserved	RO	-
34:33	a4s_num	Number of AXI4Stream interfaces present	RO	Configuration dependent
32	force_rdb_prealloc	Force read data buffer preallocation 1'b1: yes 1'b0: no	RO	Configuration dependent

The following image shows the lower register bit assignments.

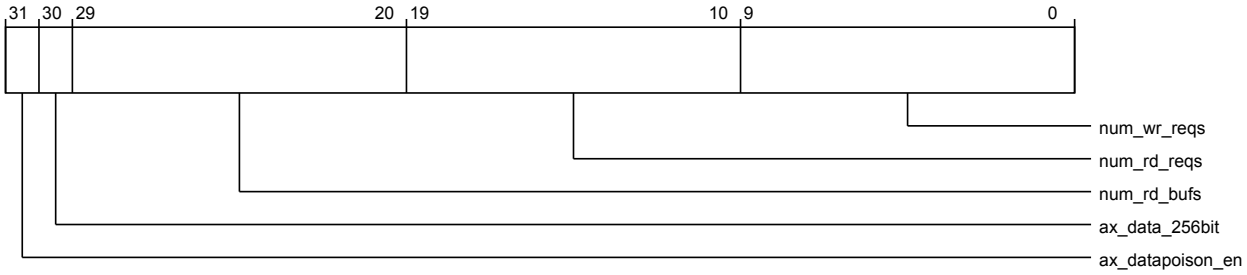

Figure 3-841 por_rni_unit_info (low)

The following table shows the por_rni_unit_info lower register bit assignments.

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Table 3-855 por_rni_unit_info (low)

Bits	Field name	Description	Type	Reset
31	ax_datapoison_en	Data Poison enable on ACE-Lite/AXI4 interface 1'b1: Enabled 1'b0: Not enabled	RO	Configuration dependent
30	ax_data_256bit	AXI interface data width 1'b1: 256 bits 1'b0: 128 bits	RO	Configuration dependent
29:20	num_rd_bufs	Number of read data buffers	RO	Configuration dependent
19:10	num_rd_reqs	Number of outstanding read requests	RO	Configuration dependent
9:0	num_wr_reqs	Number of outstanding write requests	RO	Configuration dependent

por_rni_cfg_ctl

Functions as the configuration control register. Specifies the current mode.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hA00

Register reset Configuration dependent

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rni_secure_register_groups_override.cfg_ctl

The following image shows the higher register bit assignments.

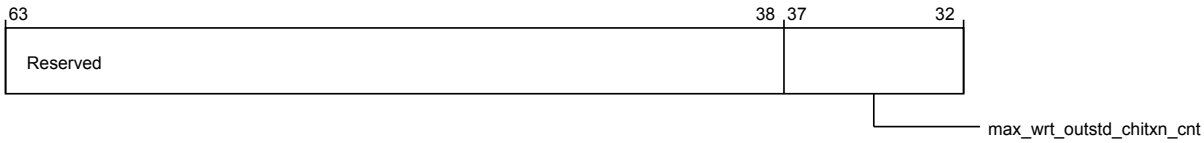

Figure 3-842 por_rni_cfg_ctl (high)

The following table shows the por_rni_cfg_ctl higher register bit assignments.

Table 3-856 por_rni_cfg_ctl (high)

Bits	Field name	Description	Type	Reset
63:38	Reserved	Reserved	RO	-
37:32	max_wrt_outstd_chitxn_cnt	Maximum number of outstanding writes allowed on CHI-side	RW	Configuration dependent

The following image shows the lower register bit assignments.

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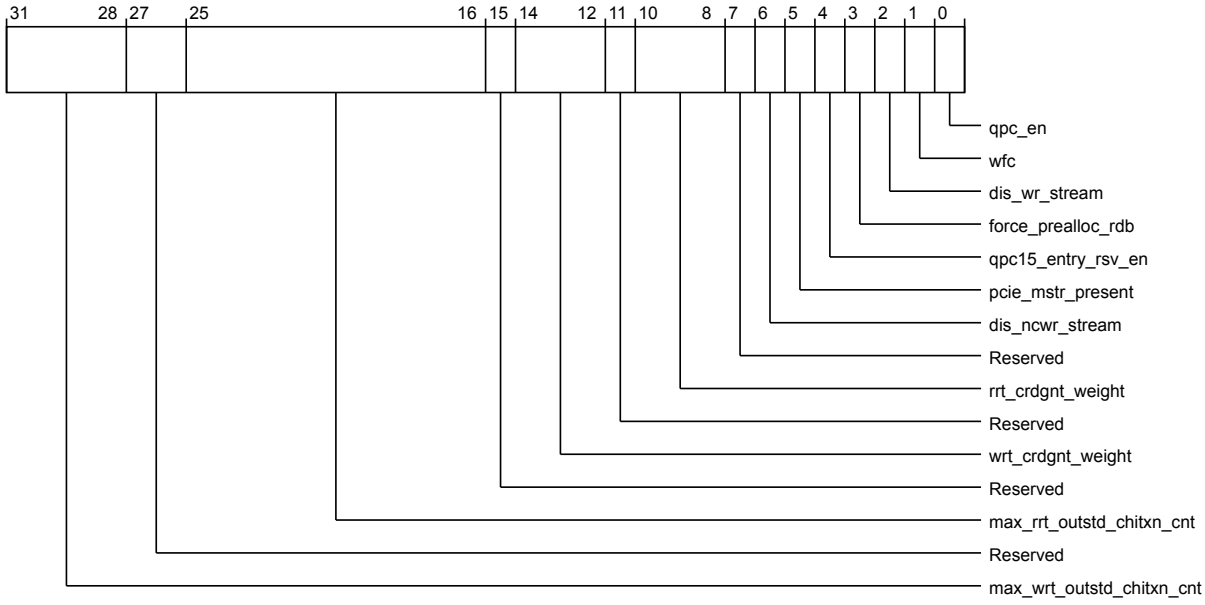

Figure 3-843 por_rni_cfg_ctl (low)

The following table shows the por_rni_cfg_ctl lower register bit assignments.

Table 3-857 por_rni_cfg_ctl (low)

Bits	Field name	Description	Type	Reset
31:28	max_wrt_outstd_chitxn_cnt	Maximum number of outstanding writes allowed on CHI-side	RW	Configuration dependent
27:26	Reserved	Reserved	RO	-
25:16	max_rrt_outstd_chitxn_cnt	Maximum number of outstanding reads allowed on CHI-side	RW	Configuration dependent
15	Reserved	Reserved	RO	-
14:12	wrt_crdgnt_weight	Determines weight of credit grant allocated to retried writes in presence of pending retried reads	RW	3'b001
11	Reserved	Reserved	RO	-
10:8	rrt_crdgnt_weight	Determines weight of credit grant allocated to retried reads in presence of pending retried writes	RW	3'b100
7	Reserved	Reserved	RO	-
6	dis_ncwr_stream	Disables streaming of ordered non-cacheable writes when set	RW	1'b0
5	pcie_mstr_present	Indicates PCIe master is present; must be set if PCIe master is present upstream of RN-I or RN-D	RW	1'b0

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Table 3-857 por_rni_cfg_ctl (low) (continued)

Bits	Field name	Description	Type	Reset
4	qpc15_entry_rsv_en	Enables QPC15 entry reservation 1'b1: Reserves tracker entry for QoS15 requests 1'b0: Does not reserve tracker entry for QoS15 requests ——— **Note** ——— Only valid and applicable when por_rni_qpc_en is set ———	RW	1'b0
3	force_prealloc_rdb	When set, all reads from the RN-I are sent with a preallocated read data buffer	RW	Configuration dependent
2	dis_wr_stream	Disables streaming of ordered writes when set	RW	1'b0
1	wfc	When set, enables waiting for completion (COMP) before dispatching dependent transaction (TXN)	RW	1'b0
0	qpc_en	When set, enables QPC-based scheduling using two QoS priority classes (QoS15 and non-QoS15)	RW	1'b1

por_rni_aux_ctl

Functions as the auxiliary control register for RN-I.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hA08
Register reset Configuration dependent
Usage constraints Only accessible by secure accesses. This register can be modified only with prior written permission from Arm.

The following image shows the higher register bit assignments.

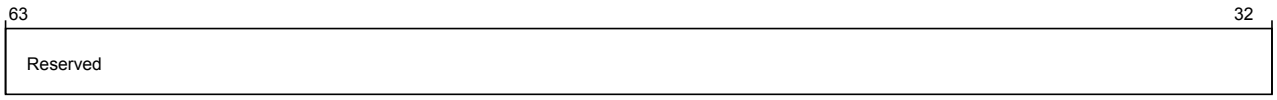

Figure 3-844 por_rni_aux_ctl (high)

The following table shows the por_rni_aux_ctl higher register bit assignments.

Table 3-858 por_rni_aux_ctl (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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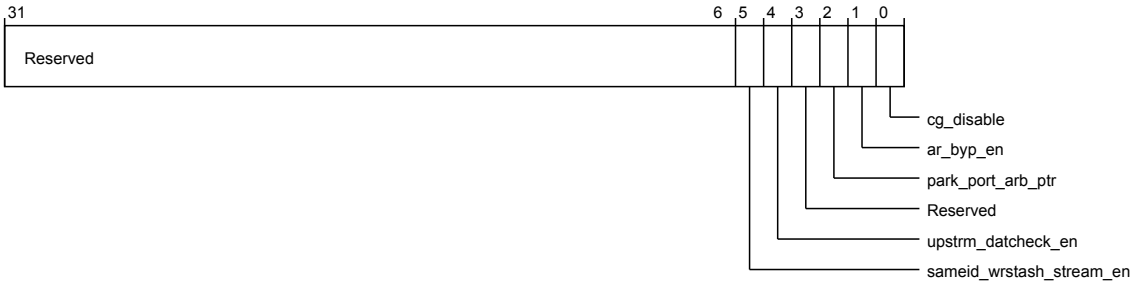

Figure 3-845 por_rni_aux_ctl (low)

The following table shows the por_rni_aux_ctl lower register bit assignments.

Table 3-859 por_rni_aux_ctl (low)

Bits	Field name	Description	Type	Reset
31:6	Reserved	Reserved	RO	-
5	sameid_wrstash_stream_en	Enables streaming of same-ID WrUniqStash	RW	Configuration dependent
4	upstrm_datcheck_en	Upstream supports Datacheck	RW	Configuration dependent
3	Reserved	Reserved	RO	-
2	park_port_arb_ptr	Parks the AXI port arbitration pointer for Burst	RW	1'b0
1	ar_byp_en	AR bypass enable; enables bypass path in the AR pipeline	RW	1'b1
0	cg_disable	Disables clock gating when set	RW	1'b0

por_rni_s0_port_control

Controls port S0 AXI/ACE slave interface settings.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hA10

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rni_secure_register_groups_override.port_ctrl

The following image shows the higher register bit assignments.

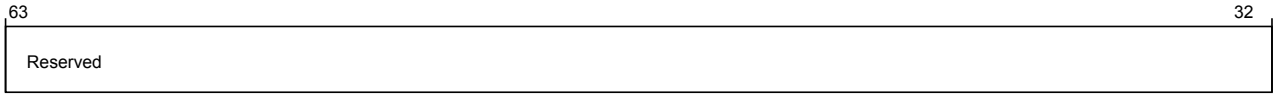

Figure 3-846 por_rni_s0_port_control (high)

The following table shows the por_rni_s0_port_control higher register bit assignments.

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Table 3-860 por_rni_s0_port_control (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

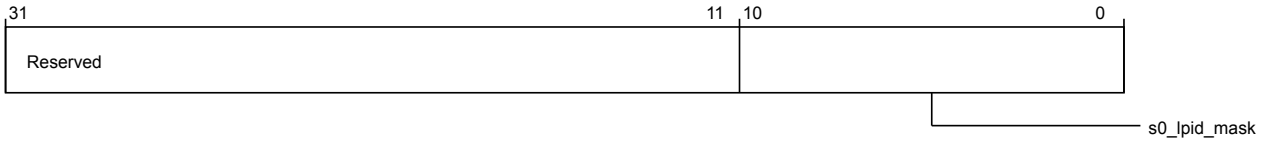

Figure 3-847 por_rni_s0_port_control (low)

The following table shows the por_rni_s0_port_control lower register bit assignments.

Table 3-861 por_rni_s0_port_control (low)

Bits	Field name	Description	Type	Reset
31:11	Reserved	Reserved	RO	-
10:0	s0_lpid_mask	Port S0 LPID mask LPID[0]: Equal to the result of UnaryOR of BitwiseAND of LPID mask and AXID (LPID[0] = (AXID and mask)); specifies which AXID bit is reflected in the LSB of LPID LPID[2:1]: Equal to port ID[1:0]; the MSB of LPID contains port ID	RW	11'b000_0000_0000

por_rni_s1_port_control

Controls port S1 AXI/ACE slave interface settings.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hA18

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rni_secure_register_groups_override.port_ctrl

The following image shows the higher register bit assignments.

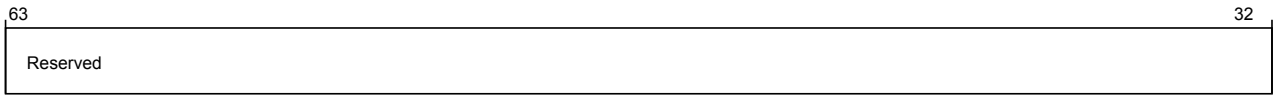

Figure 3-848 por_rni_s1_port_control (high)

The following table shows the por_rni_s1_port_control higher register bit assignments.

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Table 3-862 por_rni_s1_port_control (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

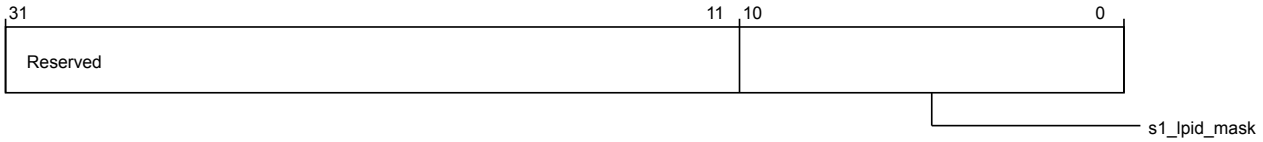

Figure 3-849 por_rni_s1_port_control (low)

The following table shows the por_rni_s1_port_control lower register bit assignments.

Table 3-863 por_rni_s1_port_control (low)

Bits	Field name	Description	Type	Reset
31:11	Reserved	Reserved	RO	-
10:0	s1_lpid_mask	Port S1 LPID mask LPID[0]: Equal to the result of UnaryOR of BitwiseAND of LPID mask and AXID (LPID[0] = (AXID and mask)); specifies which AXID bit is reflected in the LSB of LPID LPID[2:1]: Equal to port ID[1:0]; the MSB of LPID contains port ID	RW	11'b000_0000_0000

por_rni_s2_port_control

Controls port S2 AXI/ACE slave interface settings.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hA20

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rni_secure_register_groups_override.port_ctrl

The following image shows the higher register bit assignments.

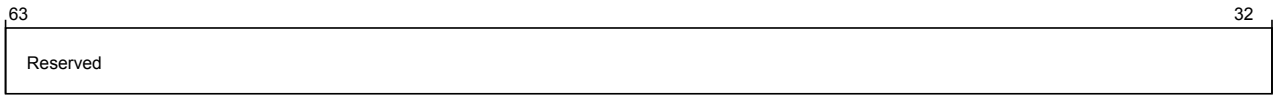

Figure 3-850 por_rni_s2_port_control (high)

The following table shows the por_rni_s2_port_control higher register bit assignments.

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Table 3-864 por_rni_s2_port_control (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

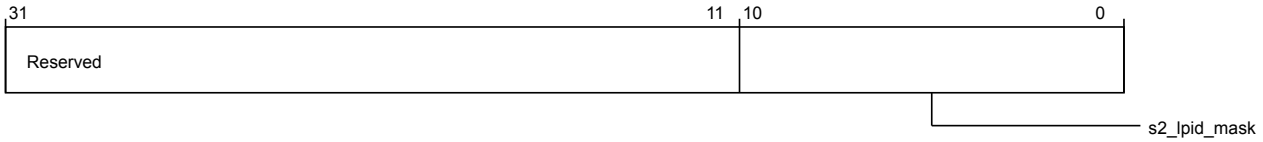

Figure 3-851 por_rni_s2_port_control (low)

The following table shows the por_rni_s2_port_control lower register bit assignments.

Table 3-865 por_rni_s2_port_control (low)

Bits	Field name	Description	Type	Reset
31:11	Reserved	Reserved	RO	-
10:0	s2_lpid_mask	Port S2 LPID mask LPID[0]: Equal to the result of UnaryOR of BitwiseAND of LPID mask and AXID (LPID[0] = (AXID and mask)); specifies which AXID bit is reflected in the LSB of LPID LPID[2:1]: Equal to port ID[1:0]; the MSB of LPID contains port ID	RW	11'b000_0000_0000

por_rni_s0_qos_control

Controls QoS settings for port S0 AXI/ACE slave interface.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hA80

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rni_secure_register_groups_override.qos_ctrl

The following image shows the higher register bit assignments.

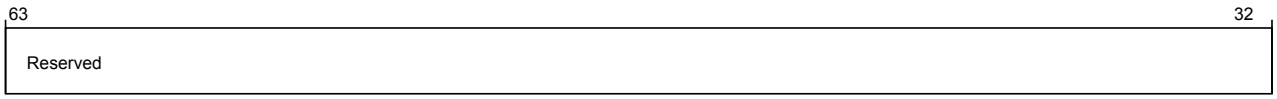

Figure 3-852 por_rni_s0_qos_control (high)

The following table shows the por_rni_s0_qos_control higher register bit assignments.

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Table 3-866 por_rni_s0_qos_control (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

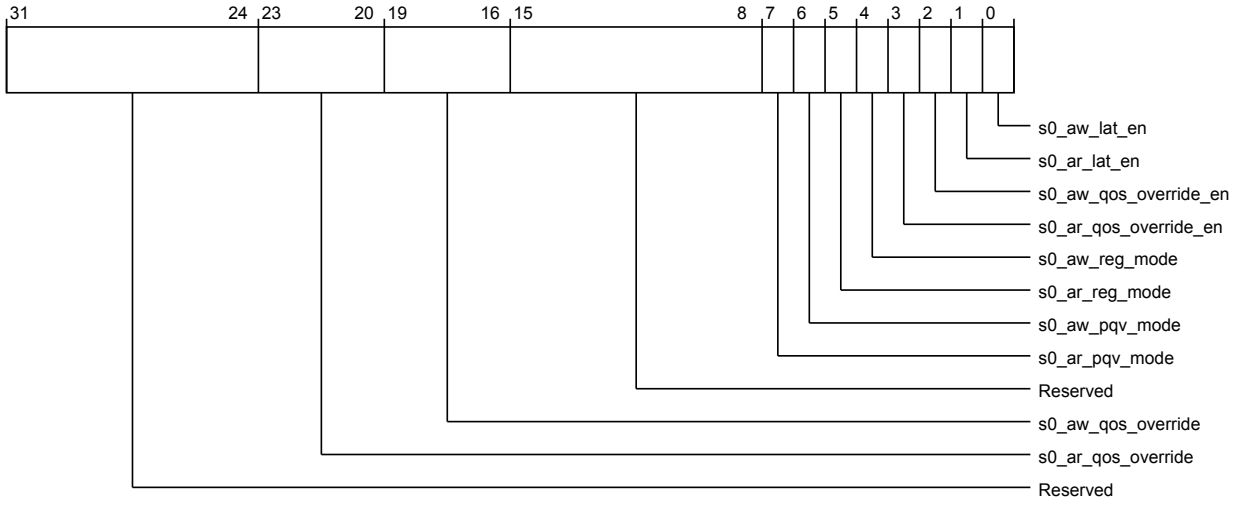

Figure 3-853 por_rni_s0_qos_control (low)

The following table shows the por_rni_s0_qos_control lower register bit assignments.

Table 3-867 por_rni_s0_qos_control (low)

Bits	Field name	Description	Type	Reset
31:24	Reserved	Reserved	RO	-
23:20	s0_ar_qos_override	AR QoS override value for port S0	RW	4'b0000
19:16	s0_aw_qos_override	AW QoS override value for port S0	RW	4'b0000
15:8	Reserved	Reserved	RO	-
7	s0_ar_pqv_mode	Configures the QoS regulator mode for read transactions during period mode 1'b0: Normal mode; QoS value is stable when the master is idle 1'b1: Quiesce high mode; QoS value tends to the maximum value when the master is idle	RW	1'b0
6	s0_aw_pqv_mode	Configures the QoS regulator mode for write transactions during period mode 1'b0: Normal mode; QoS value is stable when the master is idle 1'b1: Quiesce high mode; QoS value tends to the maximum value when the master is idle	RW	1'b0
5	s0_ar_reg_mode	Configures the QoS regulator mode for read transactions 1'b0: Latency mode 1'b1: Period mode; used for bandwidth regulation	RW	1'b0

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Table 3-867 por_rni_s0_qos_control (low) (continued)

Bits	Field name	Description	Type	Reset
4	s0_aw_reg_mode	Configures the QoS regulator mode for write transactions 1'b0: Latency mode 1'b1: Period mode; used for bandwidth regulation	RW	1'b0
3	s0_ar_qos_override_en	Enables port S0 AR QoS override; when set, allows QoS value on inbound AR transactions to be overridden	RW	1'b0
2	s0_aw_qos_override_en	Enables port S0 AW QoS override; when set, allows QoS value on inbound AW transactions to be overridden	RW	1'b0
1	s0_ar_lat_en	Enables port S0 AR QoS regulation when set	RW	1'b0
0	s0_aw_lat_en	Enables port S0 AW QoS regulation when set	RW	1'b0

por_rni_s0_qos_lat_tgt

Controls QoS target latency (in cycles) for regulations of port S0 read and write transactions.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hA88

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rni_secure_register_groups_override.qos_ctrl

The following image shows the higher register bit assignments.

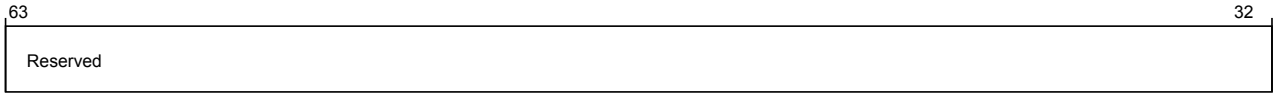

Figure 3-854 por_rni_s0_qos_lat_tgt (high)

The following table shows the por_rni_s0_qos_lat_tgt higher register bit assignments.

Table 3-868 por_rni_s0_qos_lat_tgt (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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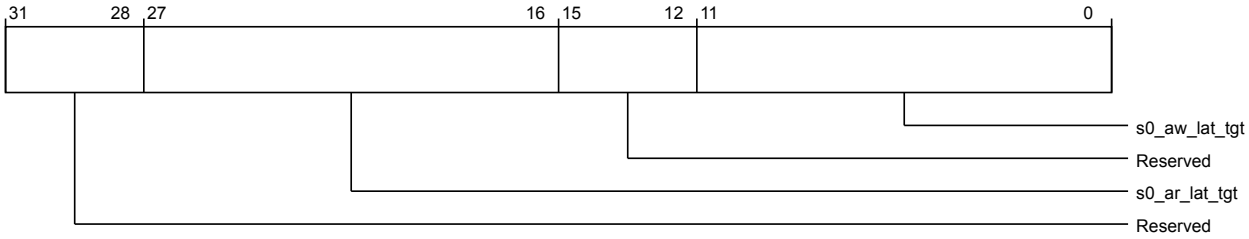

Figure 3-855 por_rni_s0_qos_lat_tgt (low)

The following table shows the por_rni_s0_qos_lat_tgt lower register bit assignments.

Table 3-869 por_rni_s0_qos_lat_tgt (low)

Bits	Field name	Description	Type	Reset
31:28	Reserved	Reserved	RO	-
27:16	s0_ar_lat_tgt	Port S0 AR channel target latency; a value of 0 corresponds to no regulation	RW	12'h000
15:12	Reserved	Reserved	RO	-
11:0	s0_aw_lat_tgt	Port S0 AW channel target latency; a value of 0 corresponds to no regulation	RW	12'h000

por_rni_s0_qos_lat_scale

Controls the QoS target latency scale factor for port S0 read and write transactions. This register represents powers of two from the range 2^(-5) to 2^(-12); it is used to match a 16-bit integrator.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hA90

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rni_secure_register_groups_override.qos_ctrl

The following image shows the higher register bit assignments.

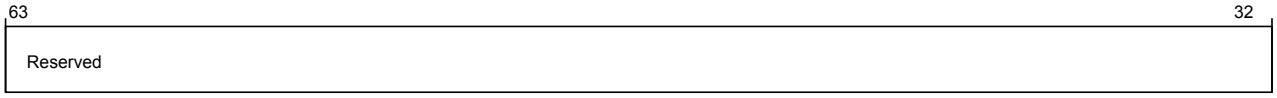

Figure 3-856 por_rni_s0_qos_lat_scale (high)

The following table shows the por_rni_s0_qos_lat_scale higher register bit assignments.

Table 3-870 por_rni_s0_qos_lat_scale (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

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The following image shows the lower register bit assignments.

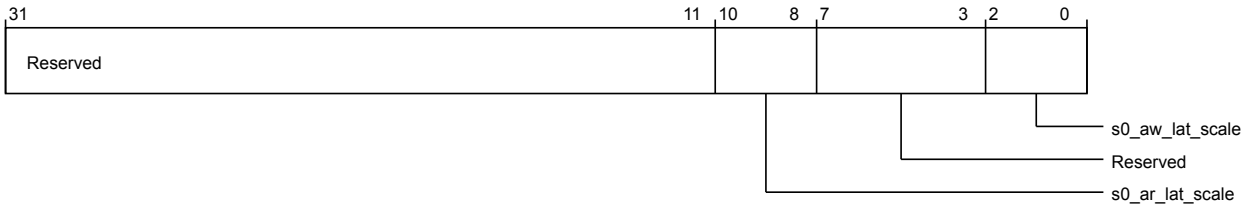

Figure 3-857 por_rni_s0_qos_lat_scale (low)

The following table shows the por_rni_s0_qos_lat_scale lower register bit assignments.

Table 3-871 por_rni_s0_qos_lat_scale (low)

Bits	Field name	Description	Type	Reset
31:11	Reserved	Reserved	RO	-
10:8	s0_ar_lat_scale	Port S0 AR QoS scale factor 3'b000: 2^(-5) 3'b001: 2^(-6) 3'b010: 2^(-7) 3'b011: 2^(-8) 3'b100: 2^(-9) 3'b101: 2^(-10) 3'b110: 2^(-11) 3'b111: 2^(-12)	RW	3'h0
7:3	Reserved	Reserved	RO	-
2:0	s0_aw_lat_scale	Port S0 AW QoS scale factor 3'b000: 2^(-5) 3'b001: 2^(-6) 3'b010: 2^(-7) 3'b011: 2^(-8) 3'b100: 2^(-9) 3'b101: 2^(-10) 3'b110: 2^(-11) 3'b111: 2^(-12)	RW	3'h0

por_rni_s0_qos_lat_range

Controls the minimum and maximum QoS values generated by the QoS latency regulator for port S0 read and write transactions.

Its characteristics are:

Type RW

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Register width (Bits) 64

Address offset 14'hA98

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rni_secure_register_groups_override.qos_ctrl

The following image shows the higher register bit assignments.

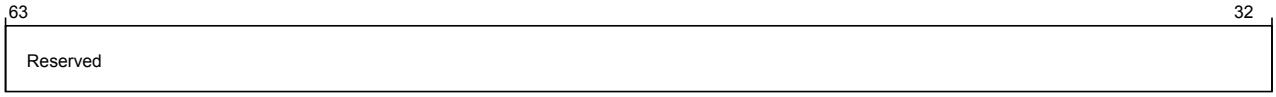

Figure 3-858 por_rni_s0_qos_lat_range (high)

The following table shows the por_rni_s0_qos_lat_range higher register bit assignments.

Table 3-872 por_rni_s0_qos_lat_range (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

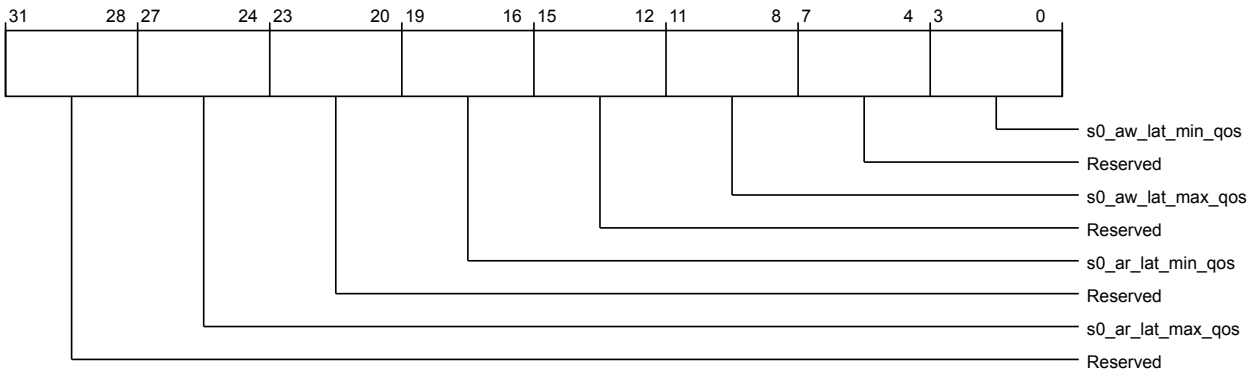

Figure 3-859 por_rni_s0_qos_lat_range (low)

The following table shows the por_rni_s0_qos_lat_range lower register bit assignments.

Table 3-873 por_rni_s0_qos_lat_range (low)

Bits	Field name	Description	Type	Reset
31:28	Reserved	Reserved	RO	-
27:24	s0_ar_lat_max_qos	Port S0 AR QoS maximum value	RW	4'h0
23:20	Reserved	Reserved	RO	-
19:16	s0_ar_lat_min_qos	Port S0 AR QoS minimum value	RW	4'h0

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Table 3-873 por_rni_s0_qos_lat_range (low) (continued)

Bits	Field name	Description	Type	Reset
15:12	Reserved	Reserved	RO	-
11:8	s0_aw_lat_max_qos	Port S0 AW QoS maximum value	RW	4'h0
7:4	Reserved	Reserved	RO	-
3:0	s0_aw_lat_min_qos	Port S0 AW QoS minimum value	RW	4'h0

por_rni_s1_qos_control

Controls QoS settings for port S1 AXI/ACE slave interface.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hAA0

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rni_secure_register_groups_override.qos_ctrl

The following image shows the higher register bit assignments.

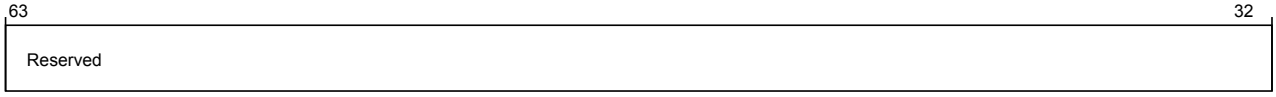

Figure 3-860 por_rni_s1_qos_control (high)

The following table shows the por_rni_s1_qos_control higher register bit assignments.

Table 3-874 por_rni_s1_qos_control (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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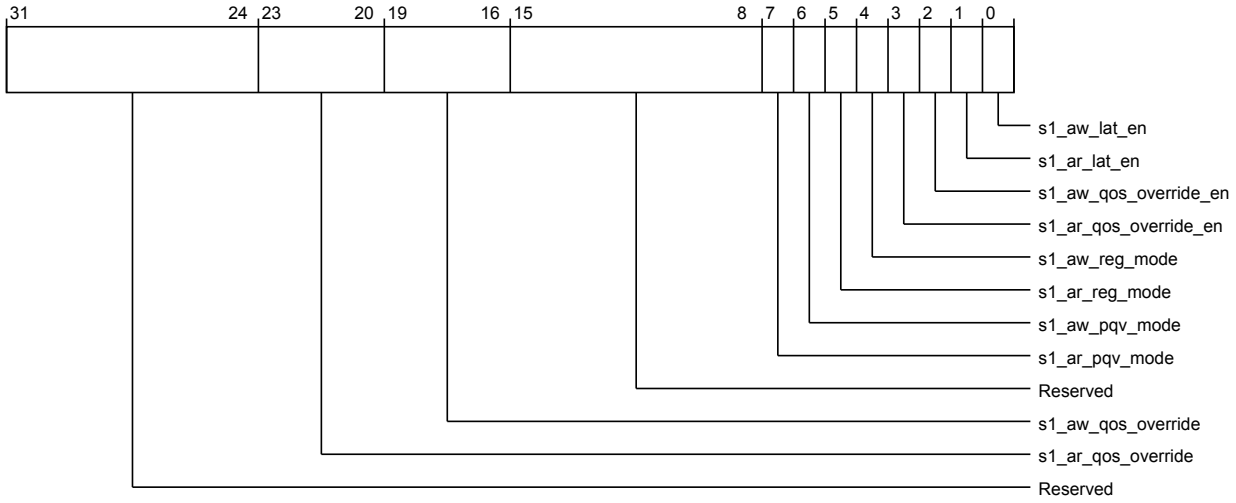

Figure 3-861 por_rni_s1_qos_control (low)

The following table shows the por_rni_s1_qos_control lower register bit assignments.

Table 3-875 por_rni_s1_qos_control (low)

Bits	Field name	Description	Type	Reset
31:24	Reserved	Reserved	RO	-
23:20	s1_ar_qos_override	AR QoS override value for port S1	RW	4'b0000
19:16	s1_aw_qos_override	AW QoS override value for port S1	RW	4'b0000
15:8	Reserved	Reserved	RO	-
7	s1_ar_pqv_mode	Configures the QoS regulator mode for read transactions during period mode 1'b0: Normal mode; QoS value is stable when the master is idle 1'b1: Quiesce high mode; QoS value tends to the maximum value when the master is idle	RW	1'b0
6	s1_aw_pqv_mode	Configures the QoS regulator mode for write transactions during period mode 1'b0: Normal mode; QoS value is stable when the master is idle 1'b1: Quiesce high mode; QoS value tends to the maximum value when the master is idle	RW	1'b0
5	s1_ar_reg_mode	Configures the QoS regulator mode for read transactions 1'b0: Latency mode 1'b1: Period mode; used for bandwidth regulation	RW	1'b0
4	s1_aw_reg_mode	Configures the QoS regulator mode for write transactions 1'b0: Latency mode 1'b1: Period mode; used for bandwidth regulation	RW	1'b0
3	s1_ar_qos_override_en	Enables port S1 AR QoS override; when set, allows QoS value on inbound AR transactions to be overridden	RW	1'b0

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Table 3-875 por_rni_s1_qos_control (low) (continued)

Bits	Field name	Description	Type	Reset
2	s1_aw_qos_override_en	Enables port S1 AW QoS override; when set, allows QoS value on inbound AW transactions to be overridden	RW	1'b0
1	s1_ar_lat_en	Enables port S1 AR QoS regulation when set	RW	1'b0
0	s1_aw_lat_en	Enables port S1 AW QoS regulation when set	RW	1'b0

por_rni_s1_qos_lat_tgt

Controls QoS target latency (in cycles) for regulation of port S1 read and write transactions.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hAA8

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rni_secure_register_groups_override.qos_ctrl

The following image shows the higher register bit assignments.

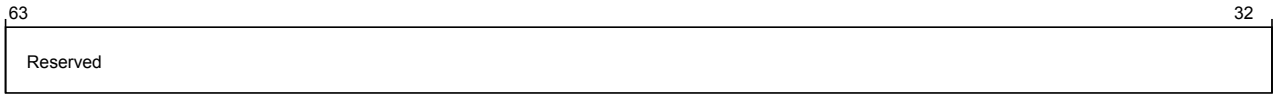

Figure 3-862 por_rni_s1_qos_lat_tgt (high)

The following table shows the por_rni_s1_qos_lat_tgt higher register bit assignments.

Table 3-876 por_rni_s1_qos_lat_tgt (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

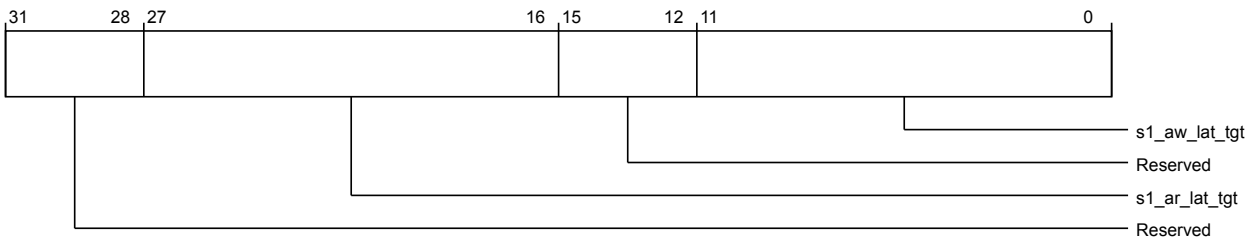

Figure 3-863 por_rni_s1_qos_lat_tgt (low)

The following table shows the por_rni_s1_qos_lat_tgt lower register bit assignments.

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Table 3-877 por_rni_s1_qos_lat_tgt (low)

Bits	Field name	Description	Type	Reset
31:28	Reserved	Reserved	RO	-
27:16	s1_ar_lat_tgt	Port S1 AR channel target latency; a value of 0 corresponds to no regulation	RW	12'h000
15:12	Reserved	Reserved	RO	-
11:0	s1_aw_lat_tgt	Port S1 AW channel target latency; a value of 0 corresponds to no regulation	RW	12'h000

por_rni_s1_qos_lat_scale

Controls the QoS target latency scale factor for port S1 read and write transactions. This register represents powers of two from the range 2^(-5) to 2^(-12); it is used to match a 16-bit integrator.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hAB0

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rni_secure_register_groups_override.qos_ctrl

The following image shows the higher register bit assignments.

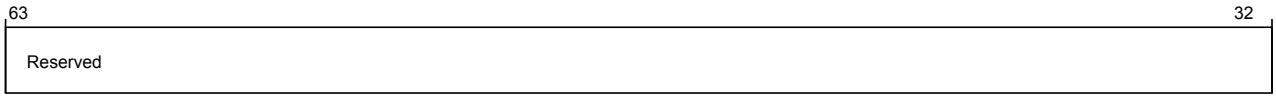

Figure 3-864 por_rni_s1_qos_lat_scale (high)

The following table shows the por_rni_s1_qos_lat_scale higher register bit assignments.

Table 3-878 por_rni_s1_qos_lat_scale (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

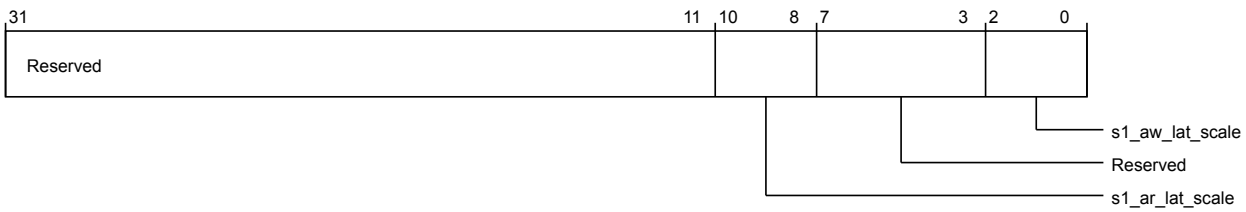

Figure 3-865 por_rni_s1_qos_lat_scale (low)

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The following table shows the por_rni_s1_qos_lat_scale lower register bit assignments.

Table 3-879 por_rni_s1_qos_lat_scale (low)

Bits	Field name	Description	Type	Reset
31:11	Reserved	Reserved	RO	-
10:8	s1_ar_lat_scale	Port S1 AR QoS scale factor 3'b000: 2^(-5) 3'b001: 2^(-6) 3'b010: 2^(-7) 3'b011: 2^(-8) 3'b100: 2^(-9) 3'b101: 2^(-10) 3'b110: 2^(-11) 3'b111: 2^(-12)	RW	3'h0
7:3	Reserved	Reserved	RO	-
2:0	s1_aw_lat_scale	Port S1 AW QoS scale factor 3'b000: 2^(-5) 3'b001: 2^(-6) 3'b010: 2^(-7) 3'b011: 2^(-8) 3'b100: 2^(-9) 3'b101: 2^(-10) 3'b110: 2^(-11) 3'b111: 2^(-12)	RW	3'h0

por_rni_s1_qos_lat_range

Controls the minimum and maximum QoS values generated by the QoS latency regulator for port S1 read and write transactions.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hAB8

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rni_secure_register_groups_override.qos_ctrl

The following image shows the higher register bit assignments.

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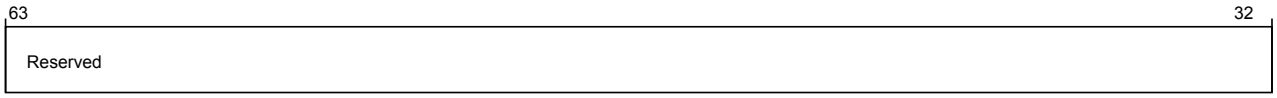

Figure 3-866 por_rni_s1_qos_lat_range (high)

The following table shows the por_rni_s1_qos_lat_range higher register bit assignments.

Table 3-880 por_rni_s1_qos_lat_range (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

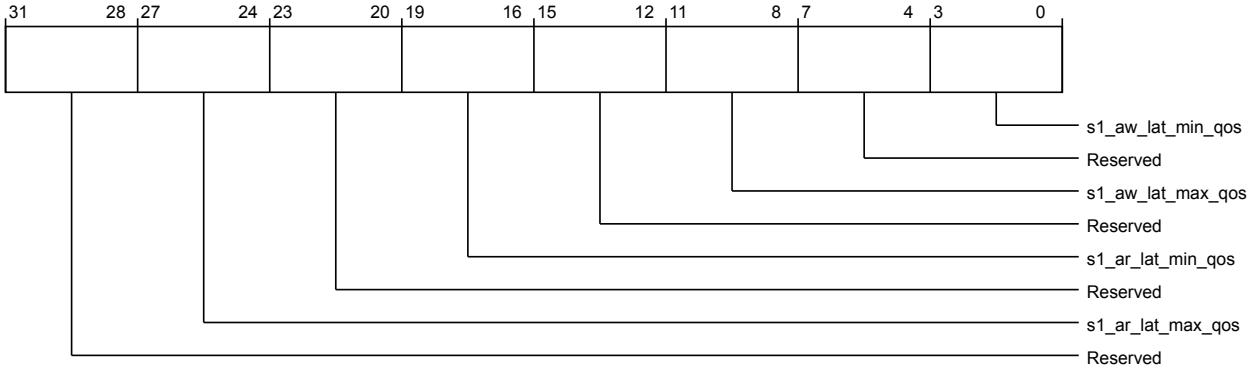

Figure 3-867 por_rni_s1_qos_lat_range (low)

The following table shows the por_rni_s1_qos_lat_range lower register bit assignments.

Table 3-881 por_rni_s1_qos_lat_range (low)

Bits	Field name	Description	Type	Reset
31:28	Reserved	Reserved	RO	-
27:24	s1_ar_lat_max_qos	Port S1 AR QoS maximum value	RW	4'h0
23:20	Reserved	Reserved	RO	-
19:16	s1_ar_lat_min_qos	Port S1 AR QoS minimum value	RW	4'h0
15:12	Reserved	Reserved	RO	-
11:8	s1_aw_lat_max_qos	Port S1 AW QoS maximum value	RW	4'h0
7:4	Reserved	Reserved	RO	-
3:0	s1_aw_lat_min_qos	Port S1 AW QoS minimum value	RW	4'h0

por_rni_s2_qos_control

Controls QoS settings for port S2 AXI/ACE slave interface.

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Its characteristics are:

Type	RW
Register width (Bits)	64
Address offset	14'hAC0
Register reset	64'b0
Usage constraints	Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.
Secure group override	por_rni_secure_register_groups_override.qos_ctrl

The following image shows the higher register bit assignments.

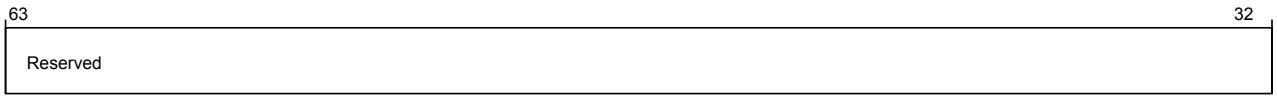

Figure 3-868 por_rni_s2_qos_control (high)

The following table shows the por_rni_s2_qos_control higher register bit assignments.

Table 3-882 por_rni_s2_qos_control (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

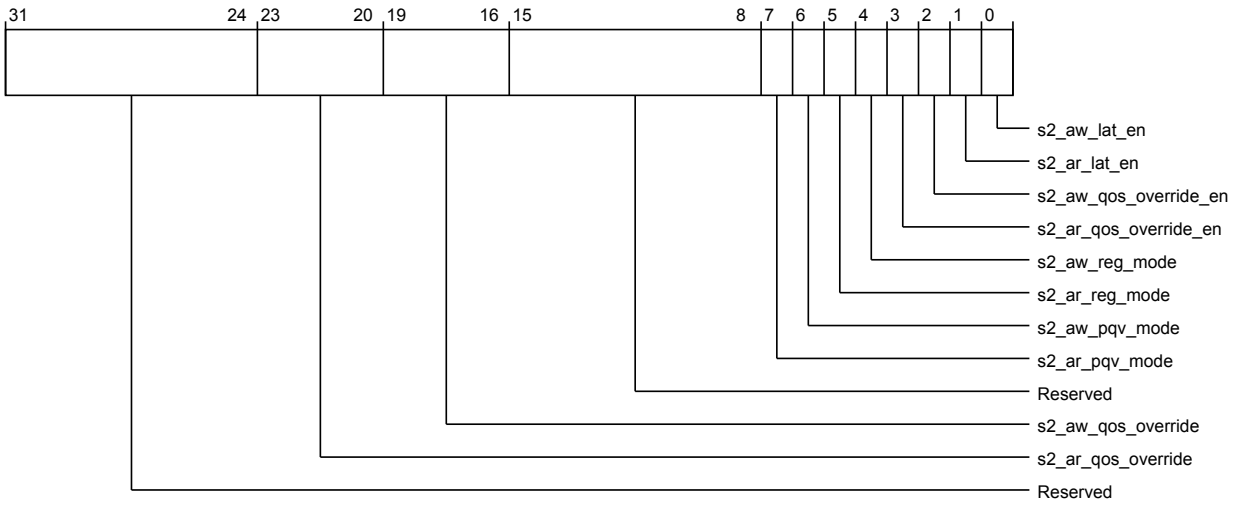

Figure 3-869 por_rni_s2_qos_control (low)

The following table shows the por_rni_s2_qos_control lower register bit assignments.

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Table 3-883 por_rni_s2_qos_control (low)

Bits	Field name	Description	Type	Reset
31:24	Reserved	Reserved	RO	-
23:20	s2_ar_qos_override	AR QoS override value for port S2	RW	4'b0000
19:16	s2_aw_qos_override	AW QoS override value for port S2	RW	4'b0000
15:8	Reserved	Reserved	RO	-
7	s2_ar_pqv_mode	Configures the QoS regulator mode for read transactions during period mode 1'b0: Normal mode; QoS value is stable when the master is idle 1'b1: Quiesce high mode; QoS value tends to the maximum value when the master is idle	RW	1'b0
6	s2_aw_pqv_mode	Configures the QoS regulator mode for write transactions during period mode 1'b0: Normal mode; QoS value is stable when the master is idle 1'b1: Quiesce high mode; QoS value tends to the maximum value when the master is idle	RW	1'b0
5	s2_ar_reg_mode	Configures the QoS regulator mode for read transactions 1'b0: Latency mode 1'b1: Period mode; used for bandwidth regulation	RW	1'b0
4	s2_aw_reg_mode	Configures the QoS regulator mode for write transactions 1'b0: Latency mode 1'b1: Period mode; used for bandwidth regulation	RW	1'b0
3	s2_ar_qos_override_en	Enables port S2 AR QoS override; when set, allows QoS value on inbound AR transactions to be overridden	RW	1'b0
2	s2_aw_qos_override_en	Enables port S2 AW QoS override; when set, allows QoS value on inbound AW transactions to be overridden	RW	1'b0
1	s2_ar_lat_en	Enables port S2 AR QoS regulation when set	RW	1'b0
0	s2_aw_lat_en	Enables port S2 AW QoS regulation when set	RW	1'b0

por_rni_s2_qos_lat_tgt

Controls QoS target latency (in cycles) for regulation of port S2 read and write transactions.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hAC8

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

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Secure group override por_rni_secure_register_groups_override.qos_ctrl

The following image shows the higher register bit assignments.

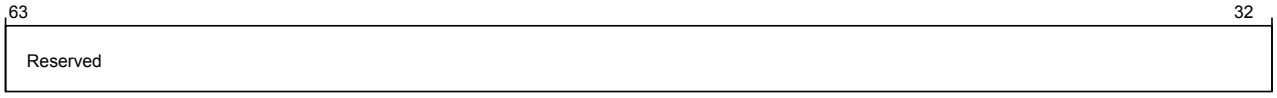

Figure 3-870 por_rni_s2_qos_lat_tgt (high)

The following table shows the por_rni_s2_qos_lat_tgt higher register bit assignments.

Table 3-884 por_rni_s2_qos_lat_tgt (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

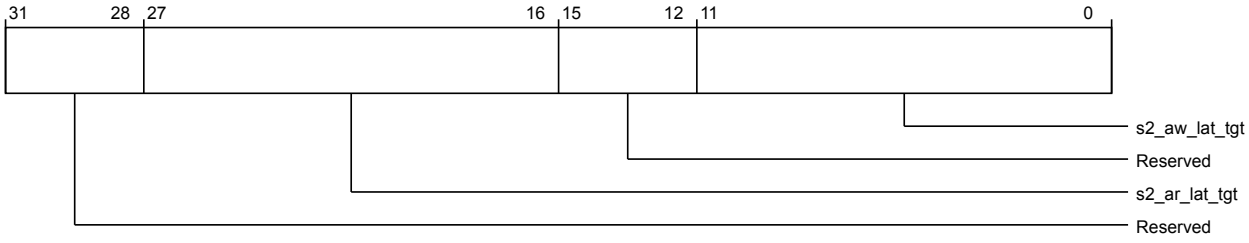

Figure 3-871 por_rni_s2_qos_lat_tgt (low)

The following table shows the por_rni_s2_qos_lat_tgt lower register bit assignments.

Table 3-885 por_rni_s2_qos_lat_tgt (low)

Bits	Field name	Description	Type	Reset
31:28	Reserved	Reserved	RO	-
27:16	s2_ar_lat_tgt	Port S2 AR channel target latency; a value of 0 corresponds to no regulation	RW	12'h000
15:12	Reserved	Reserved	RO	-
11:0	s2_aw_lat_tgt	Port S2 AW channel target latency; a value of 0 corresponds to no regulation	RW	12'h000

por_rni_s2_qos_lat_scale

Controls the QoS target latency scale factor for port S2 read and write transactions. This register represents powers of two from the range 2^(-5) to 2^(-12); it is used to match a 16-bit integrator.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hAD0

Register reset 64'b0

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Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rni_secure_register_groups_override.qos_ctrl

The following image shows the higher register bit assignments.

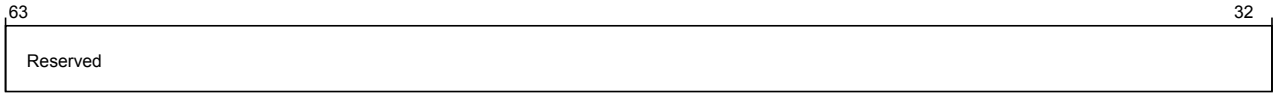

Figure 3-872 por_rni_s2_qos_lat_scale (high)

The following table shows the por_rni_s2_qos_lat_scale higher register bit assignments.

Table 3-886 por_rni_s2_qos_lat_scale (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

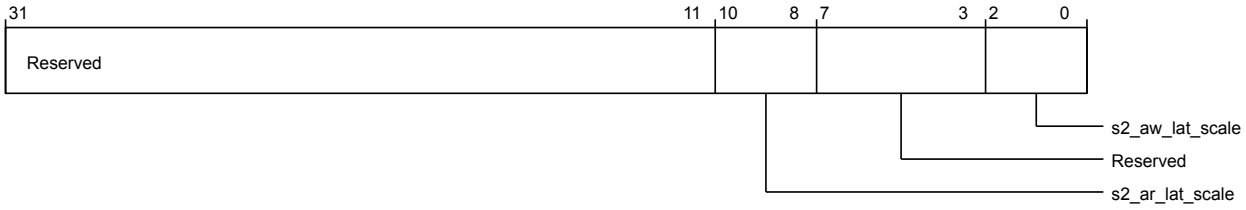

Figure 3-873 por_rni_s2_qos_lat_scale (low)

The following table shows the por_rni_s2_qos_lat_scale lower register bit assignments.

Table 3-887 por_rni_s2_qos_lat_scale (low)

Bits	Field name	Description	Type	Reset
31:11	Reserved	Reserved	RO	-
10:8	s2_ar_lat_scale	Port S2 AR QoS scale factor 3'b000: 2^(-5) 3'b001: 2^(-6) 3'b010: 2^(-7) 3'b011: 2^(-8) 3'b100: 2^(-9) 3'b101: 2^(-10) 3'b110: 2^(-11) 3'b111: 2^(-12)	RW	3'h0

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Table 3-887 por_rni_s2_qos_lat_scale (low) (continued)

Bits	Field name	Description	Type	Reset
7:3	Reserved	Reserved	RO	-
2:0	s2_aw_lat_scale	Port S2 AW QoS scale factor 3'b000: 2^(-5) 3'b001: 2^(-6) 3'b010: 2^(-7) 3'b011: 2^(-8) 3'b100: 2^(-9) 3'b101: 2^(-10) 3'b110: 2^(-11) 3'b111: 2^(-12)	RW	3'h0

por_rni_s2_qos_lat_range

Controls the minimum and maximum QoS values generated by the QoS latency regulator for port S2 read and write transactions.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hAD8

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rni_secure_register_groups_override.qos_ctrl

The following image shows the higher register bit assignments.

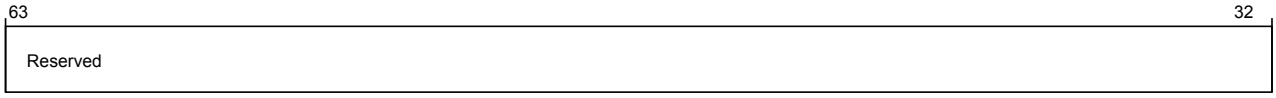

Figure 3-874 por_rni_s2_qos_lat_range (high)

The following table shows the por_rni_s2_qos_lat_range higher register bit assignments.

Table 3-888 por_rni_s2_qos_lat_range (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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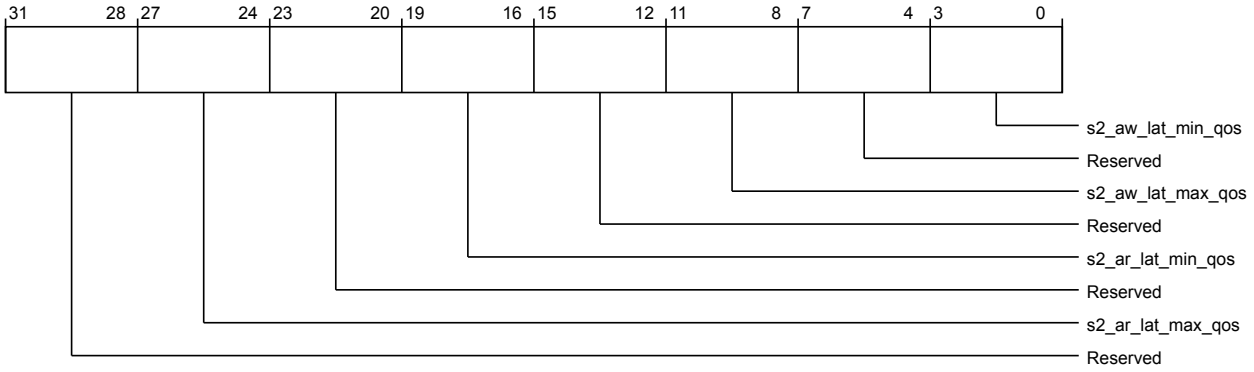

Figure 3-875 por_rni_s2_qos_lat_range (low)

The following table shows the por_rni_s2_qos_lat_range lower register bit assignments.

Table 3-889 por_rni_s2_qos_lat_range (low)

Bits	Field name	Description	Type	Reset
31:28	Reserved	Reserved	RO	-
27:24	s2_ar_lat_max_qos	Port S2 AR QoS maximum value	RW	4'h0
23:20	Reserved	Reserved	RO	-
19:16	s2_ar_lat_min_qos	Port S2 AR QoS minimum value	RW	4'h0
15:12	Reserved	Reserved	RO	-
11:8	s2_aw_lat_max_qos	Port S2 AW QoS maximum value	RW	4'h0
7:4	Reserved	Reserved	RO	-
3:0	s2_aw_lat_min_qos	Port S2 AW QoS minimum value	RW	4'h0

por_rni_pmu_event_sel

Specifies the PMU event to be counted.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h2000
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

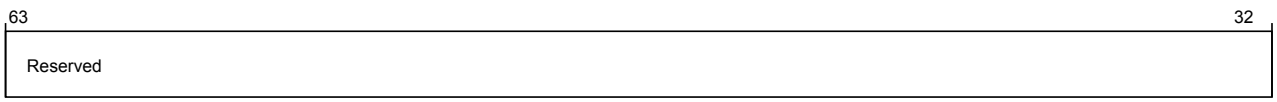

Figure 3-876 por_rni_pmu_event_sel (high)

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The following table shows the por_rni_pmu_event_sel higher register bit assignments.

Table 3-890 por_rni_pmu_event_sel (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

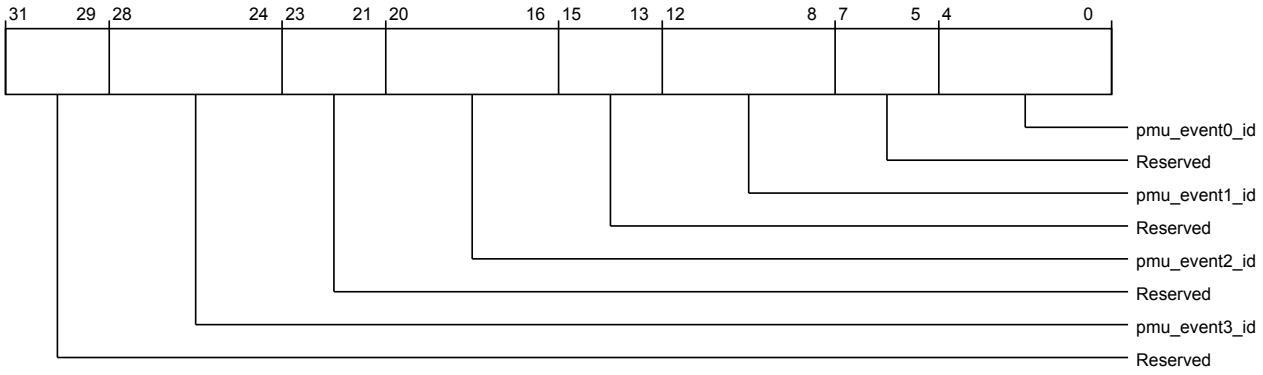

Figure 3-877 por_rni_pmu_event_sel (low)

The following table shows the por_rni_pmu_event_sel lower register bit assignments.

Table 3-891 por_rni_pmu_event_sel (low)

Bits	Field name	Description	Type	Reset
31:29	Reserved	Reserved	RO	-
28:24	pmu_event3_id	RN-I PMU Event 3 ID; see pmu_event0_id for encodings	RW	5'b0
23:21	Reserved	Reserved	RO	-
20:16	pmu_event2_id	RN-I PMU Event 2 ID; see pmu_event0_id for encodings	RW	5'b0
15:13	Reserved	Reserved	RO	-
12:8	pmu_event1_id	RN-I PMU Event 1 ID; see pmu_event0_id for encodings	RW	5'b0

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Table 3-891 por_rni_pmu_event_sel (low) (continued)

Bits	Field name	Description	Type	Reset
7:5	Reserved	Reserved	RO	-
4:0	pmu_event0_id	RN-I PMU Event 0 ID 5'h00: No event 5'h01: Port S0 RDataBeats 5'h02: Port S1 RDataBeats 5'h03: Port S2 RDataBeats 5'h04: RXDAT flits received 5'h05: TXDAT flits sent 5'h06: Total TXREQ flits sent 5'h07: Retried TXREQ flits sent 5'h08: RRT occupancy count overflow 5'h09: WRT occupancy count overflow 5'h0A: Replayed TXREQ flits 5'h0B: WriteCancel sent 5'h0C: Port S0 WDataBeats 5'h0D: Port S1 WDataBeats 5'h0E: Port S2 WDataBeats 5'h0F: RRT allocation 5'h10: WRT allocation 5'h11: RDB pool state is all unordered 5'h12: RDB pool state is replay 5'h13: RDB pool state is hybrid 5'h14: RDB pool state is all ordered	RW	5'b0

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3.3.9 RN SAM register descriptions

Lists the RN SAM registers.

por_rnsam_node_info

Provides component identification information.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h0
Register reset Configuration dependent
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

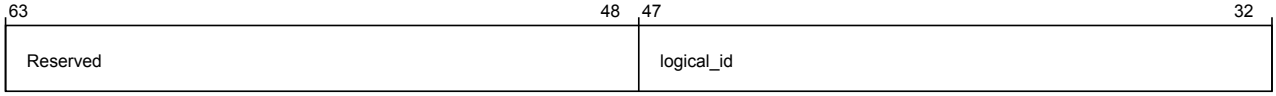

Figure 3-878 por_rnsam_node_info (high)

The following table shows the por_rnsam_node_info higher register bit assignments.

Table 3-892 por_rnsam_node_info (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	logical_id	Component logical ID **Note** RN SAM logical ID is always set to 16'b0.	RO	16'h0

The following image shows the lower register bit assignments.

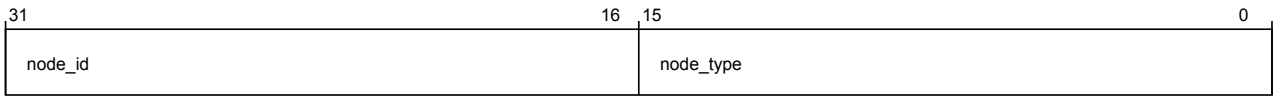

Figure 3-879 por_rnsam_node_info (low)

The following table shows the por_rnsam_node_info lower register bit assignments.

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Table 3-893 por_rnsam_node_info (low)

Bits	Field name	Description	Type	Reset
31:16	node_id	Component node ID	RO	Configuration dependent
15:0	node_type	CMN-600 node type identifier	RO	16'h000F

por_rnsam_child_info

Provides component child identification information.

Its characteristics are:

Type RO

Register width (Bits) 64

Address offset 14'h80

Register reset 64'b0

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

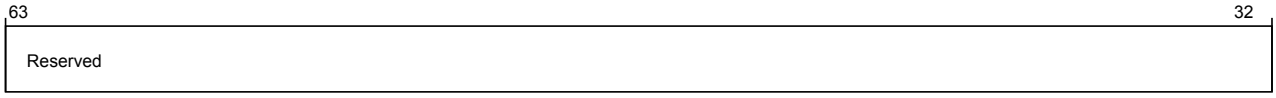

Figure 3-880 por_rnsam_child_info (high)

The following table shows the por_rnsam_child_info higher register bit assignments.

Table 3-894 por_rnsam_child_info (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

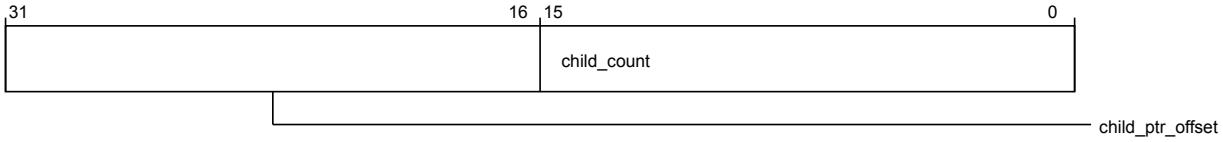

Figure 3-881 por_rnsam_child_info (low)

The following table shows the por_rnsam_child_info lower register bit assignments.

Table 3-895 por_rnsam_child_info (low)

Bits	Field name	Description	Type	Reset
31:16	child_ptr_offset	Starting register offset which contains pointers to the child nodes	RO	16'h0
15:0	child_count	Number of child nodes; used in discovery process	RO	16'b0

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por_rnsam_secure_register_groups_override

Allows non-secure access to predefined groups of secure registers.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h980

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

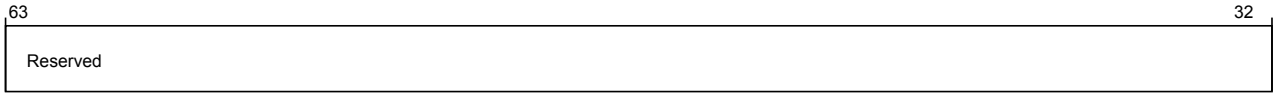

Figure 3-882 por_rnsam_secure_register_groups_override (high)

The following table shows the por_rnsam_secure_register_groups_override higher register bit assignments.

Table 3-896 por_rnsam_secure_register_groups_override (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

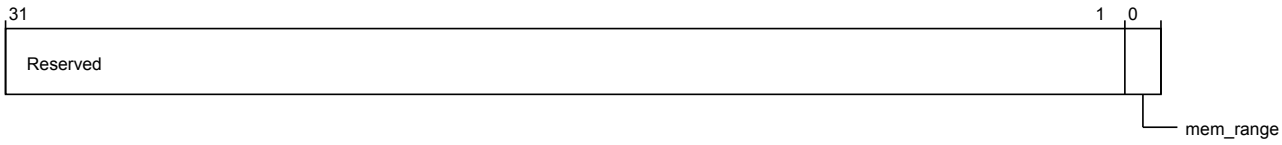

Figure 3-883 por_rnsam_secure_register_groups_override (low)

The following table shows the por_rnsam_secure_register_groups_override lower register bit assignments.

Table 3-897 por_rnsam_secure_register_groups_override (low)

Bits	Field name	Description	Type	Reset
31:1	Reserved	Reserved	RO	-
0	mem_range	Allows non-secure access to secure mem_ranges registers	RW	1'b0

por_rnsam_unit_info

Provides component identification information for RN SAM.

Its characteristics are:

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Type RO
Register width (Bits) 64
Address offset 14'h900
Register reset Configuration dependent
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

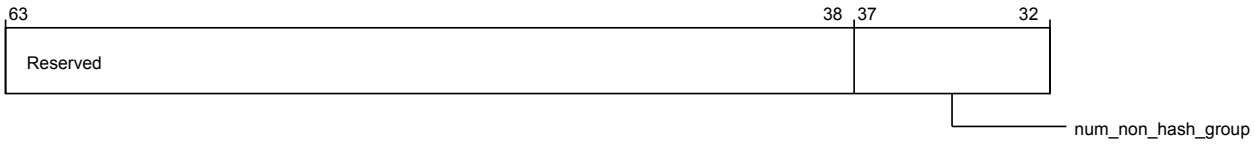

Figure 3-884 por_rnsam_unit_info (high)

The following table shows the por_rnsam_unit_info higher register bit assignments.

Table 3-898 por_rnsam_unit_info (high)

Bits	Field name	Description	Type	Reset
63:38	Reserved	Reserved	RO	-
37:32	num_non_hash_group	Number of non-hashed groups supported	RO	Configuration dependent

The following image shows the lower register bit assignments.

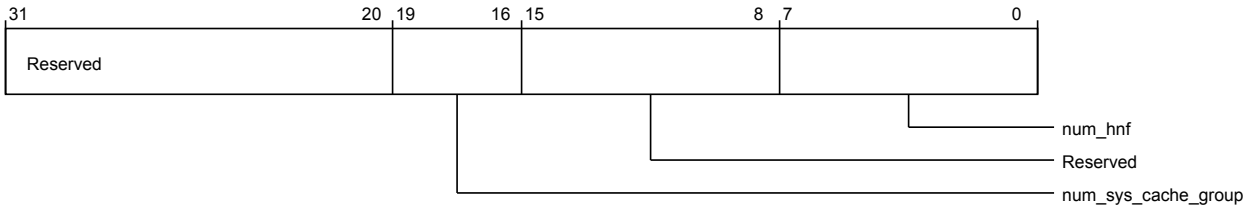

Figure 3-885 por_rnsam_unit_info (low)

The following table shows the por_rnsam_unit_info lower register bit assignments.

Table 3-899 por_rnsam_unit_info (low)

Bits	Field name	Description	Type	Reset
31:20	Reserved	Reserved	RO	-
19:16	num_sys_cache_group	Number of system cache groups supported	RO	Configuration dependent
15:8	Reserved	Reserved	RO	-
7:0	num_hnf	Number of hashed targets supported	RO	Configuration dependent

rnsam_status

Functions as the default and programming mode status register.

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Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC00

Register reset 64'b01

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

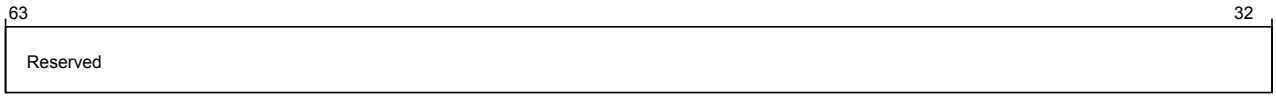

Figure 3-886 por_rnsam_rnsam_status (high)

The following table shows the rnsam_status higher register bit assignments.

Table 3-900 por_rnsam_rnsam_status (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

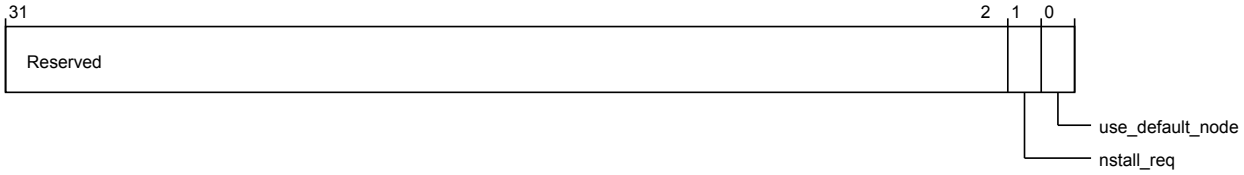

Figure 3-887 por_rnsam_rnsam_status (low)

The following table shows the rnsam_status lower register bit assignments.

Table 3-901 por_rnsam_rnsam_status (low)

Bits	Field name	Description	Type	Reset
31:2	Reserved	Reserved	RO	-
1	nstall_req	Indicates RN SAM is programmed and ready 1'b0: STALL requests 1'b1: UNSTALL requests	RW	1'b0
0	use_default_node	Indicates target ID selection mode 1'b0: Enables RN SAM to hash address bits and generate target ID 1'b1: Uses default target ID	RW	1'b1

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non_hash_mem_region_reg0

Configures non-hashed memory regions 0 and 1.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC08

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rnsam_secure_register_groups_override.mem_range

The following image shows the higher register bit assignments.

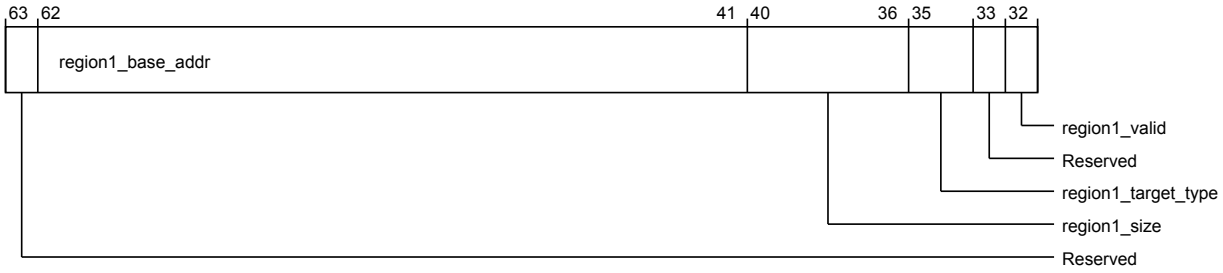

Figure 3-888 por_rnsam_non_hash_mem_region_reg0 (high)

The following table shows the non_hash_mem_region_reg0 higher register bit assignments.

Table 3-902 por_rnsam_non_hash_mem_region_reg0 (high)

Bits	Field name	Description	Type	Reset
63	Reserved	Reserved	RO	-
62:41	region1_base_addr	Bits [47:26] of base address of the range CONSTRAINT: Must be an integer multiple of region 1 size	RW	22'b0000000000000000000000
40:36	region1_size	Memory region 1 size CONSTRAINT: Memory region must be a power of two, from minimum size supported to maximum memory size (2^address width).	RW	5'b00000
35:34	region1_target_type	Indicates node type 2'b00: HN-F 2'b01: HN-I 2'b10: CXRA 2'b11: Reserved CONSTRAINT: Only applicable for RN-I	RW	2'b00

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Table 3-902 por_rnsam_non_hash_mem_region_reg0 (high) (continued)

Bits	Field name	Description	Type	Reset
33	Reserved	Reserved	RO	-
32	region1_valid	Memory region 1 valid 1'b0: Not valid 1'b1: Valid for memory region comparison	RW	1'b0

The following image shows the lower register bit assignments.

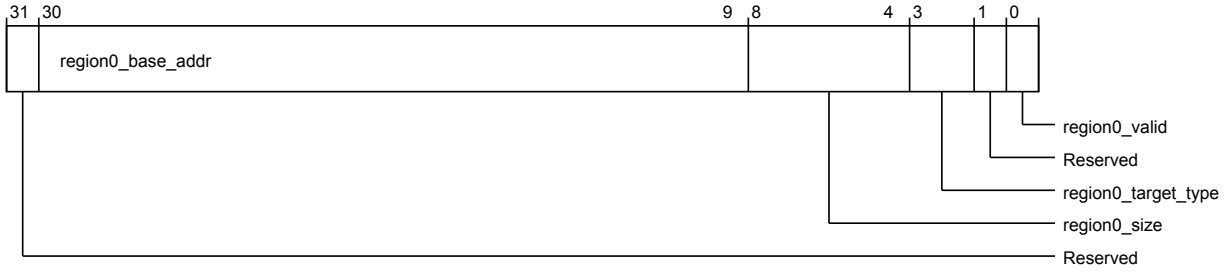

Figure 3-889 por_rnsam_non_hash_mem_region_reg0 (low)

The following table shows the non_hash_mem_region_reg0 lower register bit assignments.

Table 3-903 por_rnsam_non_hash_mem_region_reg0 (low)

Bits	Field name	Description	Type	Reset
31	Reserved	Reserved	RO	-
30:9	region0_base_addr	Bits [47:26] of base address of the range CONSTRAINT: Must be an integer multiple of region 0 size	RW	22'b0000000000000000000000
8:4	region0_size	Memory region 0 size CONSTRAINT: Memory region must be a power of two, from minimum size supported to maximum memory size (2^address width).	RW	5'b00000
3:2	region0_target_type	Indicates node type 2'b00: HN-F 2'b01: HN-I 2'b10: CXRA 2'b11: Reserved CONSTRAINT: Only applicable for RN-I	RW	2'b00

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Table 3-903 por_rnsam_non_hash_mem_region_reg0 (low) (continued)

Bits	Field name	Description	Type	Reset
1	Reserved	Reserved	RO	-
0	region0_valid	Memory region 0 valid 1'b0: Not valid 1'b1: Valid for memory region comparison	RW	1'b0

non_hash_mem_region_reg1

Configures non-hashed memory regions 2 and 3.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC10

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rnsam_secure_register_groups_override.mem_range

The following image shows the higher register bit assignments.

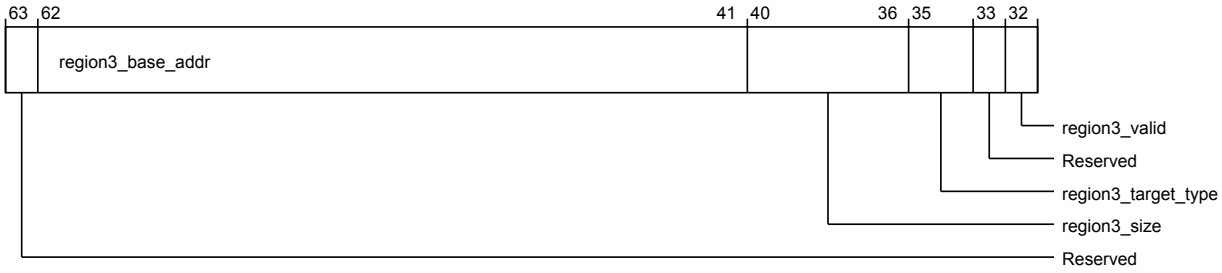

Figure 3-890 por_rnsam_non_hash_mem_region_reg1 (high)

The following table shows the non_hash_mem_region_reg1 higher register bit assignments.

Table 3-904 por_rnsam_non_hash_mem_region_reg1 (high)

Bits	Field name	Description	Type	Reset
63	Reserved	Reserved	RO	-
62:41	region3_base_addr	Bits [47:26] of base address of the range CONSTRAINT: Must be an integer multiple of region 3 size	RW	22'b0000000000000000000000
40:36	region3_size	Memory region 3 size CONSTRAINT: Memory region must be a power of two, from minimum size supported to maximum memory size (2^address width).	RW	5'b00000

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Table 3-904 por_rnsam_non_hash_mem_region_reg1 (high) (continued)

Bits	Field name	Description	Type	Reset
35:34	region3_target_type	Indicates node type 2'b00: HN-F 2'b01: HN-I 2'b10: CXRA 2'b11: Reserved CONSTRAINT: Only applicable for RN-I	RW	2'b00
33	Reserved	Reserved	RO	-
32	region3_valid	Memory region 3 valid 1'b0: Not valid 1'b1: Valid for memory region comparison	RW	1'b0

The following image shows the lower register bit assignments.

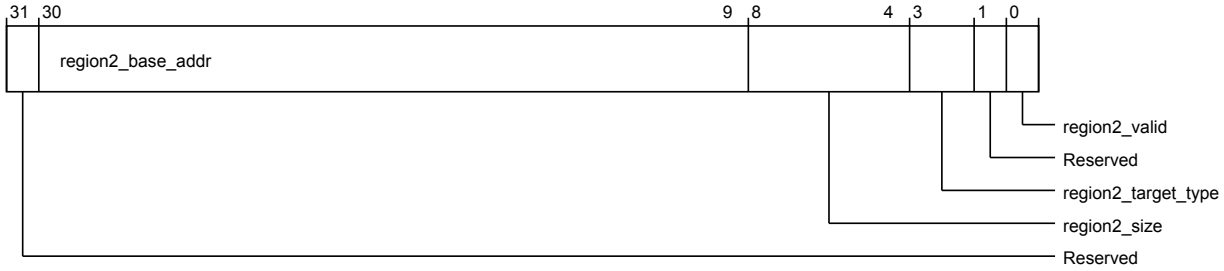

Figure 3-891 por_rnsam_non_hash_mem_region_reg1 (low)

The following table shows the non_hash_mem_region_reg1 lower register bit assignments.

Table 3-905 por_rnsam_non_hash_mem_region_reg1 (low)

Bits	Field name	Description	Type	Reset
31	Reserved	Reserved	RO	-
30:9	region2_base_addr	Bits [47:26] of base address of the range CONSTRAINT: Must be an integer multiple of region 2 size	RW	22'b0000000000000000000000
8:4	region2_size	Memory region 2 size CONSTRAINT: Memory region must be a power of two, from minimum size supported to maximum memory size (2^address width).	RW	5'b00000

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Table 3-905 por_rnsam_non_hash_mem_region_reg1 (low) (continued)

Bits	Field name	Description	Type	Reset
3:2	region2_target_type	Indicates node type 2'b00: HN-F 2'b01: HN-I 2'b10: CXRA 2'b11: Reserved CONSTRAINT: Only applicable for RN-I	RW	2'b00
1	Reserved	Reserved	RO	-
0	region2_valid	Memory region 2 valid 1'b0: Not valid 1'b1: Valid for memory region comparison	RW	1'b0

non_hash_mem_region_reg2

Configures non-hashed memory regions 4 and 5.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC18

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rnsam_secure_register_groups_override.mem_range

The following image shows the higher register bit assignments.

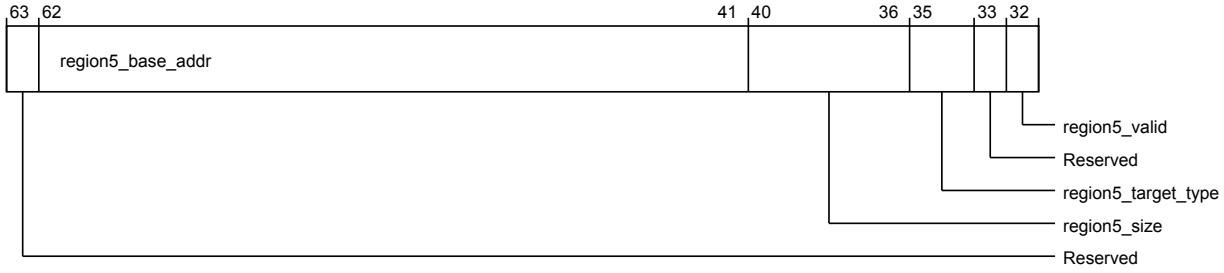

Figure 3-892 por_rnsam_non_hash_mem_region_reg2 (high)

The following table shows the non_hash_mem_region_reg2 higher register bit assignments.

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Table 3-906 por_rnsam_non_hash_mem_region_reg2 (high)

Bits	Field name	Description	Type	Reset
63	Reserved	Reserved	RO	-
62:41	region5_base_addr	Bits [47:26] of base address of the range CONSTRAINT: Must be an integer multiple of region 5 size	RW	22'b0000000000000000000000
40:36	region5_size	Memory region 5 size CONSTRAINT: Memory region must be a power of two, from minimum size supported to maximum memory size (2^address width).	RW	5'b00000
35:34	region5_target_type	Indicates node type 2'b00: HN-F 2'b01: HN-I 2'b10: CXRA 2'b11: Reserved CONSTRAINT: Only applicable for RN-I	RW	2'b00
33	Reserved	Reserved	RO	-
32	region5_valid	Memory region 5 valid 1'b0: Not valid 1'b1: Valid for memory region comparison	RW	1'b0

The following image shows the lower register bit assignments.

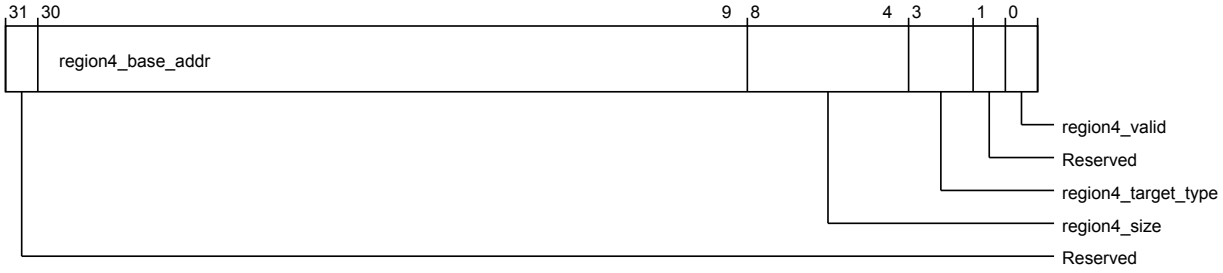

Figure 3-893 por_rnsam_non_hash_mem_region_reg2 (low)

The following table shows the non_hash_mem_region_reg2 lower register bit assignments.

Table 3-907 por_rnsam_non_hash_mem_region_reg2 (low)

Bits	Field name	Description	Type	Reset
31	Reserved	Reserved	RO	-
30:9	region4_base_addr	Bits [47:26] of base address of the range CONSTRAINT: Must be an integer multiple of region 4 size	RW	22'b0000000000000000000000

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Table 3-907 por_rnsam_non_hash_mem_region_reg2 (low) (continued)

Bits	Field name	Description	Type	Reset
8:4	region4_size	Memory region 4 size CONSTRAINT: Memory region must be a power of two, from minimum size supported to maximum memory size (2^address width).	RW	5'b00000
3:2	region4_target_type	Indicates node type 2'b00: HN-F 2'b01: HN-I 2'b10: CXRA 2'b11: Reserved CONSTRAINT: Only applicable for RN-I	RW	2'b00
1	Reserved	Reserved	RO	-
0	region4_valid	Memory region 4 valid 1'b0: Not valid 1'b1: Valid for memory region comparison	RW	1'b0

non_hash_mem_region_reg3

Configures non-hashed memory regions 6 and 7.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC20

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rnsam_secure_register_groups_override.mem_range

The following image shows the higher register bit assignments.

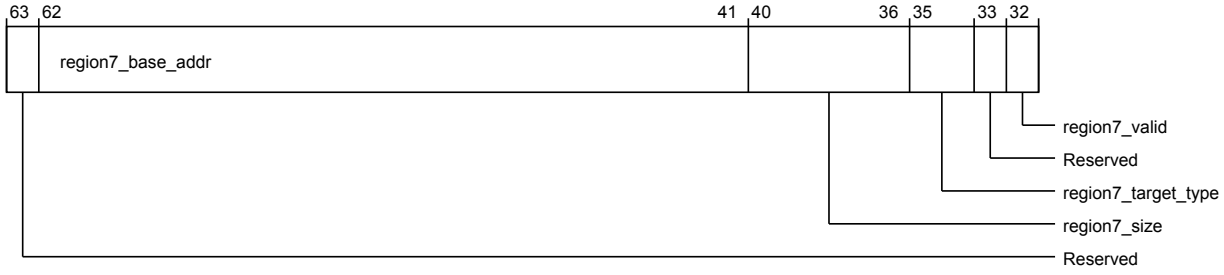

Figure 3-894 por_rnsam_non_hash_mem_region_reg3 (high)

The following table shows the non_hash_mem_region_reg3 higher register bit assignments.

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Table 3-908 por_rnsam_non_hash_mem_region_reg3 (high)

Bits	Field name	Description	Type	Reset
63	Reserved	Reserved	RO	-
62:41	region7_base_addr	Bits [47:26] of base address of the range CONSTRAINT: Must be an integer multiple of region 7 size	RW	22'b0000000000000000000000
40:36	region7_size	Memory region 7 size CONSTRAINT: Memory region must be a power of two, from minimum size supported to maximum memory size (2^address width).	RW	5'b00000
35:34	region7_target_type	Indicates node type 2'b00: HN-F 2'b01: HN-I 2'b10: CXRA 2'b11: Reserved CONSTRAINT: Only applicable for RN-I	RW	2'b00
33	Reserved	Reserved	RO	-
32	region7_valid	Memory region 7 valid 1'b0: Not valid 1'b1: Valid for memory region comparison	RW	1'b0

The following image shows the lower register bit assignments.

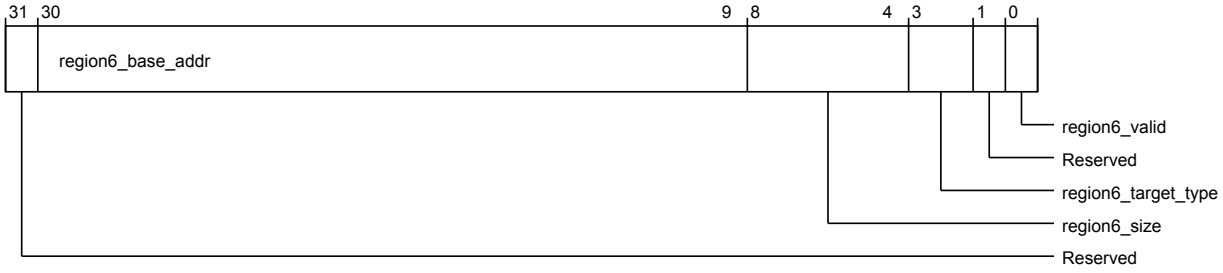

Figure 3-895 por_rnsam_non_hash_mem_region_reg3 (low)

The following table shows the non_hash_mem_region_reg3 lower register bit assignments.

Table 3-909 por_rnsam_non_hash_mem_region_reg3 (low)

Bits	Field name	Description	Type	Reset
31	Reserved	Reserved	RO	-
30:9	region6_base_addr	Bits [47:26] of base address of the range CONSTRAINT: Must be an integer multiple of region 6 size	RW	22'b0000000000000000000000

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Table 3-909 por_rnsam_non_hash_mem_region_reg3 (low) (continued)

Bits	Field name	Description	Type	Reset
8:4	region6_size	Memory region 6 size CONSTRAINT: Memory region must be a power of two, from minimum size supported to maximum memory size (2^address width).	RW	5'b00000
3:2	region6_target_type	Indicates node type 2'b00: HN-F 2'b01: HN-I 2'b10: CXRA 2'b11: Reserved CONSTRAINT: Only applicable for RN-I	RW	2'b00
1	Reserved	Reserved	RO	-
0	region6_valid	Memory region 6 valid 1'b0: Not valid 1'b1: Valid for memory region comparison	RW	1'b0

non_hash_mem_region_reg4

Configures non-hashed memory regions 8 and 9.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC28

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rnsam_secure_register_groups_override.mem_range

The following image shows the higher register bit assignments.

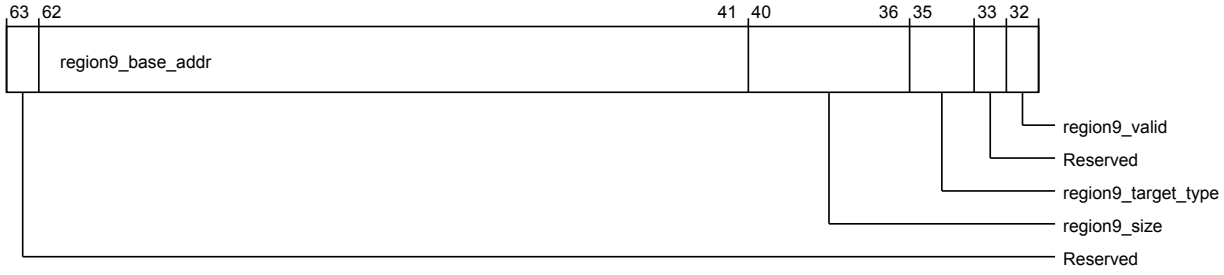

Figure 3-896 por_rnsam_non_hash_mem_region_reg4 (high)

The following table shows the non_hash_mem_region_reg4 higher register bit assignments.

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Table 3-910 por_rnsam_non_hash_mem_region_reg4 (high)

Bits	Field name	Description	Type	Reset
63	Reserved	Reserved	RO	-
62:41	region9_base_addr	Bits [47:26] of base address of the range CONSTRAINT: Must be an integer multiple of region 9 size	RW	22'b0000000000000000000000
40:36	region9_size	Memory region 9 size CONSTRAINT: Memory region must be a power of two, from minimum size supported to maximum memory size (2^address width).	RW	5'b00000
35:34	region9_target_type	Indicates node type 2'b00: HN-F 2'b01: HN-I 2'b10: CXRA 2'b11: Reserved CONSTRAINT: Only applicable for RN-I	RW	2'b00
33	Reserved	Reserved	RO	-
32	region9_valid	Memory region 9 valid 1'b0: Not valid 1'b1: Valid for memory region comparison	RW	1'b0

The following image shows the lower register bit assignments.

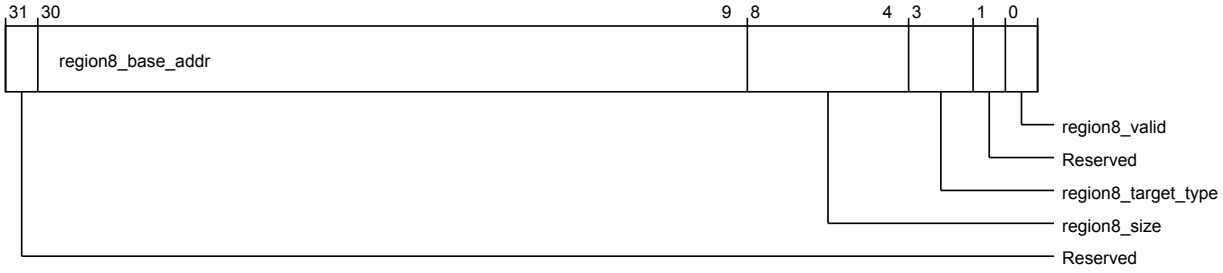

Figure 3-897 por_rnsam_non_hash_mem_region_reg4 (low)

The following table shows the non_hash_mem_region_reg4 lower register bit assignments.

Table 3-911 por_rnsam_non_hash_mem_region_reg4 (low)

Bits	Field name	Description	Type	Reset
31	Reserved	Reserved	RO	-
30:9	region8_base_addr	Bits [47:26] of base address of the range CONSTRAINT: Must be an integer multiple of region 8 size	RW	22'b0000000000000000000000

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Table 3-911 por_rnsam_non_hash_mem_region_reg4 (low) (continued)

Bits	Field name	Description	Type	Reset
8:4	region8_size	Memory region 8 size CONSTRAINT: Memory region must be a power of two, from minimum size supported to maximum memory size (2^address width).	RW	5'b00000
3:2	region8_target_type	Indicates node type 2'b00: HN-F 2'b01: HN-I 2'b10: CXRA 2'b11: Reserved CONSTRAINT: Only applicable for RN-I	RW	2'b00
1	Reserved	Reserved	RO	-
0	region8_valid	Memory region 8 valid 1'b0: Not valid 1'b1: Valid for memory region comparison	RW	1'b0

non_hash_mem_region_reg5

Configures non-hashed memory regions 10 and 11.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hCA0

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rnsam_secure_register_groups_override.mem_range

The following image shows the higher register bit assignments.

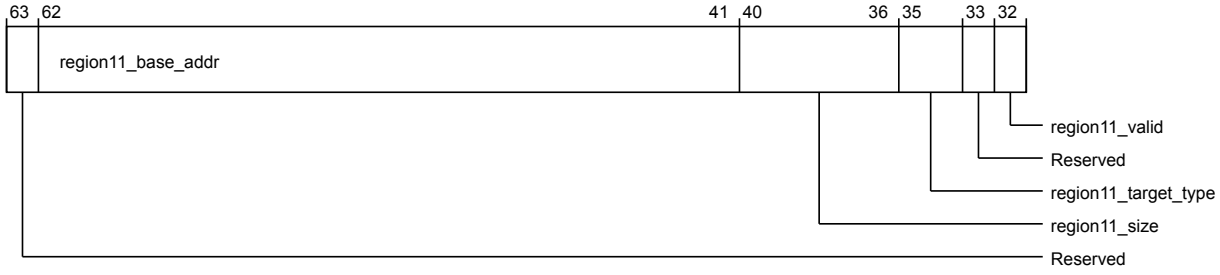

Figure 3-898 por_rnsam_non_hash_mem_region_reg5 (high)

The following table shows the non_hash_mem_region_reg5 higher register bit assignments.

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Table 3-912 por_rnsam_non_hash_mem_region_reg5 (high)

Bits	Field name	Description	Type	Reset
63	Reserved	Reserved	RO	-
62:41	region11_base_addr	Bits [47:26] of base address of the range CONSTRAINT: Must be an integer multiple of region 11 size	RW	22'b0000000000000000000000
40:36	region11_size	Memory region 11 size CONSTRAINT: Memory region must be a power of two, from minimum size supported to maximum memory size (2^address width).	RW	5'b00000
35:34	region11_target_type	Indicates node type 2'b00: HN-F 2'b01: HN-I 2'b10: CXRA 2'b11: Reserved CONSTRAINT: Only applicable for RN-I	RW	2'b00
33	Reserved	Reserved	RO	-
32	region11_valid	Memory region 11 valid 1'b0: Not valid 1'b1: Valid for memory region comparison	RW	1'b0

The following image shows the lower register bit assignments.

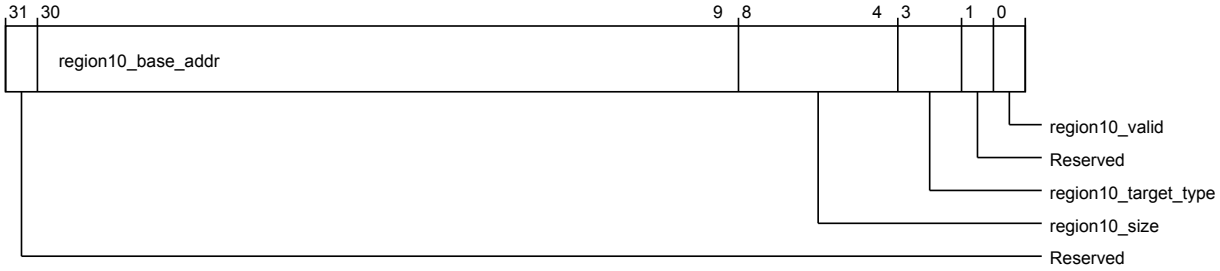

Figure 3-899 por_rnsam_non_hash_mem_region_reg5 (low)

The following table shows the non_hash_mem_region_reg5 lower register bit assignments.

Table 3-913 por_rnsam_non_hash_mem_region_reg5 (low)

Bits	Field name	Description	Type	Reset
31	Reserved	Reserved	RO	-
30:9	region10_base_addr	Bits [47:26] of base address of the range CONSTRAINT: Must be an integer multiple of region 10 size	RW	22'b0000000000000000000000

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Table 3-913 por_rnsam_non_hash_mem_region_reg5 (low) (continued)

Bits	Field name	Description	Type	Reset
8:4	region10_size	Memory region 10 size CONSTRAINT: Memory region must be a power of two, from minimum size supported to maximum memory size (2^address width).	RW	5'b00000
3:2	region10_target_type	Indicates node type 2'b00: HN-F 2'b01: HN-I 2'b10: CXRA 2'b11: Reserved CONSTRAINT: Only applicable for RN-I	RW	2'b00
1	Reserved	Reserved	RO	-
0	region10_valid	Memory region 10 valid 1'b0: Not valid 1'b1: Valid for memory region comparison	RW	1'b0

non_hash_mem_region_reg6

Configures non-hashed memory regions 12 and 13.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hCA8

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rnsam_secure_register_groups_override.mem_range

The following image shows the higher register bit assignments.

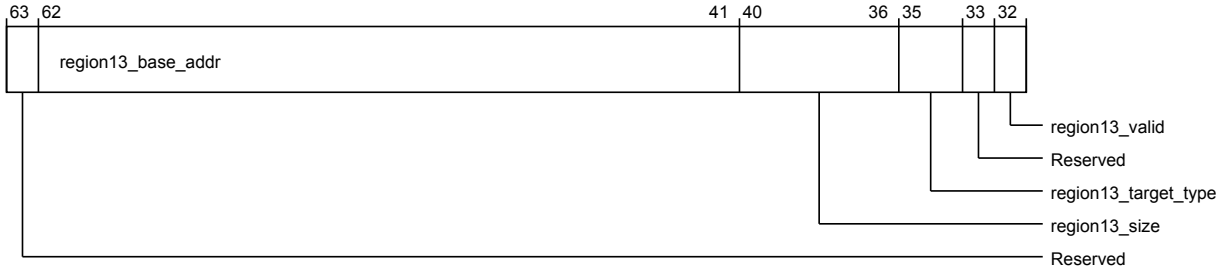

Figure 3-900 por_rnsam_non_hash_mem_region_reg6 (high)

The following table shows the non_hash_mem_region_reg6 higher register bit assignments.

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Table 3-914 por_rnsam_non_hash_mem_region_reg6 (high)

Bits	Field name	Description	Type	Reset
63	Reserved	Reserved	RO	-
62:41	region13_base_addr	Bits [47:26] of base address of the range CONSTRAINT: Must be an integer multiple of region 13 size	RW	22'b0000000000000000000000
40:36	region13_size	Memory region 13 size CONSTRAINT: Memory region must be a power of two, from minimum size supported to maximum memory size (2^address width).	RW	5'b00000
35:34	region13_target_type	Indicates node type 2'b00: HN-F 2'b01: HN-I 2'b10: CXRA 2'b11: Reserved CONSTRAINT: Only applicable for RN-I	RW	2'b00
33	Reserved	Reserved	RO	-
32	region13_valid	Memory region 13 valid 1'b0: Not valid 1'b1: Valid for memory region comparison	RW	1'b0

The following image shows the lower register bit assignments.

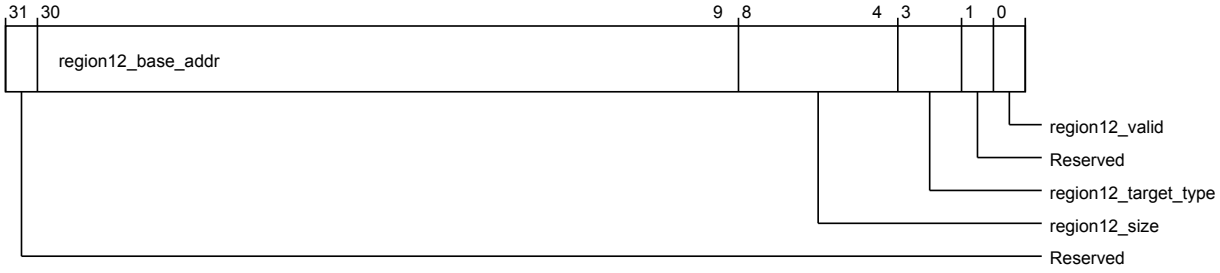

Figure 3-901 por_rnsam_non_hash_mem_region_reg6 (low)

The following table shows the non_hash_mem_region_reg6 lower register bit assignments.

Table 3-915 por_rnsam_non_hash_mem_region_reg6 (low)

Bits	Field name	Description	Type	Reset
31	Reserved	Reserved	RO	-
30:9	region12_base_addr	Bits [47:26] of base address of the range CONSTRAINT: Must be an integer multiple of region 12 size	RW	22'b0000000000000000000000

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Table 3-915 por_rnsam_non_hash_mem_region_reg6 (low) (continued)

Bits	Field name	Description	Type	Reset
8:4	region12_size	Memory region 12 size CONSTRAINT: Memory region must be a power of two, from minimum size supported to maximum memory size (2^address width).	RW	5'b00000
3:2	region12_target_type	Indicates node type 2'b00: HN-F 2'b01: HN-I 2'b10: CXRA 2'b11: Reserved CONSTRAINT: Only applicable for RN-I	RW	2'b00
1	Reserved	Reserved	RO	-
0	region12_valid	Memory region 12 valid 1'b0: Not valid 1'b1: Valid for memory region comparison	RW	1'b0

non_hash_mem_region_reg7

Configures non-hashed memory regions 14 and 15.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hCB0

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rnsam_secure_register_groups_override.mem_range

The following image shows the higher register bit assignments.

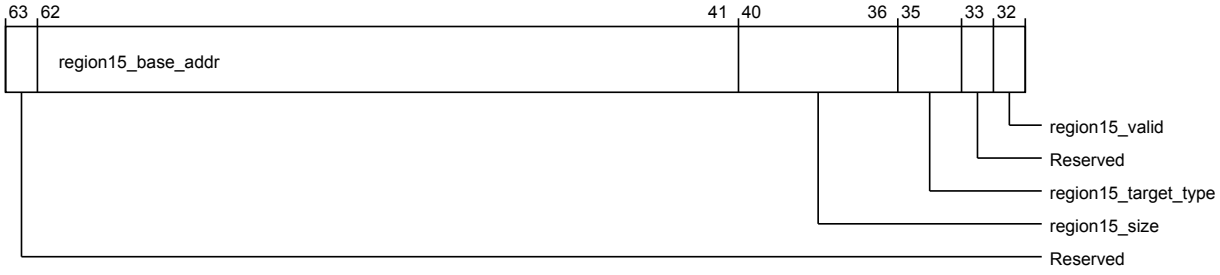

Figure 3-902 por_rnsam_non_hash_mem_region_reg7 (high)

The following table shows the non_hash_mem_region_reg7 higher register bit assignments.

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Table 3-916 por_rnsam_non_hash_mem_region_reg7 (high)

Bits	Field name	Description	Type	Reset
63	Reserved	Reserved	RO	-
62:41	region15_base_addr	Bits [47:26] of base address of the range CONSTRAINT: Must be an integer multiple of region 15 size	RW	22'b0000000000000000000000
40:36	region15_size	Memory region 15 size CONSTRAINT: Memory region must be a power of two, from minimum size supported to maximum memory size (2^address width).	RW	5'b00000
35:34	region15_target_type	Indicates node type 2'b00: HN-F 2'b01: HN-I 2'b10: CXRA 2'b11: Reserved CONSTRAINT: Only applicable for RN-I	RW	2'b00
33	Reserved	Reserved	RO	-
32	region15_valid	Memory region 15 valid 1'b0: Not valid 1'b1: Valid for memory region comparison	RW	1'b0

The following image shows the lower register bit assignments.

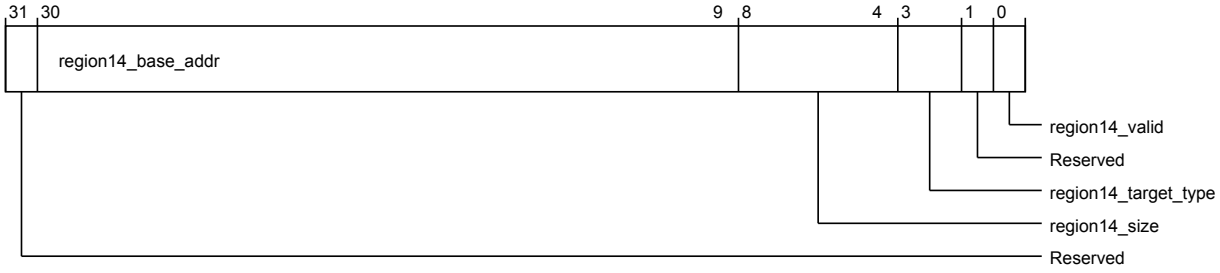

Figure 3-903 por_rnsam_non_hash_mem_region_reg7 (low)

The following table shows the non_hash_mem_region_reg7 lower register bit assignments.

Table 3-917 por_rnsam_non_hash_mem_region_reg7 (low)

Bits	Field name	Description	Type	Reset
31	Reserved	Reserved	RO	-
30:9	region14_base_addr	Bits [47:26] of base address of the range CONSTRAINT: Must be an integer multiple of region 14 size	RW	22'b0000000000000000000000

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Table 3-917 por_rnsam_non_hash_mem_region_reg7 (low) (continued)

Bits	Field name	Description	Type	Reset
8:4	region14_size	Memory region 14 size CONSTRAINT: Memory region must be a power of two, from minimum size supported to maximum memory size (2^address width).	RW	5'b00000
3:2	region14_target_type	Indicates node type 2'b00: HN-F 2'b01: HN-I 2'b10: CXRA 2'b11: Reserved CONSTRAINT: Only applicable for RN-I	RW	2'b00
1	Reserved	Reserved	RO	-
0	region14_valid	Memory region 14 valid 1'b0: Not valid 1'b1: Valid for memory region comparison	RW	1'b0

non_hash_mem_region_reg8

Configures non-hashed memory regions 16 and 17.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hCB8

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rnsam_secure_register_groups_override.mem_range

The following image shows the higher register bit assignments.

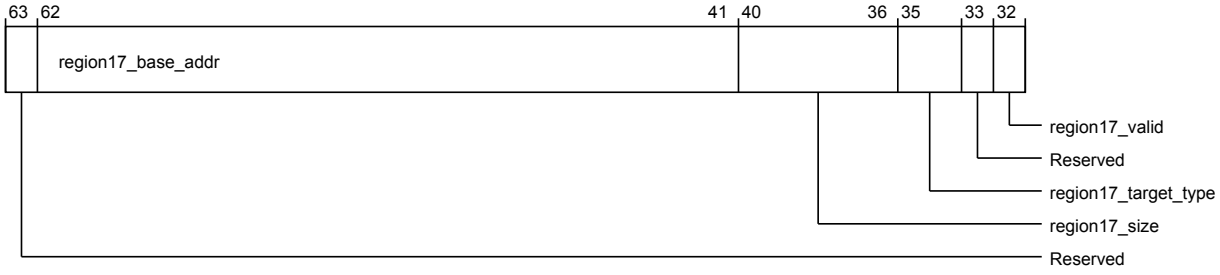

Figure 3-904 por_rnsam_non_hash_mem_region_reg8 (high)

The following table shows the non_hash_mem_region_reg8 higher register bit assignments.

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Table 3-918 por_rnsam_non_hash_mem_region_reg8 (high)

Bits	Field name	Description	Type	Reset
63	Reserved	Reserved	RO	-
62:41	region17_base_addr	Bits [47:26] of base address of the range CONSTRAINT: Must be an integer multiple of region 17 size	RW	22'b0000000000000000000000
40:36	region17_size	Memory region 17 size CONSTRAINT: Memory region must be a power of two, from minimum size supported to maximum memory size (2^address width).	RW	5'b00000
35:34	region17_target_type	Indicates node type 2'b00: HN-F 2'b01: HN-I 2'b10: CXRA 2'b11: Reserved CONSTRAINT: Only applicable for RN-I	RW	2'b00
33	Reserved	Reserved	RO	-
32	region17_valid	Memory region 17 valid 1'b0: Not valid 1'b1: Valid for memory region comparison	RW	1'b0

The following image shows the lower register bit assignments.

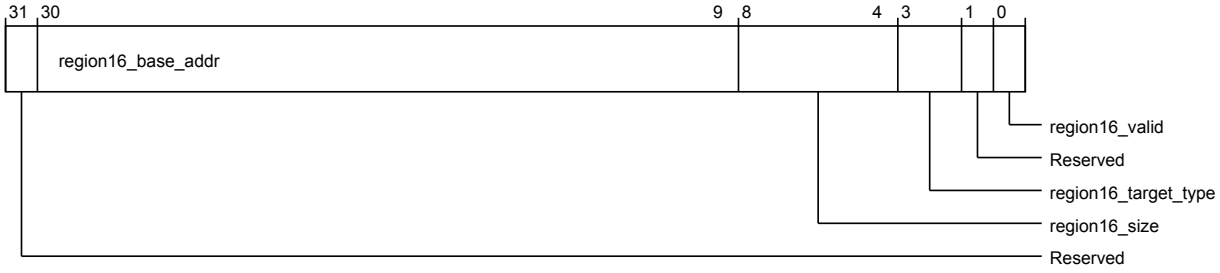

Figure 3-905 por_rnsam_non_hash_mem_region_reg8 (low)

The following table shows the non_hash_mem_region_reg8 lower register bit assignments.

Table 3-919 por_rnsam_non_hash_mem_region_reg8 (low)

Bits	Field name	Description	Type	Reset
31	Reserved	Reserved	RO	-
30:9	region16_base_addr	Bits [47:26] of base address of the range CONSTRAINT: Must be an integer multiple of region 16 size	RW	22'b0000000000000000000000

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Table 3-919 por_rnsam_non_hash_mem_region_reg8 (low) (continued)

Bits	Field name	Description	Type	Reset
8:4	region16_size	Memory region 16 size CONSTRAINT: Memory region must be a power of two, from minimum size supported to maximum memory size (2^address width).	RW	5'b00000
3:2	region16_target_type	Indicates node type 2'b00: HN-F 2'b01: HN-I 2'b10: CXRA 2'b11: Reserved CONSTRAINT: Only applicable for RN-I	RW	2'b00
1	Reserved	Reserved	RO	-
0	region16_valid	Memory region 16 valid 1'b0: Not valid 1'b1: Valid for memory region comparison	RW	1'b0

non_hash_mem_region_reg9

Configures non-hashed memory regions 18 and 19.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hCC0

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rnsam_secure_register_groups_override.mem_range

The following image shows the higher register bit assignments.

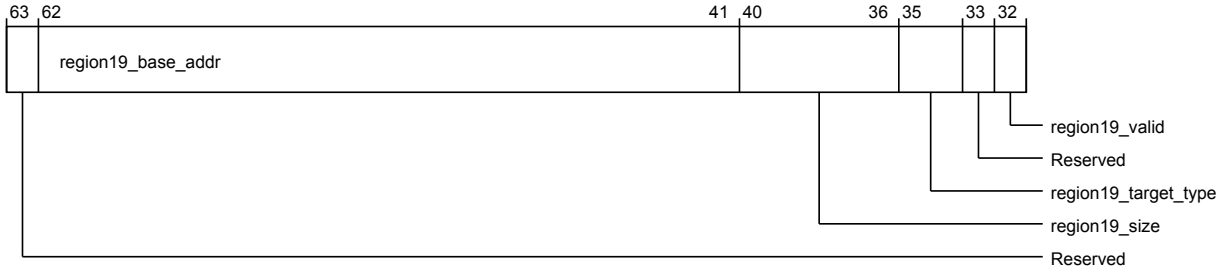

Figure 3-906 por_rnsam_non_hash_mem_region_reg9 (high)

The following table shows the non_hash_mem_region_reg9 higher register bit assignments.

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Table 3-920 por_rnsam_non_hash_mem_region_reg9 (high)

Bits	Field name	Description	Type	Reset
63	Reserved	Reserved	RO	-
62:41	region19_base_addr	Bits [47:26] of base address of the range CONSTRAINT: Must be an integer multiple of region 19 size	RW	22'b0000000000000000000000
40:36	region19_size	Memory region 19 size CONSTRAINT: Memory region must be a power of two, from minimum size supported to maximum memory size (2^address width).	RW	5'b00000
35:34	region19_target_type	Indicates node type 2'b00: HN-F 2'b01: HN-I 2'b10: CXRA 2'b11: Reserved CONSTRAINT: Only applicable for RN-I	RW	2'b00
33	Reserved	Reserved	RO	-
32	region19_valid	Memory region 19 valid 1'b0: Not valid 1'b1: Valid for memory region comparison	RW	1'b0

The following image shows the lower register bit assignments.

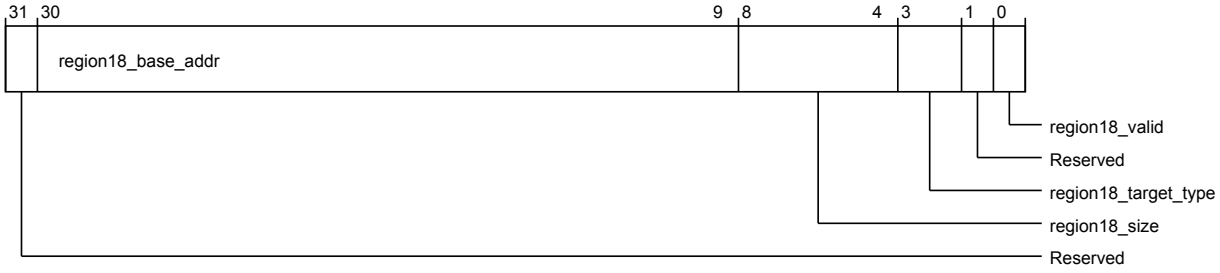

Figure 3-907 por_rnsam_non_hash_mem_region_reg9 (low)

The following table shows the non_hash_mem_region_reg9 lower register bit assignments.

Table 3-921 por_rnsam_non_hash_mem_region_reg9 (low)

Bits	Field name	Description	Type	Reset
31	Reserved	Reserved	RO	-
30:9	region18_base_addr	Bits [47:26] of base address of the range CONSTRAINT: Must be an integer multiple of region 18 size	RW	22'b0000000000000000000000

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Table 3-921 por_rnsam_non_hash_mem_region_reg9 (low) (continued)

Bits	Field name	Description	Type	Reset
8:4	region18_size	Memory region 18 size CONSTRAINT: Memory region must be a power of two, from minimum size supported to maximum memory size (2^address width).	RW	5'b00000
3:2	region18_target_type	Indicates node type 2'b00: HN-F 2'b01: HN-I 2'b10: CXRA 2'b11: Reserved CONSTRAINT: Only applicable for RN-I	RW	2'b00
1	Reserved	Reserved	RO	-
0	region18_valid	Memory region 18 valid 1'b0: Not valid 1'b1: Valid for memory region comparison	RW	1'b0

non_hash_tgt_nodeid0

Configures non-hashed target node IDs 0 to 3.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hC30
Register reset 64'b0
Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

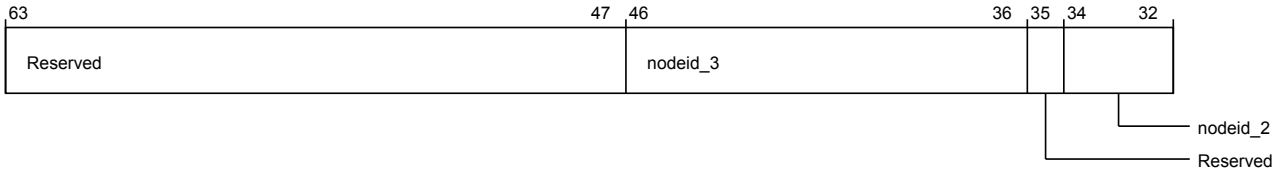

Figure 3-908 por_rnsam_non_hash_tgt_nodeid0 (high)

The following table shows the non_hash_tgt_nodeid0 higher register bit assignments.

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Table 3-922 por_rnsam_non_hash_tgt_nodeid0 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	nodeid_3	Non-hashed target node ID 3	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	nodeid_2	Non-hashed target node ID 2	RW	11'b00000000000

The following image shows the lower register bit assignments.

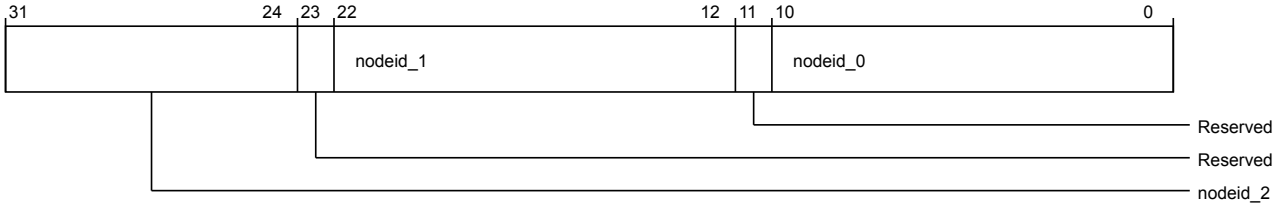

Figure 3-909 por_rnsam_non_hash_tgt_nodeid0 (low)

The following table shows the non_hash_tgt_nodeid0 lower register bit assignments.

Table 3-923 por_rnsam_non_hash_tgt_nodeid0 (low)

Bits	Field name	Description	Type	Reset
31:24	nodeid_2	Non-hashed target node ID 2	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	nodeid_1	Non-hashed target node ID 1	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	nodeid_0	Non-hashed target node ID 0	RW	11'b00000000000

non_hash_tgt_nodeid1

Configures non-hashed target node IDs 4 to 7.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC38

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

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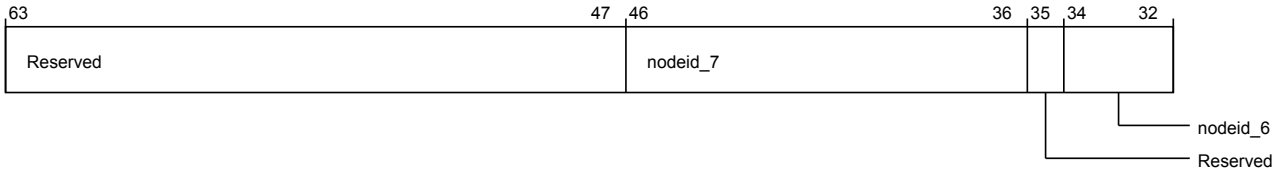

Figure 3-910 por_rnsam_non_hash_tgt_nodeid1 (high)

The following table shows the non_hash_tgt_nodeid1 higher register bit assignments.

Table 3-924 por_rnsam_non_hash_tgt_nodeid1 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	nodeid_7	Non-hashed target node ID 7	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	nodeid_6	Non-hashed target node ID 6	RW	11'b00000000000

The following image shows the lower register bit assignments.

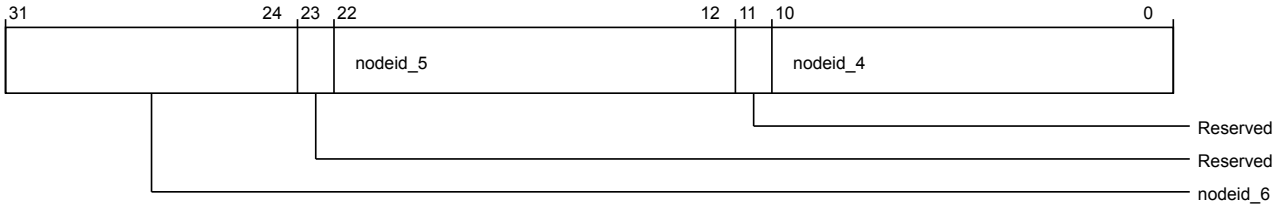

Figure 3-911 por_rnsam_non_hash_tgt_nodeid1 (low)

The following table shows the non_hash_tgt_nodeid1 lower register bit assignments.

Table 3-925 por_rnsam_non_hash_tgt_nodeid1 (low)

Bits	Field name	Description	Type	Reset
31:24	nodeid_6	Non-hashed target node ID 6	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	nodeid_5	Non-hashed target node ID 5	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	nodeid_4	Non-hashed target node ID 4	RW	11'b00000000000

non_hash_tgt_nodeid2

Configures non-hashed target node IDs 8 to 11.

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Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC40

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

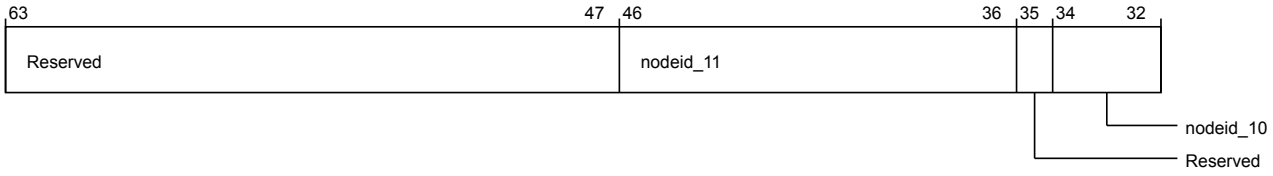

Figure 3-912 por_rnsam_non_hash_tgt_nodeid2 (high)

The following table shows the non_hash_tgt_nodeid2 higher register bit assignments.

Table 3-926 por_rnsam_non_hash_tgt_nodeid2 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	nodeid_11	Non-hashed target node ID 11	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	nodeid_10	Non-hashed target node ID 10	RW	11'b00000000000

The following image shows the lower register bit assignments.

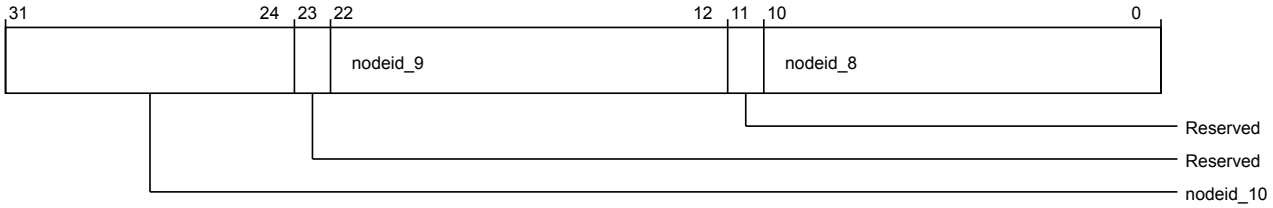

Figure 3-913 por_rnsam_non_hash_tgt_nodeid2 (low)

The following table shows the non_hash_tgt_nodeid2 lower register bit assignments.

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Table 3-927 por_rnsam_non_hash_tgt_nodeid2 (low)

Bits	Field name	Description	Type	Reset
31:24	nodeid_10	Non-hashed target node ID 10	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	nodeid_9	Non-hashed target node ID 9	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	nodeid_8	Non-hashed target node ID 8	RW	11'b00000000000

non_hash_tgt_nodeid3

Configures non-hashed target node IDs 12 to 15.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hCE0

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

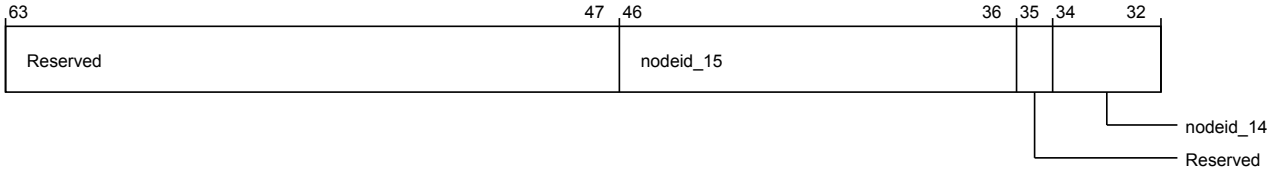

Figure 3-914 por_rnsam_non_hash_tgt_nodeid3 (high)

The following table shows the non_hash_tgt_nodeid3 higher register bit assignments.

Table 3-928 por_rnsam_non_hash_tgt_nodeid3 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	nodeid_15	Non-hashed target node ID 15	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	nodeid_14	Non-hashed target node ID 14	RW	11'b00000000000

The following image shows the lower register bit assignments.

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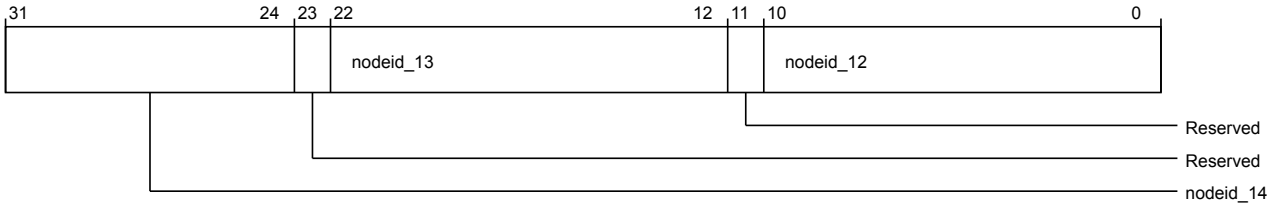

Figure 3-915 por_rnsam_non_hash_tgt_nodeid3 (low)

The following table shows the non_hash_tgt_nodeid3 lower register bit assignments.

Table 3-929 por_rnsam_non_hash_tgt_nodeid3 (low)

Bits	Field name	Description	Type	Reset
31:24	nodeid_14	Non-hashed target node ID 14	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	nodeid_13	Non-hashed target node ID 13	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	nodeid_12	Non-hashed target node ID 12	RW	11'b00000000000

non_hash_tgt_nodeid4

Configures non-hashed target node IDs 16 to 19.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hCE8

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

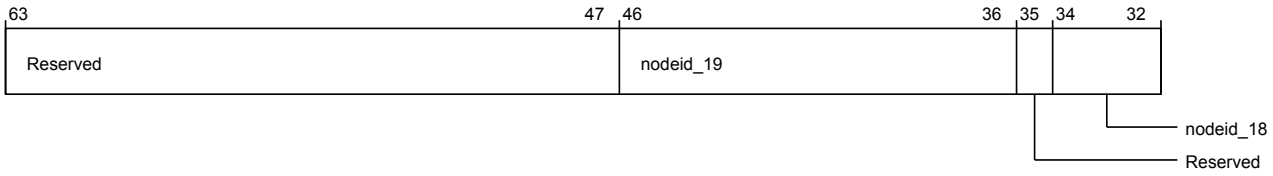

Figure 3-916 por_rnsam_non_hash_tgt_nodeid4 (high)

The following table shows the non_hash_tgt_nodeid4 higher register bit assignments.

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Table 3-930 por_rnsam_non_hash_tgt_nodeid4 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	nodeid_19	Non-hashed target node ID 19	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	nodeid_18	Non-hashed target node ID 18	RW	11'b00000000000

The following image shows the lower register bit assignments.

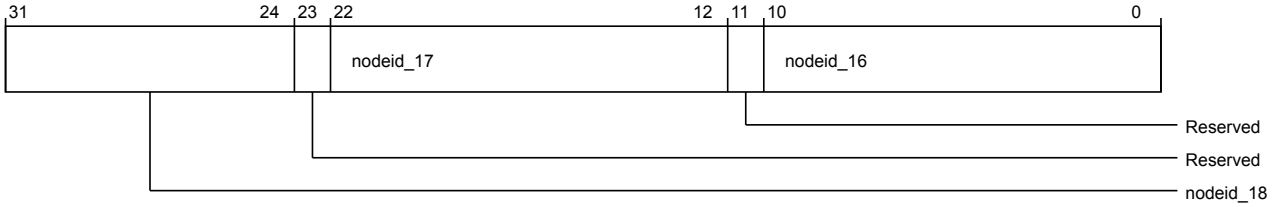

Figure 3-917 por_rnsam_non_hash_tgt_nodeid4 (low)

The following table shows the non_hash_tgt_nodeid4 lower register bit assignments.

Table 3-931 por_rnsam_non_hash_tgt_nodeid4 (low)

Bits	Field name	Description	Type	Reset
31:24	nodeid_18	Non-hashed target node ID 18	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	nodeid_17	Non-hashed target node ID 17	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	nodeid_16	Non-hashed target node ID 16	RW	11'b00000000000

sys_cache_grp_region0

Configures hashed memory regions 0 and 1.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC48

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rnsam_secure_register_groups_override.mem_range

The following image shows the higher register bit assignments.

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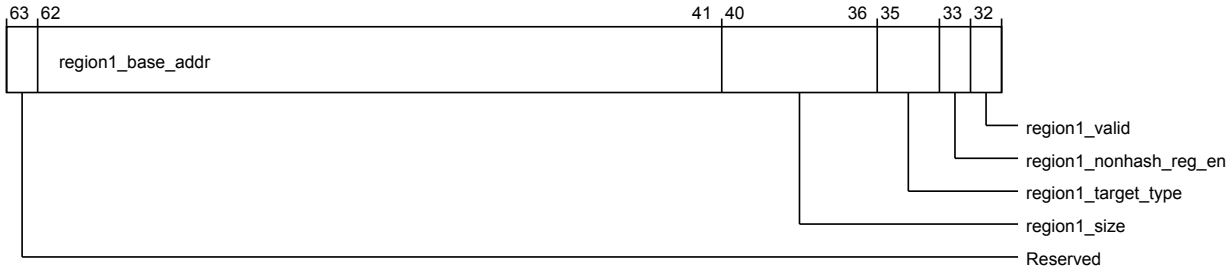

Figure 3-918 por_rnsam_sys_cache_grp_region0 (high)

The following table shows the sys_cache_grp_region0 higher register bit assignments.

Table 3-932 por_rnsam_sys_cache_grp_region0 (high)

Bits	Field name	Description	Type	Reset
63	Reserved	Reserved	RO	-
62:41	region1_base_addr	Bits [47:26] of base address of the range CONSTRAINT: Must be an integer multiple of region 1 size	RW	22'b0000000000000000000000
40:36	region1_size	Memory region 1 size CONSTRAINT: Memory region must be a power of two, from minimum size supported to maximum memory size (2^address width).	RW	5'b00000
35:34	region1_target_type	Indicates node type 2'b00: HN-F 2'b01: HN-I 2'b10: CXRA 2'b11: Reserved CONSTRAINT: Only applicable for RN-I	RW	2'b00
33	region1_nonhash_reg_en	Enables hashed region 1 to select non-hashed node	RW	1'b0
32	region1_valid	Memory region 1 valid 1'b0: Not valid 1'b1: Valid for memory region comparison	RW	1'b0

The following image shows the lower register bit assignments.

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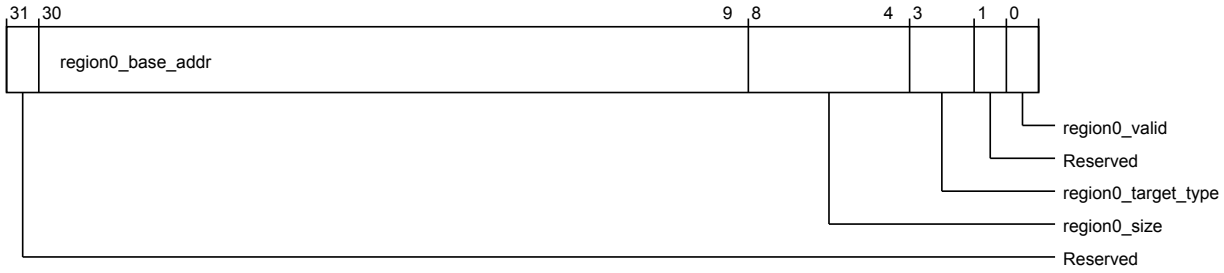

Figure 3-919 por_rnsam_sys_cache_grp_region0 (low)

The following table shows the sys_cache_grp_region0 lower register bit assignments.

Table 3-933 por_rnsam_sys_cache_grp_region0 (low)

Bits	Field name	Description	Type	Reset
31	Reserved	Reserved	RO	-
30:9	region0_base_addr	Bits [47:26] of base address of the range CONSTRAINT: Must be an integer multiple of region 0 size	RW	22'b0000000000000000000000
8:4	region0_size	Memory region 0 size CONSTRAINT: Memory region must be a power of two, from minimum size supported to maximum memory size (2^address width).	RW	5'b00000
3:2	region0_target_type	Indicates node type 2'b00: HN-F 2'b01: HN-I 2'b10: CXRA 2'b11: Reserved CONSTRAINT: Only applicable for RN-I	RW	2'b00
1	Reserved	Reserved	RO	-
0	region0_valid	Memory region 0 valid 1'b0: Not valid 1'b1: Valid for memory region comparison	RW	1'b0

sys_cache_grp_region1

Configures hashed memory regions 2 and 3.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hC50
Register reset 64'b0

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Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rnsam_secure_register_groups_override.mem_range

The following image shows the higher register bit assignments.

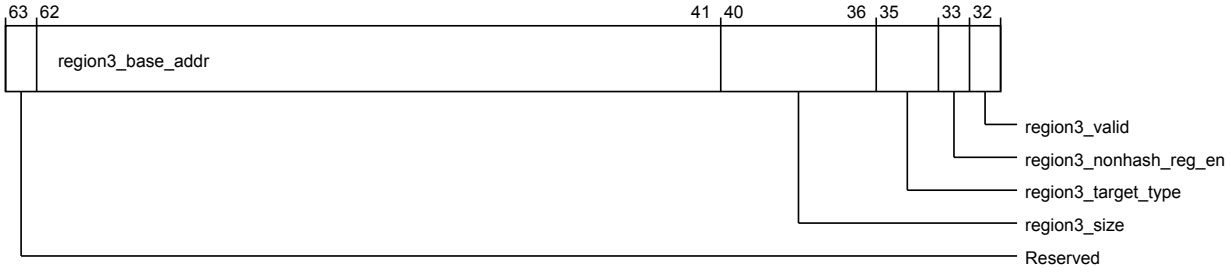

Figure 3-920 por_rnsam_sys_cache_grp_region1 (high)

The following table shows the sys_cache_grp_region1 higher register bit assignments.

Table 3-934 por_rnsam_sys_cache_grp_region1 (high)

Bits	Field name	Description	Type	Reset
63	Reserved	Reserved	RO	-
62:41	region3_base_addr	Bits [47:26] of base address of the range CONSTRAINT: Must be an integer multiple of region 3 size	RW	22'b0000000000000000000000
40:36	region3_size	Memory region 3 size CONSTRAINT: Memory region must be a power of two, from minimum size supported to maximum memory size (2^address width).	RW	5'b00000
35:34	region3_target_type	Indicates node type 2'b00: HN-F 2'b01: HN-I 2'b10: CXRA 2'b11: Reserved CONSTRAINT: Only applicable for RN-I	RW	2'b00
33	region3_nonhash_reg_en	Enables hashed region 3 to select non-hashed node	RW	1'b0
32	region3_valid	Memory region 3 valid 1'b0: Not valid 1'b1: Valid for memory region comparison	RW	1'b0

The following image shows the lower register bit assignments.

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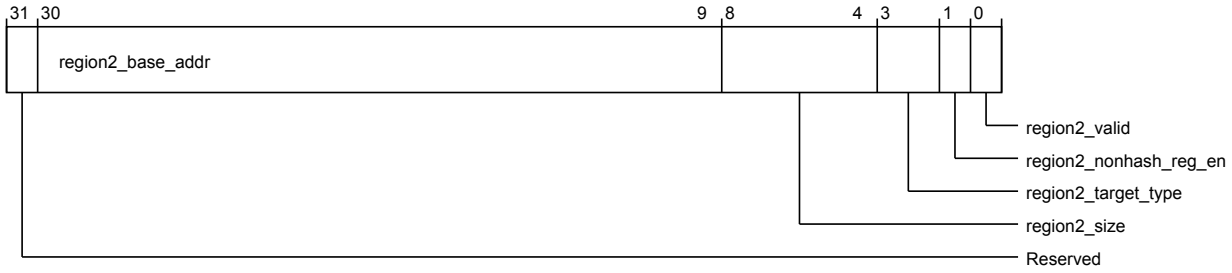

Figure 3-921 por_rnsam_sys_cache_grp_region1 (low)

The following table shows the sys_cache_grp_region1 lower register bit assignments.

Table 3-935 por_rnsam_sys_cache_grp_region1 (low)

Bits	Field name	Description	Type	Reset
31	Reserved	Reserved	RO	-
30:9	region2_base_addr	Bits [47:26] of base address of the range CONSTRAINT: Must be an integer multiple of region 2 size	RW	22'b0000000000000000000000
8:4	region2_size	Memory region 2 size CONSTRAINT: Memory region must be a power of two, from minimum size supported to maximum memory size (2^address width).	RW	5'b00000
3:2	region2_target_type	Indicates node type 2'b00: HN-F 2'b01: HN-I 2'b10: CXRA 2'b11: Reserved CONSTRAINT: Only applicable for RN-I	RW	2'b00
1	region2_nonhash_reg_en	Enables hashed region 2 to select non-hashed node	RW	1'b0
0	region2_valid	Memory region 2 valid 1'b0: Not valid 1'b1: Valid for memory region comparison	RW	1'b0

sys_cache_grp_hn_nodeid_reg0

Configures hashed node IDs for system cache groups. Controls target HN node IDs 0 to 3.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hC58
Register reset 64'b0

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Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

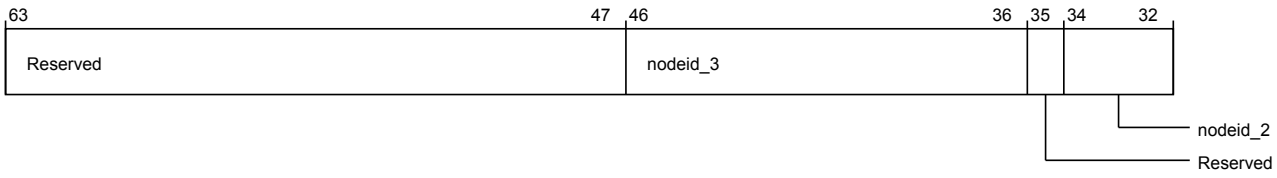

Figure 3-922 por_rnsam_sys_cache_grp_hn_nodeid_reg0 (high)

The following table shows the sys_cache_grp_hn_nodeid_reg0 higher register bit assignments.

Table 3-936 por_rnsam_sys_cache_grp_hn_nodeid_reg0 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	nodeid_3	Hashed target node ID 3	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	nodeid_2	Hashed target node ID 2	RW	11'b00000000000

The following image shows the lower register bit assignments.

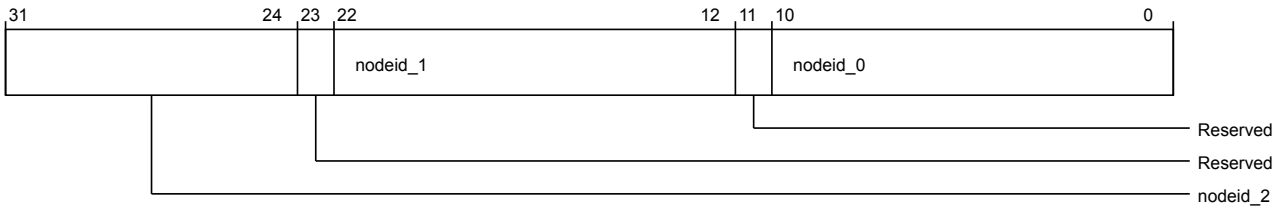

Figure 3-923 por_rnsam_sys_cache_grp_hn_nodeid_reg0 (low)

The following table shows the sys_cache_grp_hn_nodeid_reg0 lower register bit assignments.

Table 3-937 por_rnsam_sys_cache_grp_hn_nodeid_reg0 (low)

Bits	Field name	Description	Type	Reset
31:24	nodeid_2	Hashed target node ID 2	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	nodeid_1	Hashed target node ID 1	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	nodeid_0	Hashed target node ID 0	RW	11'b00000000000

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sys_cache_grp_hn_nodeid_reg1

Configures hashed node IDs for system cache groups. Controls target HN node IDs 4 to 7.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC60

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

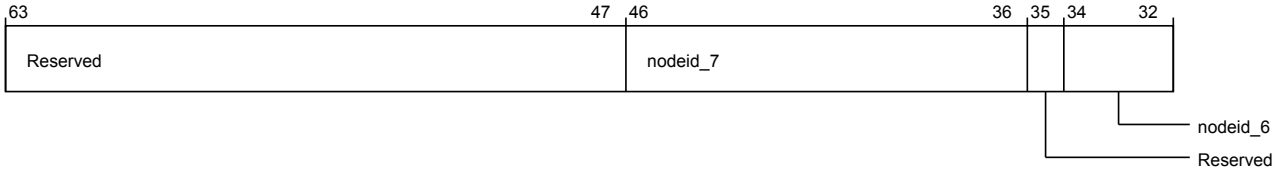

Figure 3-924 por_rnsam_sys_cache_grp_hn_nodeid_reg1 (high)

The following table shows the sys_cache_grp_hn_nodeid_reg1 higher register bit assignments.

Table 3-938 por_rnsam_sys_cache_grp_hn_nodeid_reg1 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	nodeid_7	Hashed target node ID 7	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	nodeid_6	Hashed target node ID 6	RW	11'b00000000000

The following image shows the lower register bit assignments.

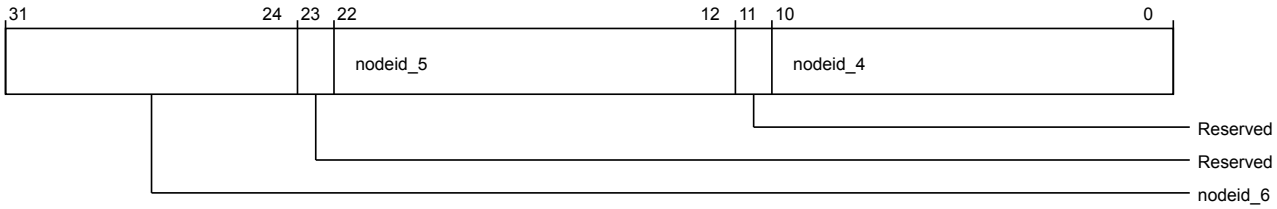

Figure 3-925 por_rnsam_sys_cache_grp_hn_nodeid_reg1 (low)

The following table shows the sys_cache_grp_hn_nodeid_reg1 lower register bit assignments.

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Table 3-939 por_rnsam_sys_cache_grp_hn_nodeid_reg1 (low)

Bits	Field name	Description	Type	Reset
31:24	nodeid_6	Hashed target node ID 6	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	nodeid_5	Hashed target node ID 5	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	nodeid_4	Hashed target node ID 4	RW	11'b00000000000

sys_cache_grp_hn_nodeid_reg2

Configures hashed node IDs for system cache groups. Controls target HN node IDs 8 to 11.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC68

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

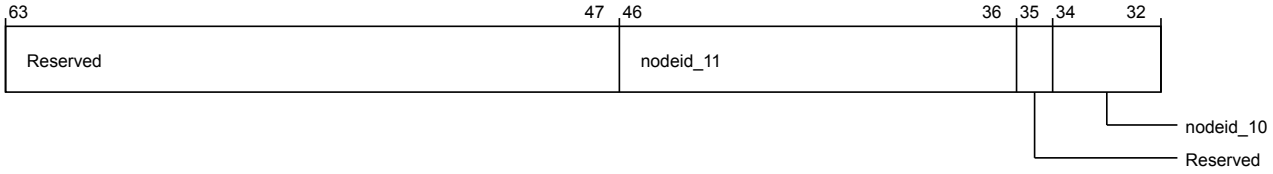

Figure 3-926 por_rnsam_sys_cache_grp_hn_nodeid_reg2 (high)

The following table shows the sys_cache_grp_hn_nodeid_reg2 higher register bit assignments.

Table 3-940 por_rnsam_sys_cache_grp_hn_nodeid_reg2 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	nodeid_11	Hashed target node ID 11	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	nodeid_10	Hashed target node ID 10	RW	11'b00000000000

The following image shows the lower register bit assignments.

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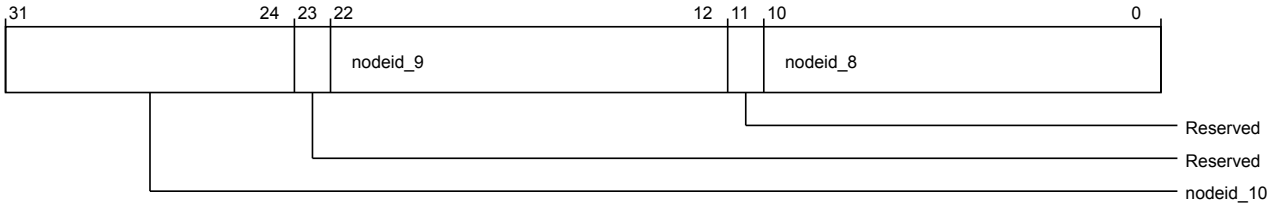

Figure 3-927 por_rnsam_sys_cache_grp_hn_nodeid_reg2 (low)

The following table shows the sys_cache_grp_hn_nodeid_reg2 lower register bit assignments.

Table 3-941 por_rnsam_sys_cache_grp_hn_nodeid_reg2 (low)

Bits	Field name	Description	Type	Reset
31:24	nodeid_10	Hashed target node ID 10	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	nodeid_9	Hashed target node ID 9	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	nodeid_8	Hashed target node ID 8	RW	11'b00000000000

sys_cache_grp_hn_nodeid_reg3

Configures hashed node IDs for system cache groups. Controls target HN node IDs 12 to 15.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC70

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

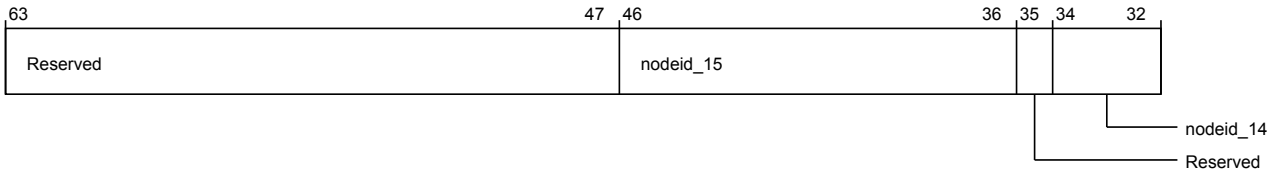

Figure 3-928 por_rnsam_sys_cache_grp_hn_nodeid_reg3 (high)

The following table shows the sys_cache_grp_hn_nodeid_reg3 higher register bit assignments.

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Table 3-942 por_rnsam_sys_cache_grp_hn_nodeid_reg3 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	nodeid_15	Hashed target node ID 15	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	nodeid_14	Hashed target node ID 14	RW	11'b00000000000

The following image shows the lower register bit assignments.

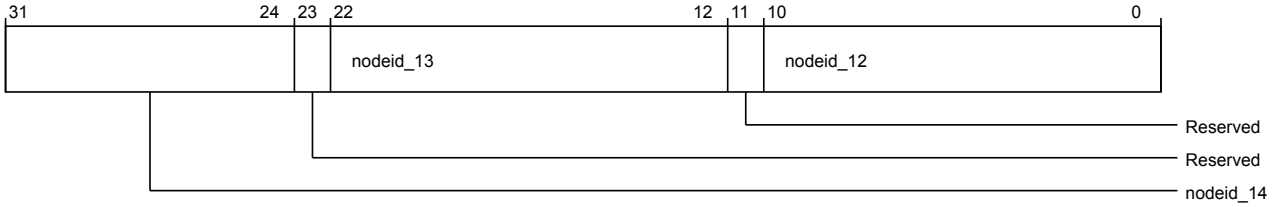

Figure 3-929 por_rnsam_sys_cache_grp_hn_nodeid_reg3 (low)

The following table shows the sys_cache_grp_hn_nodeid_reg3 lower register bit assignments.

Table 3-943 por_rnsam_sys_cache_grp_hn_nodeid_reg3 (low)

Bits	Field name	Description	Type	Reset
31:24	nodeid_14	Hashed target node ID 14	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	nodeid_13	Hashed target node ID 13	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	nodeid_12	Hashed target node ID 12	RW	11'b00000000000

sys_cache_grp_hn_nodeid_reg4

Configures hashed node IDs for system cache groups. Controls target HN node IDs 16 to 19.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC78

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

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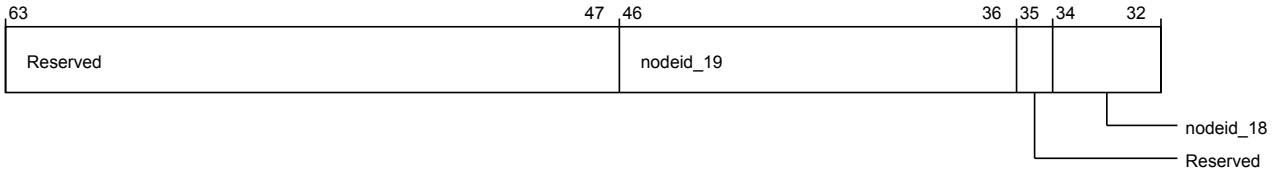

Figure 3-930 por_rnsam_sys_cache_grp_hn_nodeid_reg4 (high)

The following table shows the sys_cache_grp_hn_nodeid_reg4 higher register bit assignments.

Table 3-944 por_rnsam_sys_cache_grp_hn_nodeid_reg4 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	nodeid_19	Hashed target node ID 19	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	nodeid_18	Hashed target node ID 18	RW	11'b00000000000

The following image shows the lower register bit assignments.

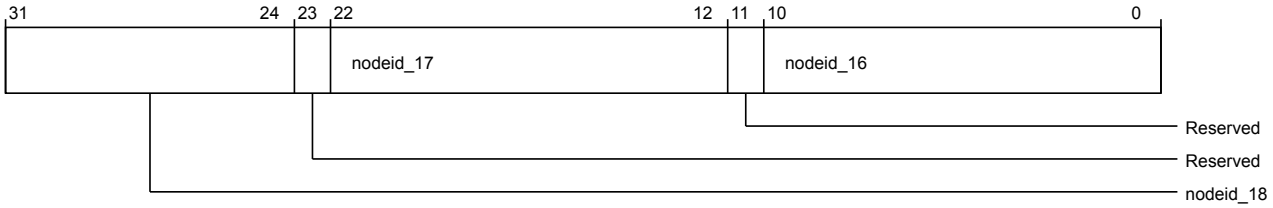

Figure 3-931 por_rnsam_sys_cache_grp_hn_nodeid_reg4 (low)

The following table shows the sys_cache_grp_hn_nodeid_reg4 lower register bit assignments.

Table 3-945 por_rnsam_sys_cache_grp_hn_nodeid_reg4 (low)

Bits	Field name	Description	Type	Reset
31:24	nodeid_18	Hashed target node ID 18	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	nodeid_17	Hashed target node ID 17	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	nodeid_16	Hashed target node ID 16	RW	11'b00000000000

sys_cache_grp_hn_nodeid_reg5

Configures hashed node IDs for system cache groups. Controls target HN node IDs 20 to 23.

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Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC80

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

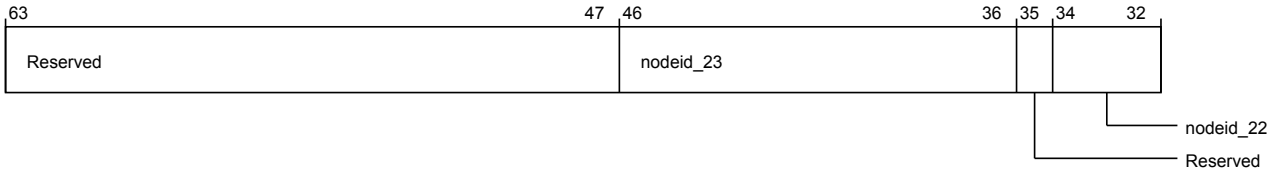

Figure 3-932 por_rnsam_sys_cache_grp_hn_nodeid_reg5 (high)

The following table shows the sys_cache_grp_hn_nodeid_reg5 higher register bit assignments.

Table 3-946 por_rnsam_sys_cache_grp_hn_nodeid_reg5 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	nodeid_23	Hashed target node ID 23	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	nodeid_22	Hashed target node ID 22	RW	11'b00000000000

The following image shows the lower register bit assignments.

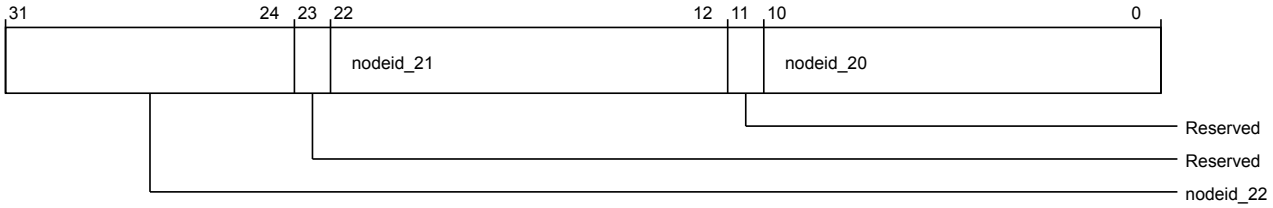

Figure 3-933 por_rnsam_sys_cache_grp_hn_nodeid_reg5 (low)

The following table shows the sys_cache_grp_hn_nodeid_reg5 lower register bit assignments.

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Table 3-947 por_rnsam_sys_cache_grp_hn_nodeid_reg5 (low)

Bits	Field name	Description	Type	Reset
31:24	nodeid_22	Hashed target node ID 22	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	nodeid_21	Hashed target node ID 21	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	nodeid_20	Hashed target node ID 20	RW	11'b00000000000

sys_cache_grp_hn_nodeid_reg6

Configures hashed node IDs for system cache groups. Controls target HN node IDs 24 to 27.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC88

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

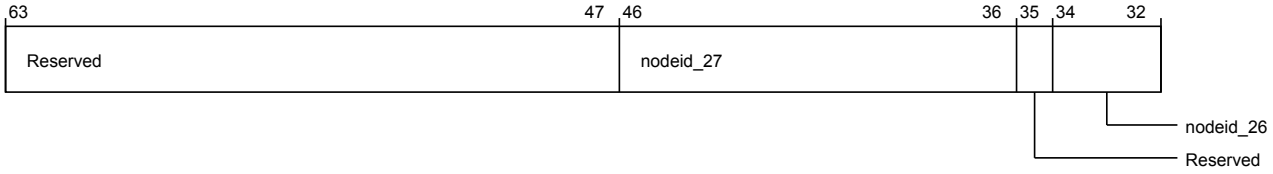

Figure 3-934 por_rnsam_sys_cache_grp_hn_nodeid_reg6 (high)

The following table shows the sys_cache_grp_hn_nodeid_reg6 higher register bit assignments.

Table 3-948 por_rnsam_sys_cache_grp_hn_nodeid_reg6 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	nodeid_27	Hashed target node ID 27	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	nodeid_26	Hashed target node ID 26	RW	11'b00000000000

The following image shows the lower register bit assignments.

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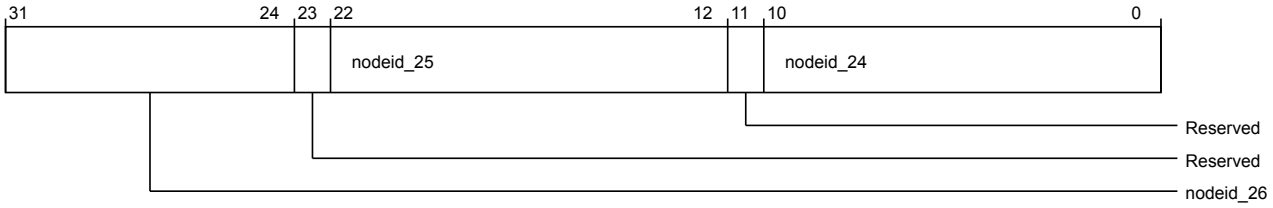

Figure 3-935 por_rnsam_sys_cache_grp_hn_nodeid_reg6 (low)

The following table shows the sys_cache_grp_hn_nodeid_reg6 lower register bit assignments.

Table 3-949 por_rnsam_sys_cache_grp_hn_nodeid_reg6 (low)

Bits	Field name	Description	Type	Reset
31:24	nodeid_26	Hashed target node ID 26	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	nodeid_25	Hashed target node ID 25	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	nodeid_24	Hashed target node ID 24	RW	11'b00000000000

sys_cache_grp_hn_nodeid_reg7

Configures hashed node IDs for system cache groups. Controls target HN node IDs 28 to 31.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC90

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

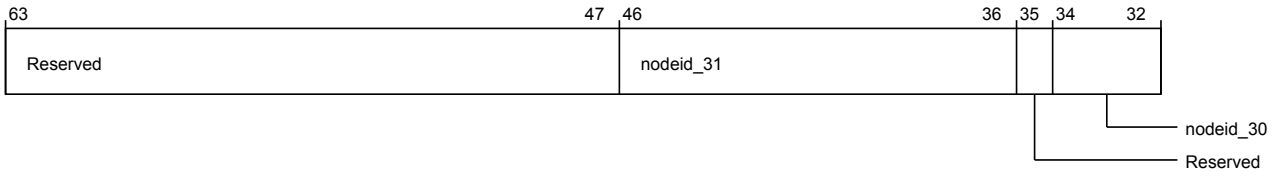

Figure 3-936 por_rnsam_sys_cache_grp_hn_nodeid_reg7 (high)

The following table shows the sys_cache_grp_hn_nodeid_reg7 higher register bit assignments.

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Table 3-950 por_rnsam_sys_cache_grp_hn_nodeid_reg7 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	nodeid_31	Hashed target node ID 31	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	nodeid_30	Hashed target node ID 30	RW	11'b00000000000

The following image shows the lower register bit assignments.

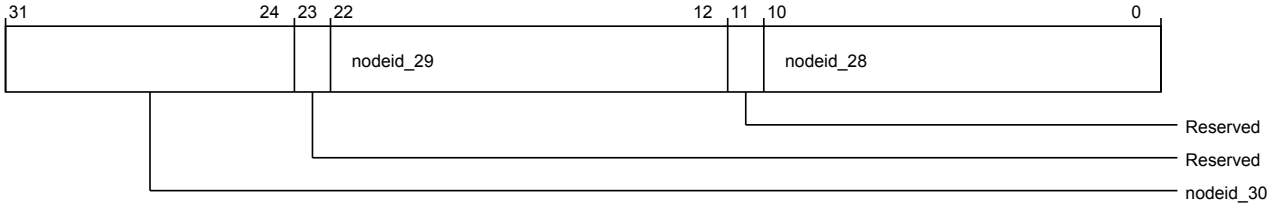

Figure 3-937 por_rnsam_sys_cache_grp_hn_nodeid_reg7 (low)

The following table shows the sys_cache_grp_hn_nodeid_reg7 lower register bit assignments.

Table 3-951 por_rnsam_sys_cache_grp_hn_nodeid_reg7 (low)

Bits	Field name	Description	Type	Reset
31:24	nodeid_30	Hashed target node ID 30	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	nodeid_29	Hashed target node ID 29	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	nodeid_28	Hashed target node ID 28	RW	11'b00000000000

sys_cache_grp_nonhash_nodeid

Configures non-hashed node IDs for system cache groups 1 to 3. NOTE: Only applicable in the non-hashed mode.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC98

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

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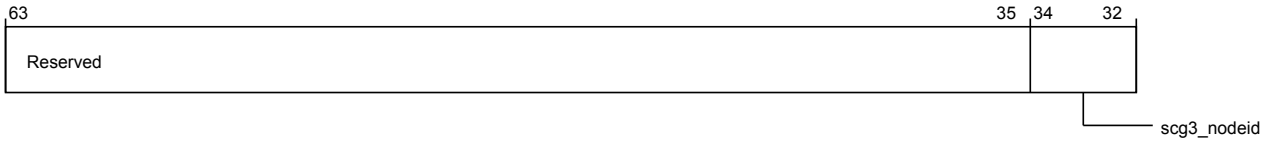

Figure 3-938 por_rnsam_sys_cache_grp_nonhash_nodeid (high)

The following table shows the sys_cache_grp_nonhash_nodeid higher register bit assignments.

Table 3-952 por_rnsam_sys_cache_grp_nonhash_nodeid (high)

Bits	Field name	Description	Type	Reset
63:35	Reserved	Reserved	RO	-
34:32	scg3_nodeid	Non-hashed node ID for system cache group 3	RW	11'b00000000000

The following image shows the lower register bit assignments.

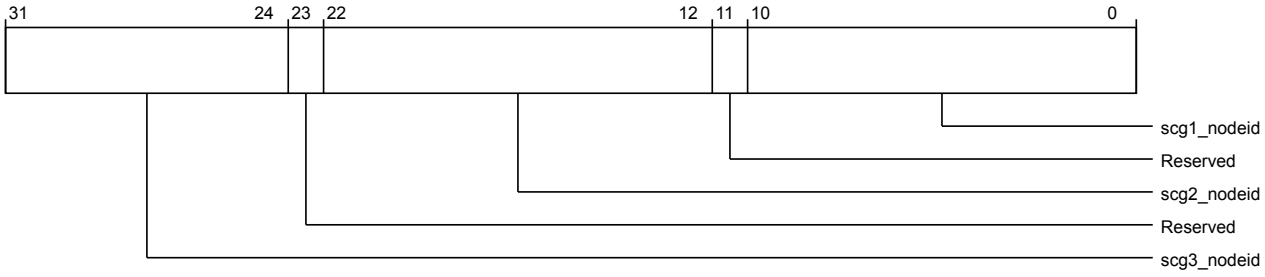

Figure 3-939 por_rnsam_sys_cache_grp_nonhash_nodeid (low)

The following table shows the sys_cache_grp_nonhash_nodeid lower register bit assignments.

Table 3-953 por_rnsam_sys_cache_grp_nonhash_nodeid (low)

Bits	Field name	Description	Type	Reset
31:24	scg3_nodeid	Non-hashed node ID for system cache group 3	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	scg2_nodeid	Non-hashed node ID for system cache group 2	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	scg1_nodeid	Non-hashed node ID for system cache group 1	RW	11'b00000000000

sys_cache_group_hn_count

Indicates number of HN-Fs in system cache groups 0 to 3.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hD00

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Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

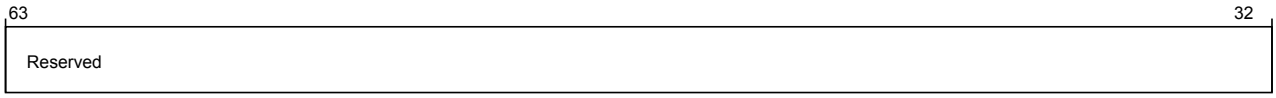

Figure 3-940 por_rnsam_sys_cache_group_hn_count (high)

The following table shows the sys_cache_group_hn_count higher register bit assignments.

Table 3-954 por_rnsam_sys_cache_group_hn_count (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

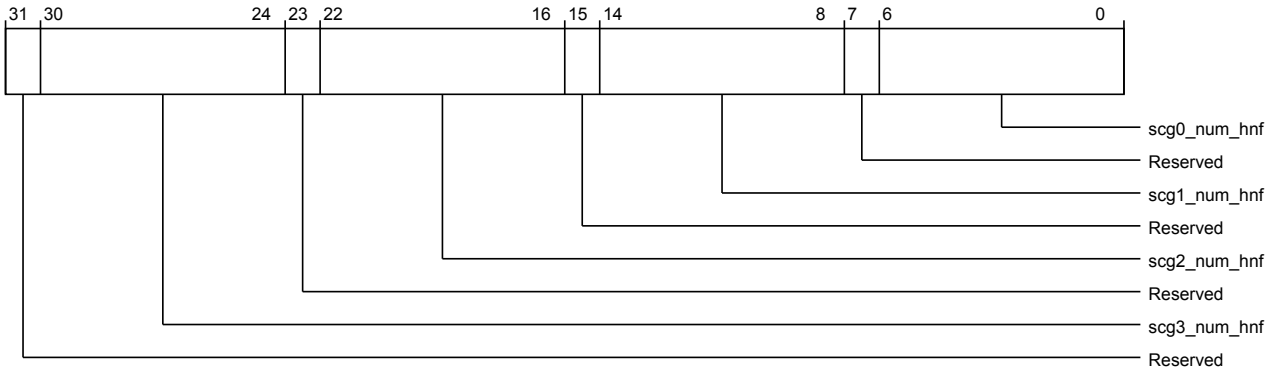

Figure 3-941 por_rnsam_sys_cache_group_hn_count (low)

The following table shows the sys_cache_group_hn_count lower register bit assignments.

Table 3-955 por_rnsam_sys_cache_group_hn_count (low)

Bits	Field name	Description	Type	Reset
31	Reserved	Reserved	RO	-
30:24	scg3_num_hnf	HN-F count for system cache group 3	RW	7'b00000
23	Reserved	Reserved	RO	-
22:16	scg2_num_hnf	HN-F count for system cache group 2	RW	7'b00000
15	Reserved	Reserved	RO	-
14:8	scg1_num_hnf	HN-F count for system cache group 1	RW	7'b00000

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Table 3-955 por_rnsam_sys_cache_group_hn_count (low) (continued)

Bits	Field name	Description	Type	Reset
7	Reserved	Reserved	RO	-
6:0	scg0_num_hnf	HN-F count for system cache group 0	RW	7'b00000

sys_cache_grp_sn_nodeid_reg0

Configures hashed node IDs for system cache groups. Controls target SN node IDs 0 to 3.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD08

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

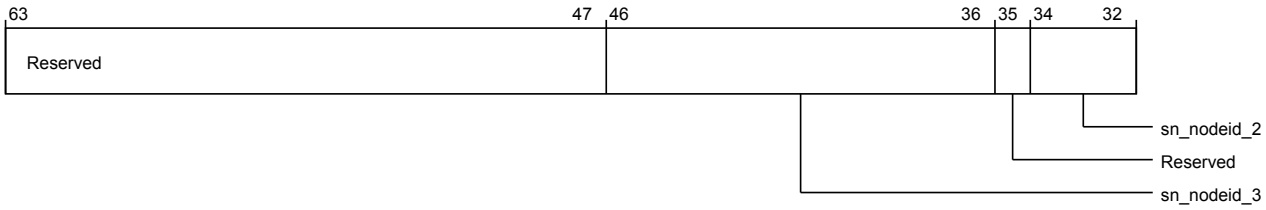

Figure 3-942 por_rnsam_sys_cache_grp_sn_nodeid_reg0 (high)

The following table shows the sys_cache_grp_sn_nodeid_reg0 higher register bit assignments.

Table 3-956 por_rnsam_sys_cache_grp_sn_nodeid_reg0 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	sn_nodeid_3	Hashed target SN node ID 3	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	sn_nodeid_2	Hashed target SN node ID 2	RW	11'b00000000000

The following image shows the lower register bit assignments.

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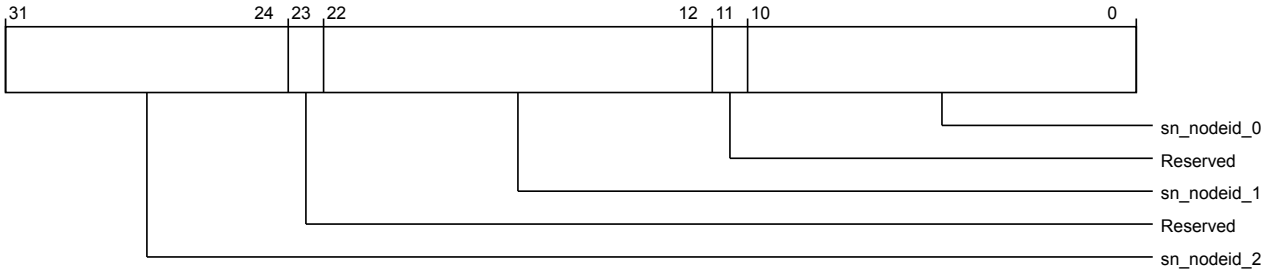

Figure 3-943 por_rnsam_sys_cache_grp_sn_nodeid_reg0 (low)

The following table shows the sys_cache_grp_sn_nodeid_reg0 lower register bit assignments.

Table 3-957 por_rnsam_sys_cache_grp_sn_nodeid_reg0 (low)

Bits	Field name	Description	Type	Reset
31:24	sn_nodeid_2	Hashed target SN node ID 2	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	sn_nodeid_1	Hashed target SN node ID 1	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	sn_nodeid_0	Hashed target SN node ID 0	RW	11'b00000000000

sys_cache_grp_sn_nodeid_reg1

Configures hashed node IDs for system cache groups. Controls target SN node IDs 4 to 7.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD10

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

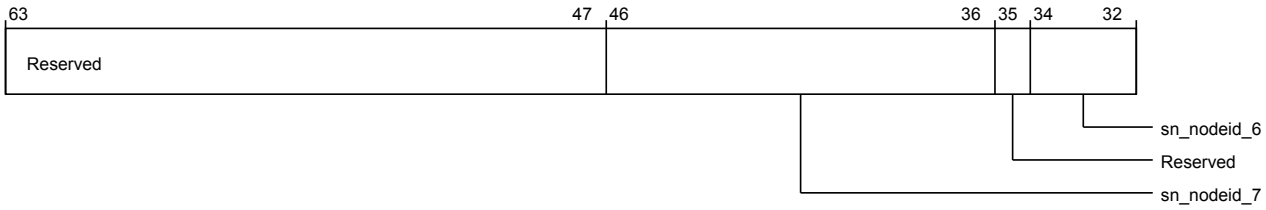

Figure 3-944 por_rnsam_sys_cache_grp_sn_nodeid_reg1 (high)

The following table shows the sys_cache_grp_sn_nodeid_reg1 higher register bit assignments.

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Table 3-958 por_rnsam_sys_cache_grp_sn_nodeid_reg1 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	sn_nodeid_7	Hashed target SN node ID 7	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	sn_nodeid_6	Hashed target SN node ID 6	RW	11'b00000000000

The following image shows the lower register bit assignments.

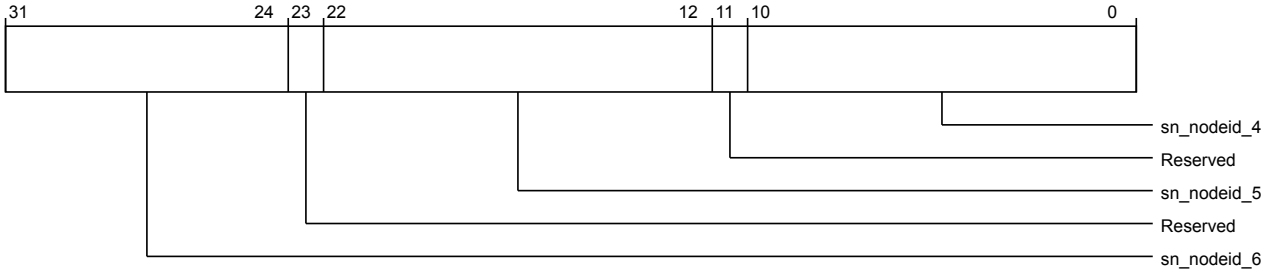

Figure 3-945 por_rnsam_sys_cache_grp_sn_nodeid_reg1 (low)

The following table shows the sys_cache_grp_sn_nodeid_reg1 lower register bit assignments.

Table 3-959 por_rnsam_sys_cache_grp_sn_nodeid_reg1 (low)

Bits	Field name	Description	Type	Reset
31:24	sn_nodeid_6	Hashed target SN node ID 6	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	sn_nodeid_5	Hashed target SN node ID 5	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	sn_nodeid_4	Hashed target SN node ID 4	RW	11'b00000000000

sys_cache_grp_sn_nodeid_reg2

Configures hashed node IDs for system cache groups. Controls target SN node IDs 8 to 11.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD18

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

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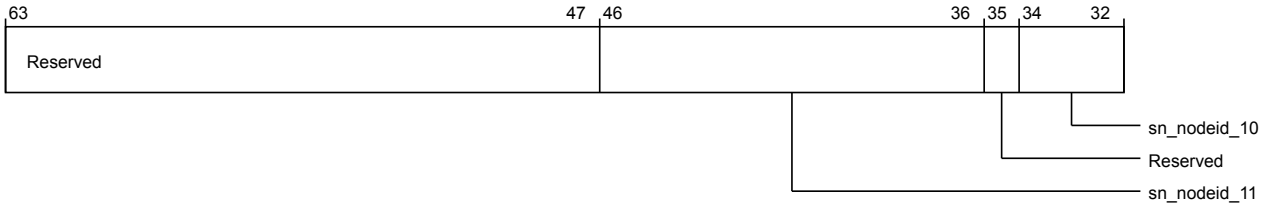

Figure 3-946 por_rnsam_sys_cache_grp_sn_nodeid_reg2 (high)

The following table shows the sys_cache_grp_sn_nodeid_reg2 higher register bit assignments.

Table 3-960 por_rnsam_sys_cache_grp_sn_nodeid_reg2 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	sn_nodeid_11	Hashed target SN node ID 11	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	sn_nodeid_10	Hashed target SN node ID 10	RW	11'b00000000000

The following image shows the lower register bit assignments.

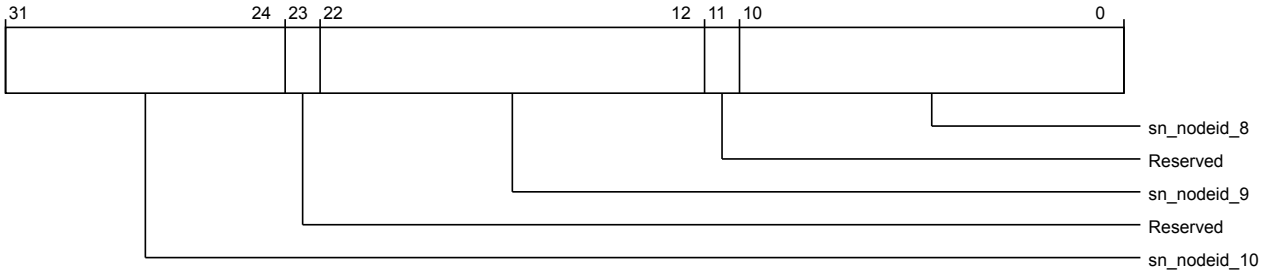

Figure 3-947 por_rnsam_sys_cache_grp_sn_nodeid_reg2 (low)

The following table shows the sys_cache_grp_sn_nodeid_reg2 lower register bit assignments.

Table 3-961 por_rnsam_sys_cache_grp_sn_nodeid_reg2 (low)

Bits	Field name	Description	Type	Reset
31:24	sn_nodeid_10	Hashed target SN node ID 10	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	sn_nodeid_9	Hashed target SN node ID 9	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	sn_nodeid_8	Hashed target SN node ID 8	RW	11'b00000000000

sys_cache_grp_sn_nodeid_reg3

Configures hashed node IDs for system cache groups. Controls target SN node IDs 12 to 15.

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Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD20

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

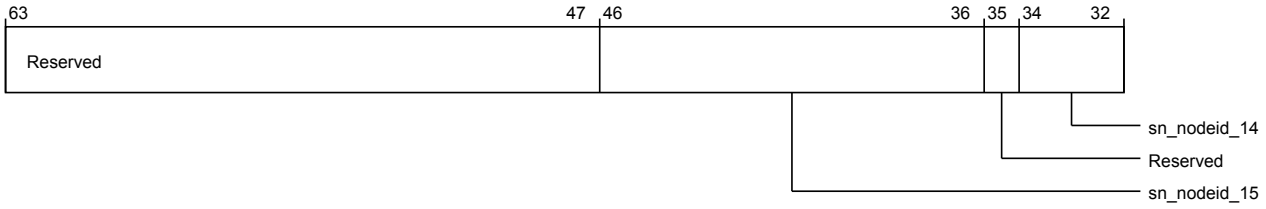

Figure 3-948 por_rnsam_sys_cache_grp_sn_nodeid_reg3 (high)

The following table shows the sys_cache_grp_sn_nodeid_reg3 higher register bit assignments.

Table 3-962 por_rnsam_sys_cache_grp_sn_nodeid_reg3 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	sn_nodeid_15	Hashed target SN node ID 15	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	sn_nodeid_14	Hashed target SN node ID 14	RW	11'b00000000000

The following image shows the lower register bit assignments.

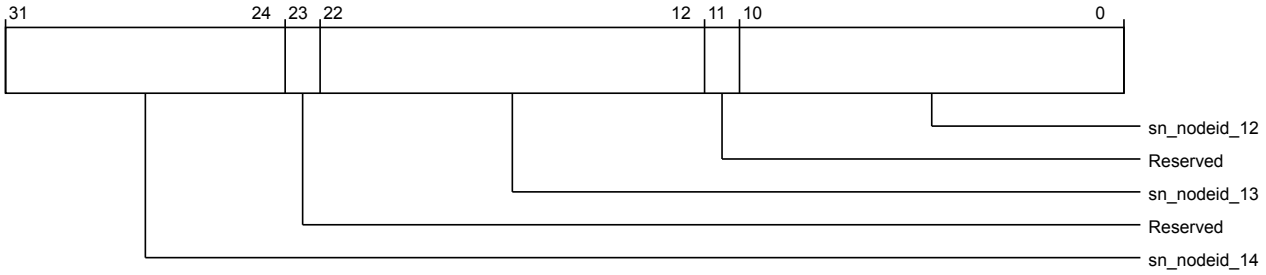

Figure 3-949 por_rnsam_sys_cache_grp_sn_nodeid_reg3 (low)

The following table shows the sys_cache_grp_sn_nodeid_reg3 lower register bit assignments.

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Table 3-963 por_rnsam_sys_cache_grp_sn_nodeid_reg3 (low)

Bits	Field name	Description	Type	Reset
31:24	sn_nodeid_14	Hashed target SN node ID 14	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	sn_nodeid_13	Hashed target SN node ID 13	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	sn_nodeid_12	Hashed target SN node ID 12	RW	11'b00000000000

sys_cache_grp_sn_nodeid_reg4

Configures hashed node IDs for system cache groups. Controls target SN node IDs 16 to 19.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD28

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

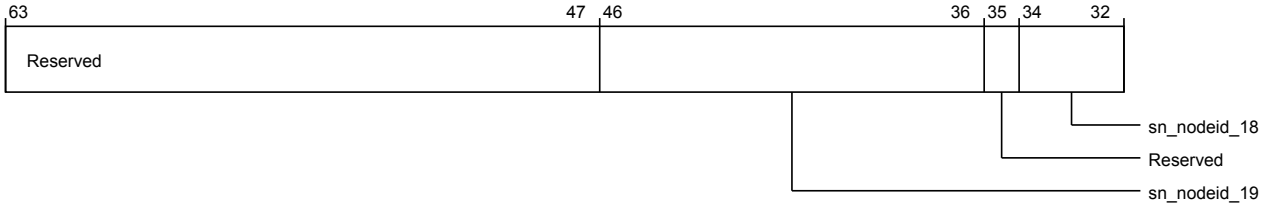

Figure 3-950 por_rnsam_sys_cache_grp_sn_nodeid_reg4 (high)

The following table shows the sys_cache_grp_sn_nodeid_reg4 higher register bit assignments.

Table 3-964 por_rnsam_sys_cache_grp_sn_nodeid_reg4 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	sn_nodeid_19	Hashed target SN node ID 19	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	sn_nodeid_18	Hashed target SN node ID 18	RW	11'b00000000000

The following image shows the lower register bit assignments.

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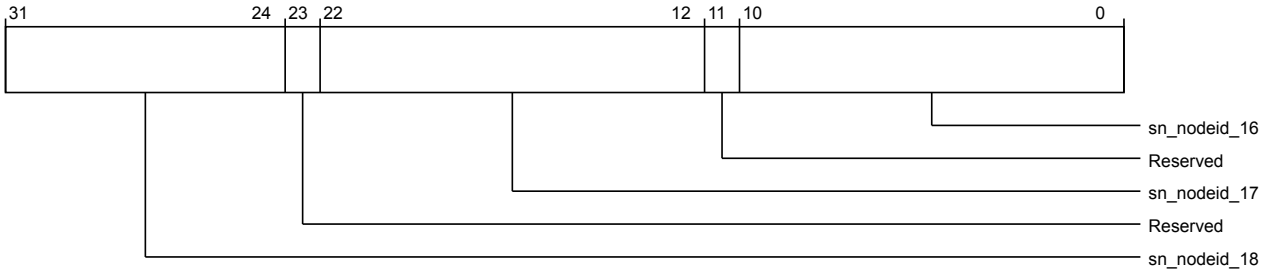

Figure 3-951 por_rnsam_sys_cache_grp_sn_nodeid_reg4 (low)

The following table shows the sys_cache_grp_sn_nodeid_reg4 lower register bit assignments.

Table 3-965 por_rnsam_sys_cache_grp_sn_nodeid_reg4 (low)

Bits	Field name	Description	Type	Reset
31:24	sn_nodeid_18	Hashed target SN node ID 18	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	sn_nodeid_17	Hashed target SN node ID 17	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	sn_nodeid_16	Hashed target SN node ID 16	RW	11'b00000000000

sys_cache_grp_sn_nodeid_reg5

Configures hashed node IDs for system cache groups. Controls target SN node IDs 20 to 23.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD30

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

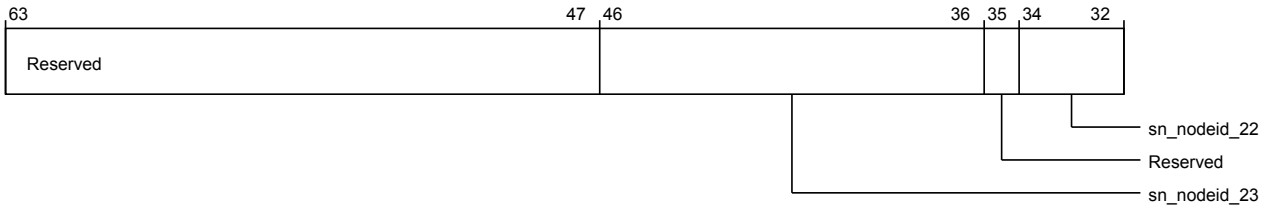

Figure 3-952 por_rnsam_sys_cache_grp_sn_nodeid_reg5 (high)

The following table shows the sys_cache_grp_sn_nodeid_reg5 higher register bit assignments.

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Table 3-966 por_rnsam_sys_cache_grp_sn_nodeid_reg5 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	sn_nodeid_23	Hashed target SN node ID 23	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	sn_nodeid_22	Hashed target SN node ID 22	RW	11'b00000000000

The following image shows the lower register bit assignments.

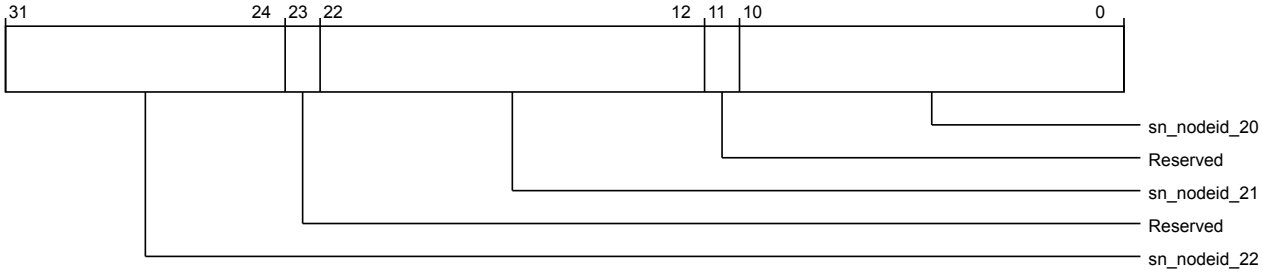

Figure 3-953 por_rnsam_sys_cache_grp_sn_nodeid_reg5 (low)

The following table shows the sys_cache_grp_sn_nodeid_reg5 lower register bit assignments.

Table 3-967 por_rnsam_sys_cache_grp_sn_nodeid_reg5 (low)

Bits	Field name	Description	Type	Reset
31:24	sn_nodeid_22	Hashed target SN node ID 22	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	sn_nodeid_21	Hashed target SN node ID 21	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	sn_nodeid_20	Hashed target SN node ID 20	RW	11'b00000000000

sys_cache_grp_sn_nodeid_reg6

Configures hashed node IDs for system cache groups. Controls target SN node IDs 24 to 27.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD38

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

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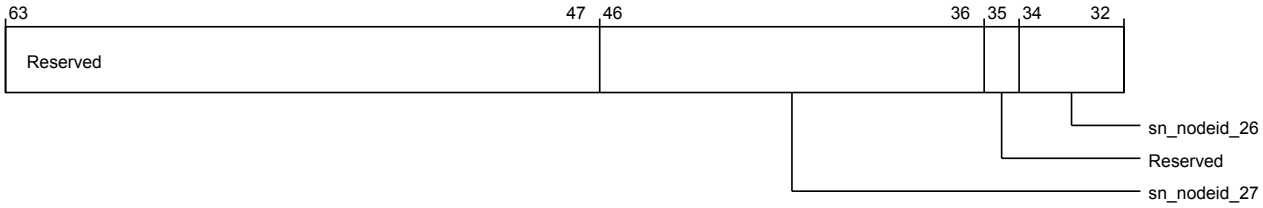

Figure 3-954 por_rnsam_sys_cache_grp_sn_nodeid_reg6 (high)

The following table shows the sys_cache_grp_sn_nodeid_reg6 higher register bit assignments.

Table 3-968 por_rnsam_sys_cache_grp_sn_nodeid_reg6 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	sn_nodeid_27	Hashed target SN node ID 27	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	sn_nodeid_26	Hashed target SN node ID 26	RW	11'b00000000000

The following image shows the lower register bit assignments.

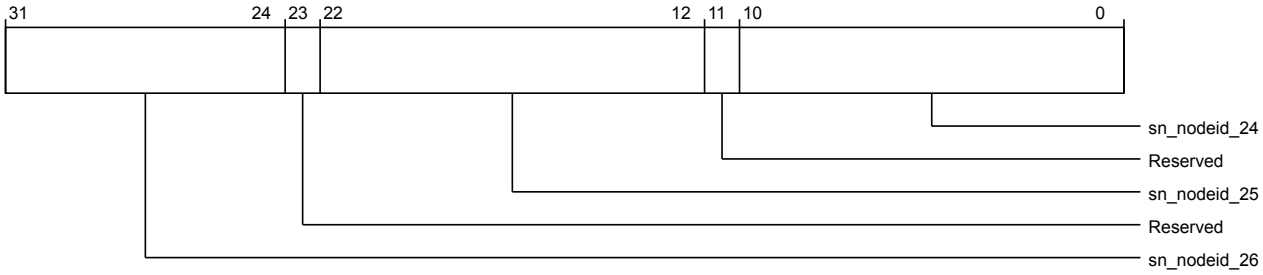

Figure 3-955 por_rnsam_sys_cache_grp_sn_nodeid_reg6 (low)

The following table shows the sys_cache_grp_sn_nodeid_reg6 lower register bit assignments.

Table 3-969 por_rnsam_sys_cache_grp_sn_nodeid_reg6 (low)

Bits	Field name	Description	Type	Reset
31:24	sn_nodeid_26	Hashed target SN node ID 26	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	sn_nodeid_25	Hashed target SN node ID 25	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	sn_nodeid_24	Hashed target SN node ID 24	RW	11'b00000000000

sys_cache_grp_sn_nodeid_reg7

Configures hashed node IDs for system cache groups. Controls target SN node IDs 28 to 31.

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Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD40

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

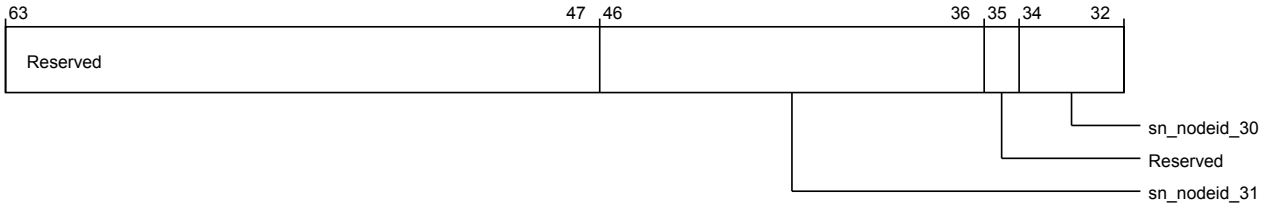

Figure 3-956 por_rnsam_sys_cache_grp_sn_nodeid_reg7 (high)

The following table shows the sys_cache_grp_sn_nodeid_reg7 higher register bit assignments.

Table 3-970 por_rnsam_sys_cache_grp_sn_nodeid_reg7 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	sn_nodeid_31	Hashed target SN node ID 31	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	sn_nodeid_30	Hashed target SN node ID 30	RW	11'b00000000000

The following image shows the lower register bit assignments.

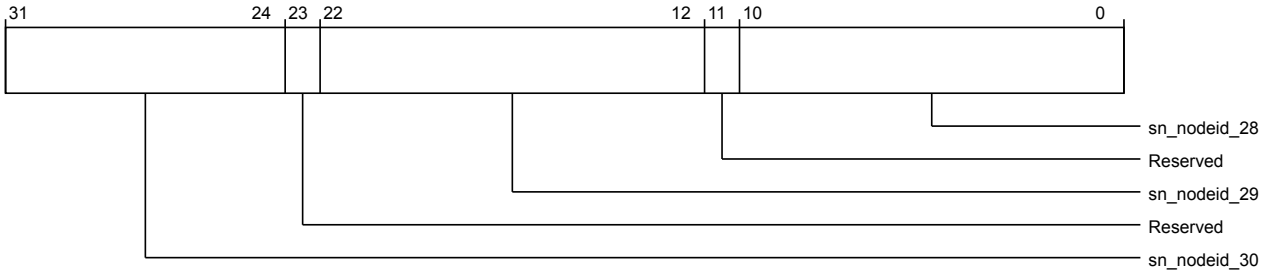

Figure 3-957 por_rnsam_sys_cache_grp_sn_nodeid_reg7 (low)

The following table shows the sys_cache_grp_sn_nodeid_reg7 lower register bit assignments.

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Table 3-971 por_rnsam_sys_cache_grp_sn_nodeid_reg7 (low)

Bits	Field name	Description	Type	Reset
31:24	sn_nodeid_30	Hashed target SN node ID 30	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	sn_nodeid_29	Hashed target SN node ID 29	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	sn_nodeid_28	Hashed target SN node ID 28	RW	11'b00000000000

sys_cache_grp_sn_sam_cfg0

Configures top address bits for SN SAM system cache groups 0 and 1. All top_address_bit fields must be between bits 47 and 28. top_address_bit2 > top_address_bit1 > top_address_bit0.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD48

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

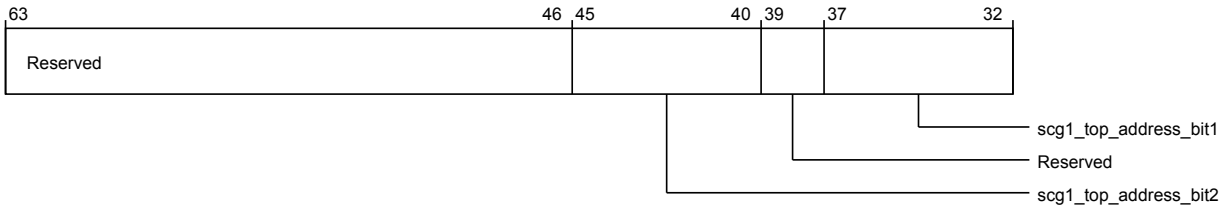

Figure 3-958 por_rnsam_sys_cache_grp_sn_sam_cfg0 (high)

The following table shows the sys_cache_grp_sn_sam_cfg0 higher register bit assignments.

Table 3-972 por_rnsam_sys_cache_grp_sn_sam_cfg0 (high)

Bits	Field name	Description	Type	Reset
63:46	Reserved	Reserved	RO	-
45:40	scg1_top_address_bit2	Top address bit 2 for system cache group 1	RW	6'h00
39:38	Reserved	Reserved	RO	-
37:32	scg1_top_address_bit1	Top address bit 1 for system cache group 1	RW	6'h00

The following image shows the lower register bit assignments.

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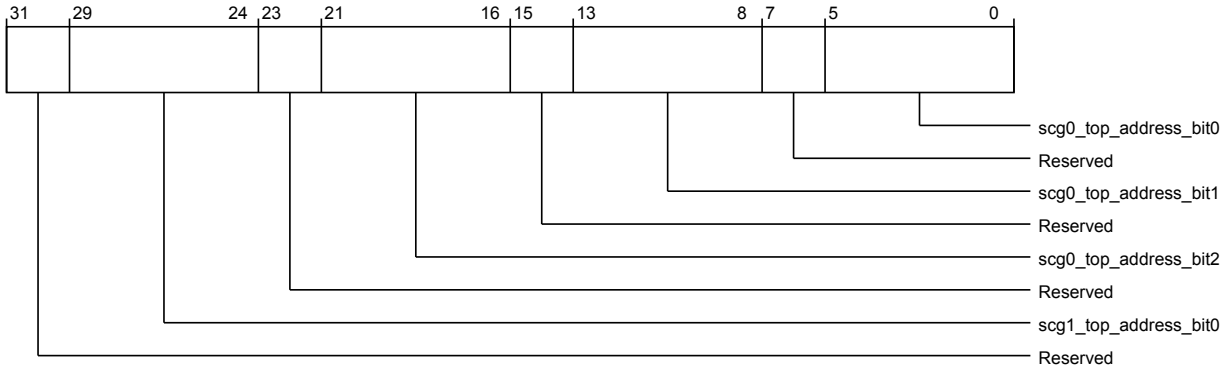

Figure 3-959 por_rnsam_sys_cache_grp_sn_sam_cfg0 (low)

The following table shows the sys_cache_grp_sn_sam_cfg0 lower register bit assignments.

Table 3-973 por_rnsam_sys_cache_grp_sn_sam_cfg0 (low)

Bits	Field name	Description	Type	Reset
31:30	Reserved	Reserved	RO	-
29:24	scg1_top_address_bit0	Top address bit 0 for system cache group 1	RW	6'h00
23:22	Reserved	Reserved	RO	-
21:16	scg0_top_address_bit2	Top address bit 2 for system cache group 0	RW	6'h00
15:14	Reserved	Reserved	RO	-
13:8	scg0_top_address_bit1	Top address bit 1 for system cache group 0	RW	6'h00
7:6	Reserved	Reserved	RO	-
5:0	scg0_top_address_bit0	Top address bit 0 for system cache group 0	RW	6'h00

sys_cache_grp_sn_sam_cfg1

Configures top address bits for SN SAM system cache groups 2 and 3. All top_address_bit fields must be between bits 47 and 28. top_address_bit2 andgt; top_address_bit1 andgt; top_address_bit0.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD50

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

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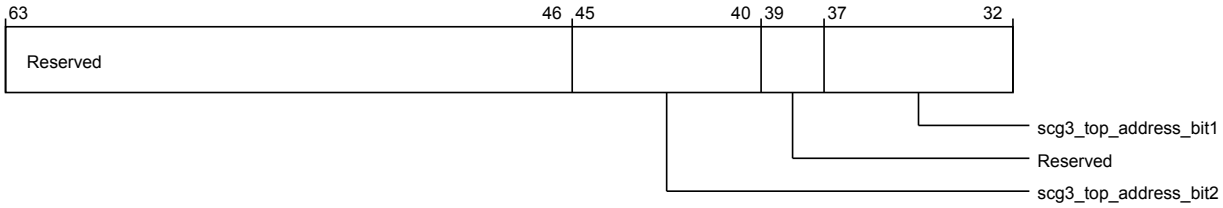

Figure 3-960 por_rnsam_sys_cache_grp_sn_sam_cfg1 (high)

The following table shows the sys_cache_grp_sn_sam_cfg1 higher register bit assignments.

Table 3-974 por_rnsam_sys_cache_grp_sn_sam_cfg1 (high)

Bits	Field name	Description	Type	Reset
63:46	Reserved	Reserved	RO	-
45:40	scg3_top_address_bit2	Top address bit 2 for system cache group 3	RW	6'h00
39:38	Reserved	Reserved	RO	-
37:32	scg3_top_address_bit1	Top address bit 1 for system cache group 3	RW	6'h00

The following image shows the lower register bit assignments.

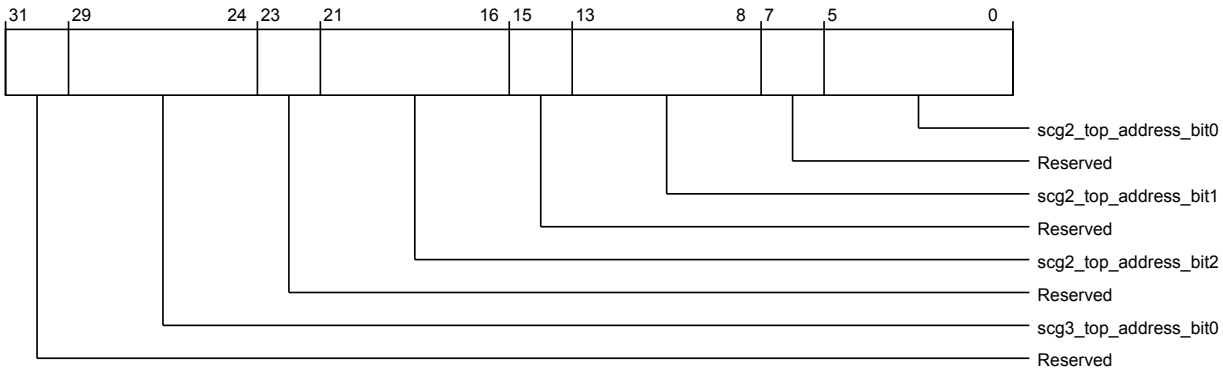

Figure 3-961 por_rnsam_sys_cache_grp_sn_sam_cfg1 (low)

The following table shows the sys_cache_grp_sn_sam_cfg1 lower register bit assignments.

Table 3-975 por_rnsam_sys_cache_grp_sn_sam_cfg1 (low)

Bits	Field name	Description	Type	Reset
31:30	Reserved	Reserved	RO	-
29:24	scg3_top_address_bit0	Top address bit 0 for system cache group 3	RW	6'h00
23:22	Reserved	Reserved	RO	-
21:16	scg2_top_address_bit2	Top address bit 2 for system cache group 2	RW	6'h00
15:14	Reserved	Reserved	RO	-

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Table 3-975 por_rnsam_sys_cache_grp_sn_sam_cfg1 (low) (continued)

Bits	Field name	Description	Type	Reset
13:8	scg2_top_address_bit1	Top address bit 1 for system cache group 2	RW	6'h00
7:6	Reserved	Reserved	RO	-
5:0	scg2_top_address_bit0	Top address bit 0 for system cache group 2	RW	6'h00

gic_mem_region_reg

Configures GIC memory region.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD58

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_rnsam_secure_register_groups_override.mem_range

The following image shows the higher register bit assignments.

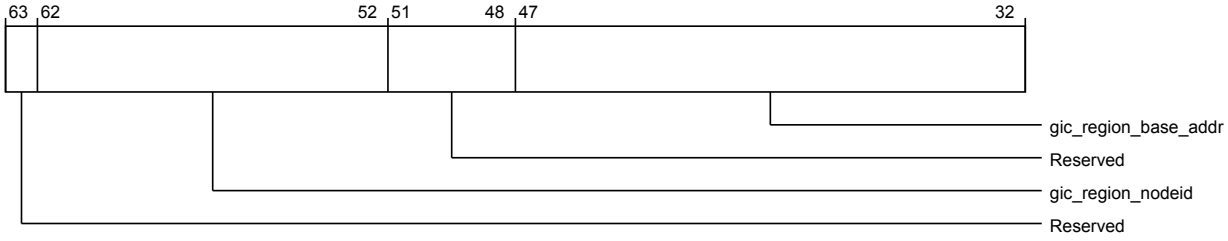

Figure 3-962 por_rnsam_gic_mem_region_reg (high)

The following table shows the gic_mem_region_reg higher register bit assignments.

Table 3-976 por_rnsam_gic_mem_region_reg (high)

Bits	Field name	Description	Type	Reset
63	Reserved	Reserved	RO	-
62:52	gic_region_nodeid	GIC node ID 30	RW	11'b00000000000
51:48	Reserved	Reserved	RO	-
47:32	gic_region_base_addr	Base address of the GIC memory region CONSTRAINT: Must be an integer multiple of region size	RW	32'h00000000

The following image shows the lower register bit assignments.

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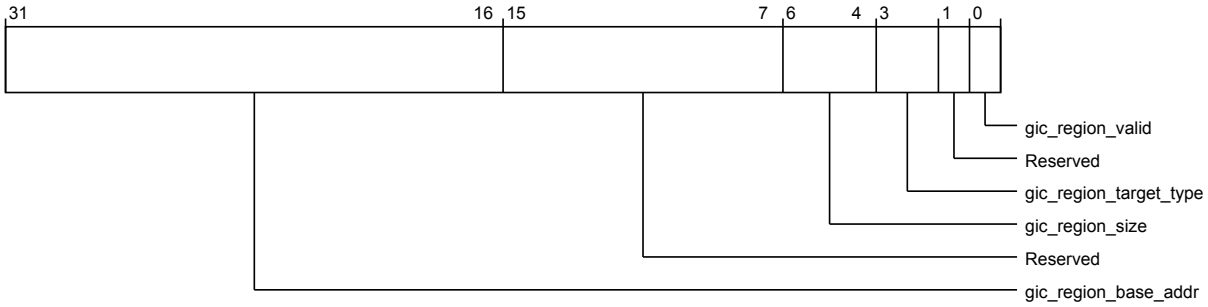

Figure 3-963 por_rnsam_gic_mem_region_reg (low)

The following table shows the gic_mem_region_reg lower register bit assignments.

Table 3-977 por_rnsam_gic_mem_region_reg (low)

Bits	Field name	Description	Type	Reset
31:16	gic_region_base_addr	Base address of the GIC memory region CONSTRAINT: Must be an integer multiple of region size	RW	32'h00000000
15:7	Reserved	Reserved	RO	-
6:4	gic_region_size	GIC memory region size 3'b000: 64KB 3'b001: 128KB 3'b010: 256KB 3'b011: 512KB CONSTRAINT: Memory region must be a power of 2.	RW	3'b000
3:2	gic_region_target_type	Indicates node type 2'b00: HN-F 2'b01: HN-I 2'b10: CXRA 2'b11: Reserved CONSTRAINT: Only applicable for RN-I	RW	2'b00
1	Reserved	Reserved	RO	-
0	gic_region_valid	Memory region 1 valid 1'b0: Not valid 1'b1: Valid for memory region comparison	RW	1'b0

sys_cache_grp_sn_attr

Configures attributes for SN node IDs for system cache groups.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hD60

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

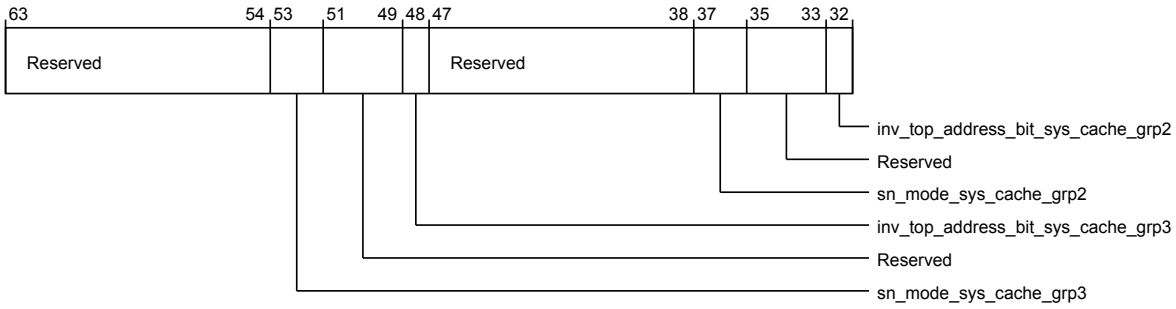

Figure 3-964 por_rnsam_sys_cache_grp_sn_attr (high)

The following table shows the sys_cache_grp_sn_attr higher register bit assignments.

Table 3-978 por_rnsam_sys_cache_grp_sn_attr (high)

Bits	Field name	Description	Type	Reset
63:54	Reserved	Reserved	RO	-
53:52	sn_mode_sys_cache_grp3	SN selection mode 2'b00: 1-SN mode (SN0) 2'b01: 3-SN mode (SN0, SN1, SN2) 2'b10: 6-SN mode (SN0, SN1, SN2, SN3, SN4, SN5) 2'b11: Reserved	RW	2'b0
51:49	Reserved	Reserved	RO	-
48	inv_top_address_bit_sys_cache_grp3	Inverts the top address bit (top_address_bit1 if 3-SN, top_address_bit2 if 6-SN); only used when the address map does not have unique address bit combinations	RW	1'h0
47:38	Reserved	Reserved	RO	-
37:36	sn_mode_sys_cache_grp2	SN selection mode 2'b00: 1-SN mode (SN0) 2'b01: 3-SN mode (SN0, SN1, SN2) 2'b10: 6-SN mode (SN0, SN1, SN2, SN3, SN4, SN5) 2'b11: Reserved	RW	2'b00

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Table 3-978 por_rnsam_sys_cache_grp_sn_attr (high) (continued)

Bits	Field name	Description	Type	Reset
35:33	Reserved	Reserved	RO	-
32	inv_top_address_bit_sys_cache_grp2	Inverts the top address bit (top_address_bit1 if 3-SN, top_address_bit2 if 6-SN); only used when the address map does not have unique address bit combinations	RW	1'h0

The following image shows the lower register bit assignments.

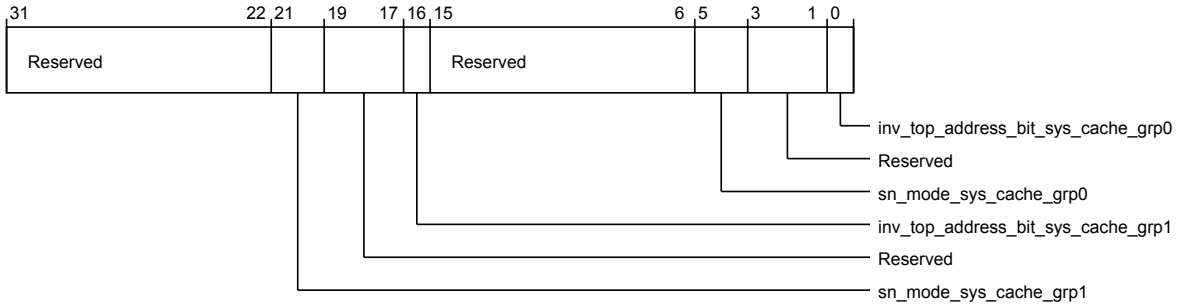

Figure 3-965 por_rnsam_sys_cache_grp_sn_attr (low)

The following table shows the sys_cache_grp_sn_attr lower register bit assignments.

Table 3-979 por_rnsam_sys_cache_grp_sn_attr (low)

Bits	Field name	Description	Type	Reset
31:22	Reserved	Reserved	RO	-
21:20	sn_mode_sys_cache_grp1	SN selection mode 2'b00: 1-SN mode (SN0) 2'b01: 3-SN mode (SN0, SN1, SN2) 2'b10: 6-SN mode (SN0, SN1, SN2, SN3, SN4, SN5) 2'b11: Reserved	RW	2'b0
19:17	Reserved	Reserved	RO	-
16	inv_top_address_bit_sys_cache_grp1	Inverts the top address bit (top_address_bit1 if 3-SN, top_address_bit2 if 6-SN); only used when the address map does not have unique address bit combinations	RW	1'h0
15:6	Reserved	Reserved	RO	-
5:4	sn_mode_sys_cache_grp0	SN selection mode 2'b00: 1-SN mode (SN0) 2'b01: 3-SN mode (SN0, SN1, SN2) 2'b10: 6-SN mode (SN0, SN1, SN2, SN3, SN4, SN5) 2'b11: Reserved	RW	2'b0

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Table 3-979 por_rnsam_sys_cache_grp_sn_attr (low) (continued)

Bits	Field name	Description	Type	Reset
3:1	Reserved	Reserved	RO	-
0	inv_top_address_bit_sys_cache_grp0	Inverts the top address bit (top_address_bit1 if 3-SN, top_address_bit2 if 6-SN); only used when the address map does not have unique address bit combinations	RW	1'h0

sys_cache_grp_hn_cpa_en_reg

Configures CCIX port aggregation mode for hashed HN node IDs

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD68

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

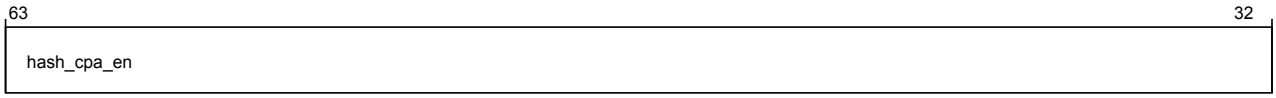

Figure 3-966 por_rnsam_sys_cache_grp_hn_cpa_en_reg (high)

The following table shows the sys_cache_grp_hn_cpa_en_reg higher register bit assignments.

Table 3-980 por_rnsam_sys_cache_grp_hn_cpa_en_reg (high)

Bits	Field name	Description	Type	Reset
63:32	hash_cpa_en	Enable CPA for each hashed node ID	RW	64'h0000000000000000

The following image shows the lower register bit assignments.

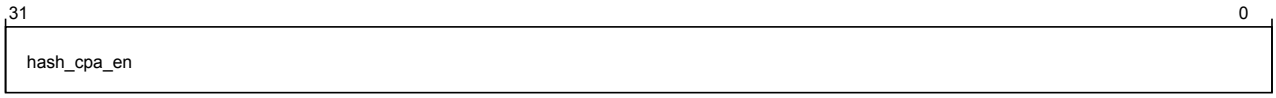

Figure 3-967 por_rnsam_sys_cache_grp_hn_cpa_en_reg (low)

The following table shows the sys_cache_grp_hn_cpa_en_reg lower register bit assignments.

Table 3-981 por_rnsam_sys_cache_grp_hn_cpa_en_reg (low)

Bits	Field name	Description	Type	Reset
31:0	hash_cpa_en	Enable CPA for each hashed node ID	RW	64'h0000000000000000

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sys_cache_grp_hn_cpa_grp_reg

Configures CCIX port aggregation group ID for each System Cache Group

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD70

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

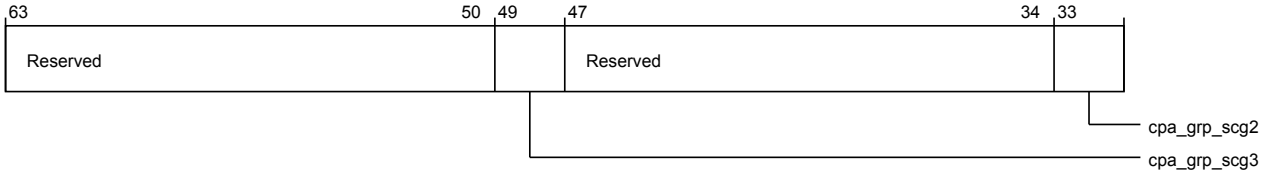

Figure 3-968 por_rnsam_sys_cache_grp_hn_cpa_grp_reg (high)

The following table shows the sys_cache_grp_hn_cpa_grp_reg higher register bit assignments.

Table 3-982 por_rnsam_sys_cache_grp_hn_cpa_grp_reg (high)

Bits	Field name	Description	Type	Reset
63:50	Reserved	Reserved	RO	-
49:48	cpa_grp_scg3	Specifies CCIX port aggregation group ID for System Cache Group 3 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'b00
47:34	Reserved	Reserved	RO	-
33:32	cpa_grp_scg2	Specifies CCIX port aggregation group ID for System Cache Group 2 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'b00

The following image shows the lower register bit assignments.

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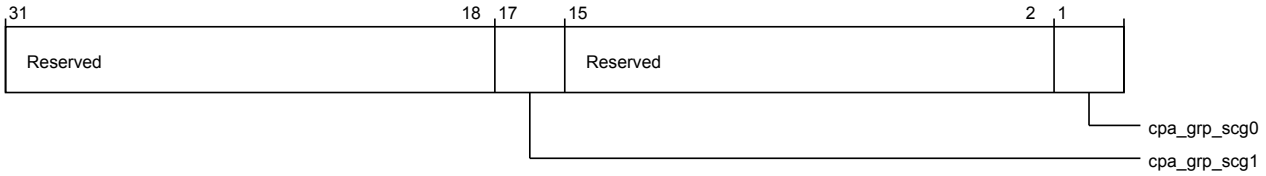

Figure 3-969 por_rnsam_sys_cache_grp_hn_cpa_grp_reg (low)

The following table shows the sys_cache_grp_hn_cpa_grp_reg lower register bit assignments.

Table 3-983 por_rnsam_sys_cache_grp_hn_cpa_grp_reg (low)

Bits	Field name	Description	Type	Reset
31:18	Reserved	Reserved	RO	-
17:16	cpa_grp_scg1	Specifies CCIX port aggregation group ID for System Cache Group 1 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'b00
15:2	Reserved	Reserved	RO	-
1:0	cpa_grp_scg0	Specifies CCIX port aggregation group ID for System Cache Group 0 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved	RW	2'b00

cml_port_aggr_mode_ctrl_reg

Configures the CCIX port aggregation modes for all non-hashed memory regions.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hE00
Register reset 64'b0
Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

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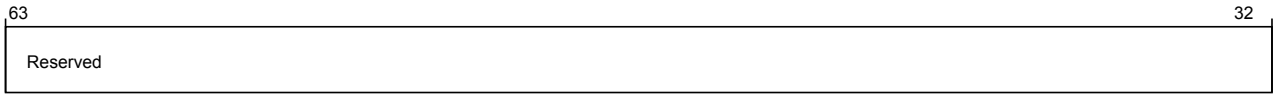

Figure 3-970 por_rnsam_cml_port_aggr_mode_ctrl_reg (high)

The following table shows the cml_port_aggr_mode_ctrl_reg higher register bit assignments.

Table 3-984 por_rnsam_cml_port_aggr_mode_ctrl_reg (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

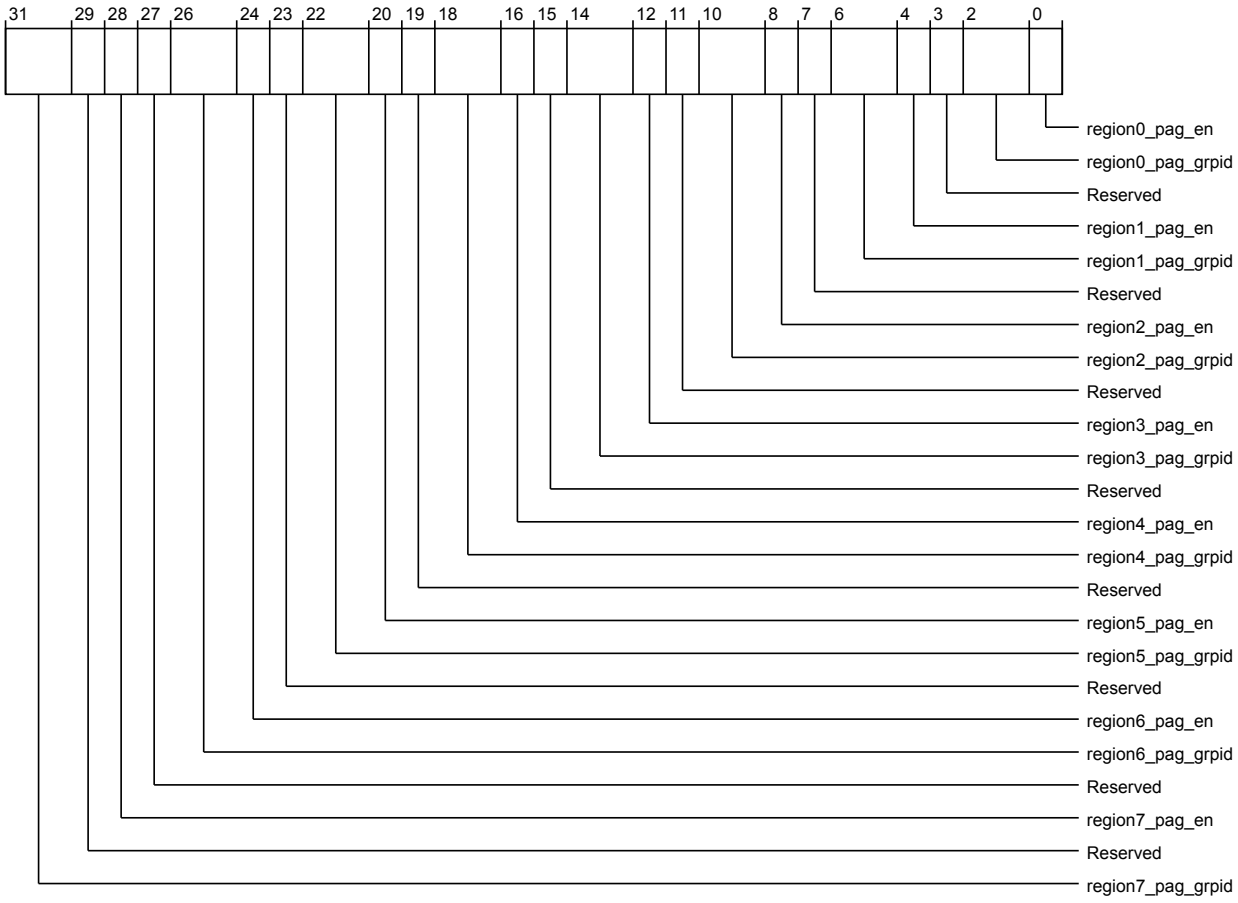

Figure 3-971 por_rnsam_cml_port_aggr_mode_ctrl_reg (low)

The following table shows the cml_port_aggr_mode_ctrl_reg lower register bit assignments.

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Table 3-985 por_rnsam_cml_port_aggr_mode_ctrl_reg (low)

Bits	Field name	Description	Type	Reset
31:30	region7_pag_grpid	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved7	RW	2'b0
29	Reserved	Reserved	RO	-
28	region7_pag_en	Enables the CPA mode for non-hashed memory region 7	RW	1'b0
27	Reserved	Reserved	RO	-
26:25	region6_pag_grpid	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved6	RW	2'b0
24	region6_pag_en	Enables the CPA mode for non-hashed memory region 6	RW	1'b0
23	Reserved	Reserved	RO	-
22:21	region5_pag_grpid	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved5	RW	2'b0
20	region5_pag_en	Enables the CPA mode for non-hashed memory region 5	RW	1'b0
19	Reserved	Reserved	RO	-
18:17	region4_pag_grpid	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved4	RW	2'b0
16	region4_pag_en	Enables the CPA mode for non-hashed memory region 4	RW	1'b0
15	Reserved	Reserved	RO	-

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Table 3-985 por_rnsam_cml_port_aggr_mode_ctrl_reg (low) (continued)

Bits	Field name	Description	Type	Reset
14:13	region3_pag_grpid	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved3	RW	2'b0
12	region3_pag_en	Enables the CPA mode for non-hashed memory region 3	RW	1'b0
11	Reserved	Reserved	RO	-
10:9	region2_pag_grpid	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved2	RW	2'b0
8	region2_pag_en	Enables the CPA mode for non-hashed memory region 2	RW	1'b0
7	Reserved	Reserved	RO	-
6:5	region1_pag_grpid	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved1	RW	2'b0
4	region1_pag_en	Enables the CPA mode for non-hashed memory region 1	RW	1'b0
3	Reserved	Reserved	RO	-
2:1	region0_pag_grpid	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved0	RW	2'b0
0	region0_pag_en	Enables the CPA mode for non-hashed memory region 0	RW	1'b0

cml_port_aggr_mode_ctrl_reg1

Configures the CCIX port aggregation modes for non-hashed memory regions 8 through 19.

Its characteristics are:

Type RW

Register width (Bits) 64

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Address offset 14'hE30

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

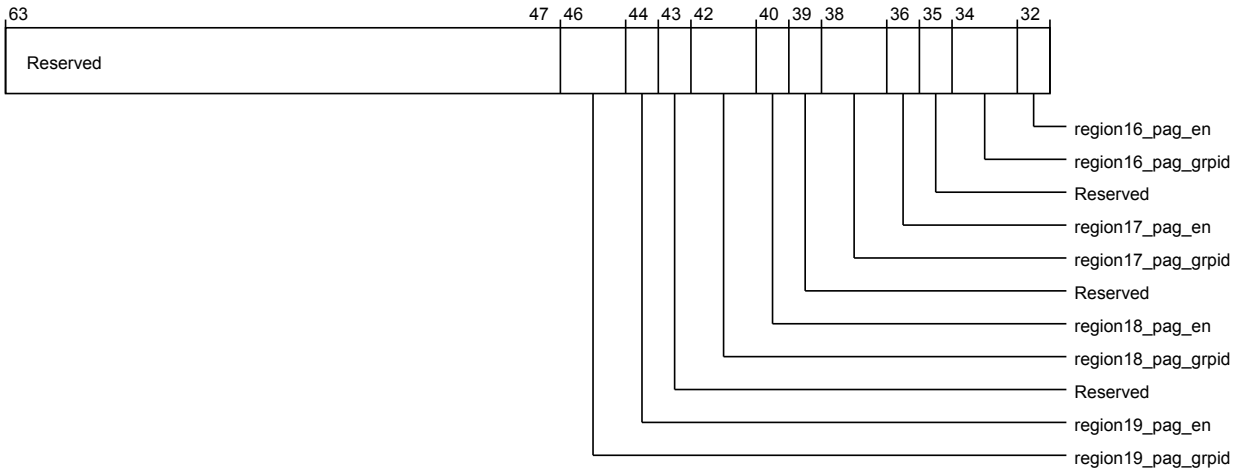

Figure 3-972 por_rnsam_cml_port_aggr_mode_ctrl_reg1 (high)

The following table shows the cml_port_aggr_mode_ctrl_reg1 higher register bit assignments.

Table 3-986 por_rnsam_cml_port_aggr_mode_ctrl_reg1 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:45	region19_pag_grpid	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved7	RW	2'b0
44	region19_pag_en	Enables the CPA mode for non-hashed memory region 19	RW	1'b0
43	Reserved	Reserved	RO	-
42:41	region18_pag_grpid	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved7	RW	2'b0
40	region18_pag_en	Enables the CPA mode for non-hashed memory region 18	RW	1'b0
39	Reserved	Reserved	RO	-

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Table 3-986 por_rnsam_cml_port_aggr_mode_ctrl_reg1 (high) (continued)

Bits	Field name	Description	Type	Reset
38:37	region17_pag_grpid	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved7	RW	2'b0
36	region17_pag_en	Enables the CPA mode for non-hashed memory region 17	RW	1'b0
35	Reserved	Reserved	RO	-
34:33	region16_pag_grpid	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved7	RW	2'b0
32	region16_pag_en	Enables the CPA mode for non-hashed memory region 16	RW	1'b0

The following image shows the lower register bit assignments.

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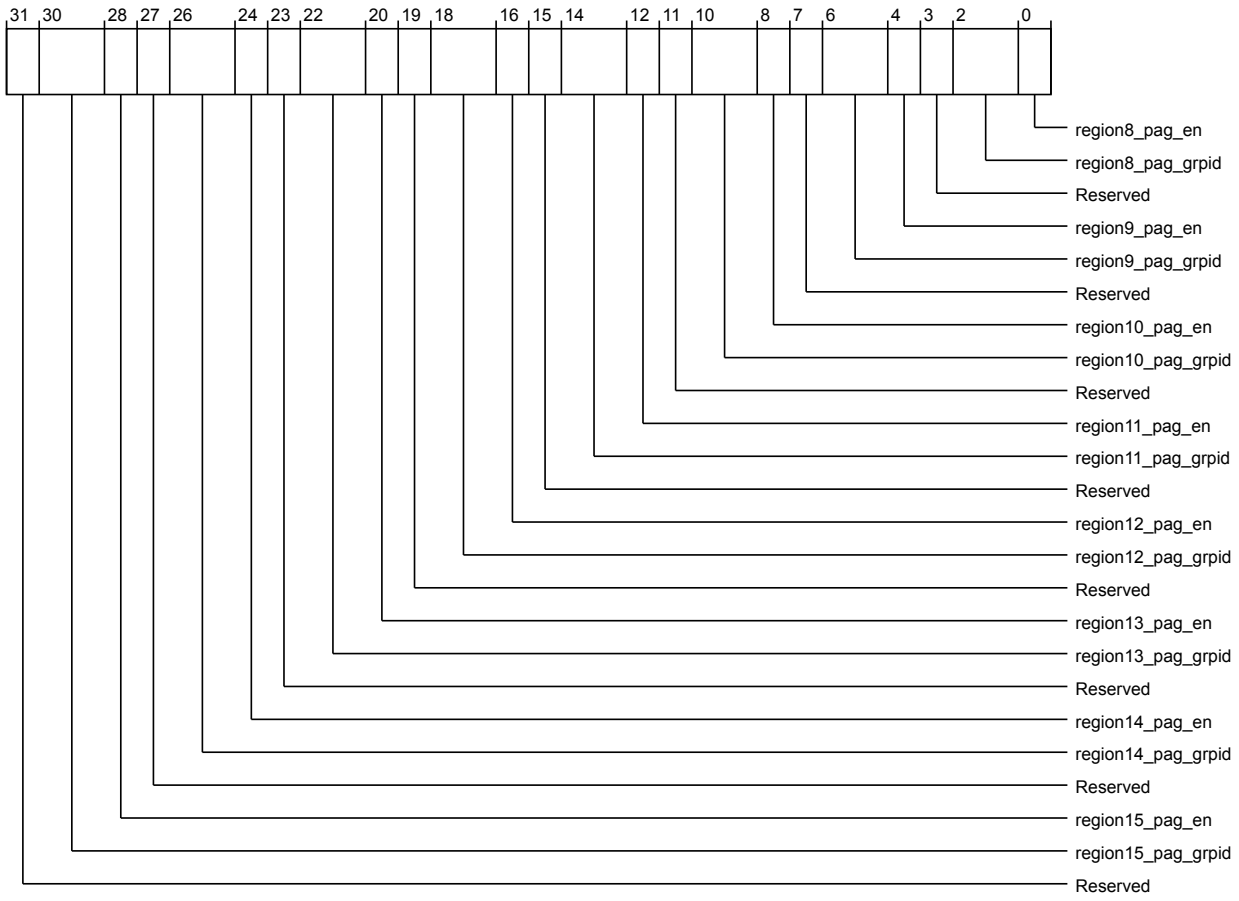

Figure 3-973 por_rnsam_cml_port_aggr_mode_ctrl_reg1 (low)

The following table shows the cml_port_aggr_mode_ctrl_reg1 lower register bit assignments.

Table 3-987 por_rnsam_cml_port_aggr_mode_ctrl_reg1 (low)

Bits	Field name	Description	Type	Reset
31	Reserved	Reserved	RO	-
30:29	region15_pag_grpid	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved7	RW	2'b0
28	region15_pag_en	Enables the CPA mode for non-hashed memory region 15	RW	1'b0
27	Reserved	Reserved	RO	-

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Table 3-987 por_rnsam_cml_port_aggr_mode_ctrl_reg1 (low) (continued)

Bits	Field name	Description	Type	Reset
26:25	region14_pag_grpid	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved6	RW	2'b0
24	region14_pag_en	Enables the CPA mode for non-hashed memory region 14	RW	1'b0
23	Reserved	Reserved	RO	-
22:21	region13_pag_grpid	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved5	RW	2'b0
20	region13_pag_en	Enables the CPA mode for non-hashed memory region 13	RW	1'b0
19	Reserved	Reserved	RO	-
18:17	region12_pag_grpid	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved4	RW	2'b0
16	region12_pag_en	Enables the CPA mode for non-hashed memory region 12	RW	1'b0
15	Reserved	Reserved	RO	-
14:13	region11_pag_grpid	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved3	RW	2'b0
12	region11_pag_en	Enables the CPA mode for non-hashed memory region 11	RW	1'b0
11	Reserved	Reserved	RO	-

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Table 3-987 por_rnsam_cml_port_aggr_mode_ctrl_reg1 (low) (continued)

Bits	Field name	Description	Type	Reset
10:9	region10_pag_grpid	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved2	RW	2'b0
8	region10_pag_en	Enables the CPA mode for non-hashed memory region 10	RW	1'b0
7	Reserved	Reserved	RO	-
6:5	region9_pag_grpid	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved1	RW	2'b0
4	region9_pag_en	Enables the CPA mode for non-hashed memory region 9	RW	1'b0
3	Reserved	Reserved	RO	-
2:1	region8_pag_grpid	Specifies CCIX port aggregation group ID 2'b00: CPA Group ID 0 2'b01: CPA Group ID 1 2'b10: Reserved 2'b11: Reserved0	RW	2'b0
0	region8_pag_en	Enables the CPA mode for non-hashed memory region 8	RW	1'b0

cml_port_aggr_grp0_add_mask

Configures the CCIX port aggregation address mask for group 0.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hE08
Register reset 64'b1
Usage constraints Only accessible by Secure accesses. Writes to this register must occur before the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

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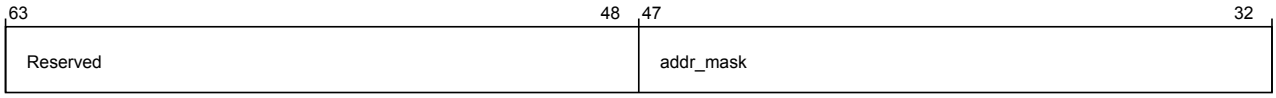

Figure 3-974 por_rnsam_cml_port_aggr_grp0_add_mask (high)

The following table shows the cml_port_aggr_grp0_add_mask higher register bit assignments.

Table 3-988 por_rnsam_cml_port_aggr_grp0_add_mask (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	addr_mask	Address mask to be applied before hashing	RW	42'b1

The following image shows the lower register bit assignments.

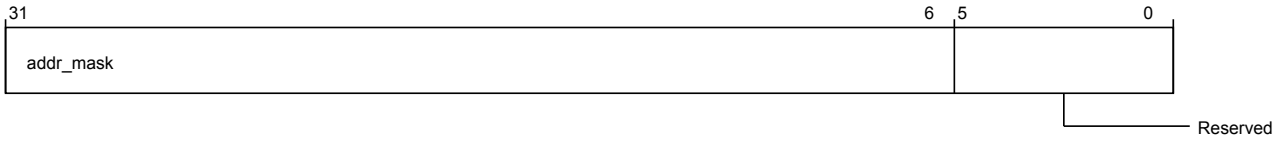

Figure 3-975 por_rnsam_cml_port_aggr_grp0_add_mask (low)

The following table shows the cml_port_aggr_grp0_add_mask lower register bit assignments.

Table 3-989 por_rnsam_cml_port_aggr_grp0_add_mask (low)

Bits	Field name	Description	Type	Reset
31:6	addr_mask	Address mask to be applied before hashing	RW	42'b1
5:0	Reserved	Reserved	RO	-

cml_port_aggr_grp1_add_mask

Configures the CCIX port aggregation address mask for group 1.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hE10

Register reset 64'b1

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

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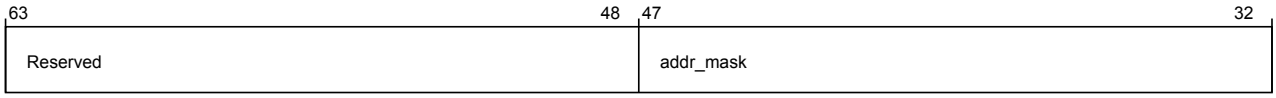

Figure 3-976 por_rnsam_cml_port_aggr_grp1_add_mask (high)

The following table shows the cml_port_aggr_grp1_add_mask higher register bit assignments.

Table 3-990 por_rnsam_cml_port_aggr_grp1_add_mask (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	addr_mask	Address mask to be applied before hashing	RW	42'b1

The following image shows the lower register bit assignments.

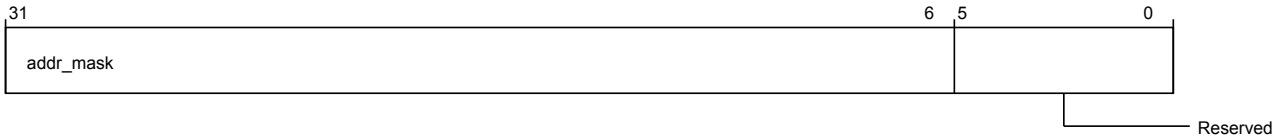

Figure 3-977 por_rnsam_cml_port_aggr_grp1_add_mask (low)

The following table shows the cml_port_aggr_grp1_add_mask lower register bit assignments.

Table 3-991 por_rnsam_cml_port_aggr_grp1_add_mask (low)

Bits	Field name	Description	Type	Reset
31:6	addr_mask	Address mask to be applied before hashing	RW	42'b1
5:0	Reserved	Reserved	RO	-

cml_port_aggr_grp0_reg

Configures the CCIX port aggregation port IDs for group 0.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hE40

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

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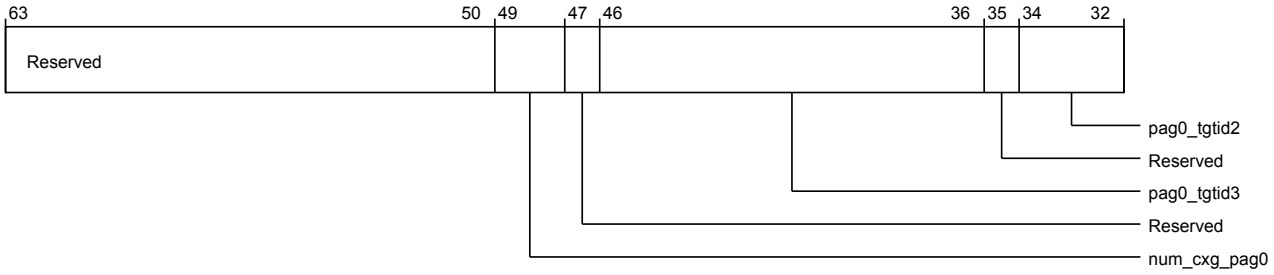

Figure 3-978 por_rnsam_cml_port_aggr_grp0_reg (high)

The following table shows the cml_port_aggr_grp0_reg higher register bit assignments.

Table 3-992 por_rnsam_cml_port_aggr_grp0_reg (high)

Bits	Field name	Description	Type	Reset
63:50	Reserved	Reserved	RO	-
49:48	num_cxg_pag0	Specifies the number of CXRAs in CPAG 0 2'b00: 1 port used 2'b01: 2 ports used 2'b10: 4 ports used 2'b11: Reserved	RW	2'b0
47	Reserved	Reserved	RO	-
46:36	pag0_tgtid3	Specifies target ID 3 for CPAG 0	RW	11'b0
35	Reserved	Reserved	RO	-
34:32	pag0_tgtid2	Specifies target ID 2 for CPAG 0	RW	11'b0

The following image shows the lower register bit assignments.

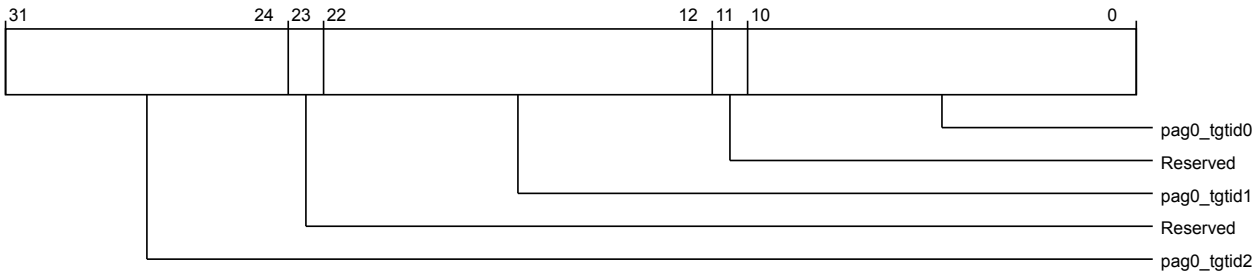

Figure 3-979 por_rnsam_cml_port_aggr_grp0_reg (low)

The following table shows the cml_port_aggr_grp0_reg lower register bit assignments.

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Table 3-993 por_rnsam_cml_port_aggr_grp0_reg (low)

Bits	Field name	Description	Type	Reset
31:24	pag0_tgtid2	Specifies target ID 2 for CPAG 0	RW	11'b0
23	Reserved	Reserved	RO	-
22:12	pag0_tgtid1	Specifies target ID 1 for CPAG 0	RW	11'b0
11	Reserved	Reserved	RO	-
10:0	pag0_tgtid0	Specifies target ID 0 for CPAG 0	RW	11'b0

cml_port_aggr_grp1_reg

Configures the CCIX port aggregation port IDs for group 1.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hE48

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

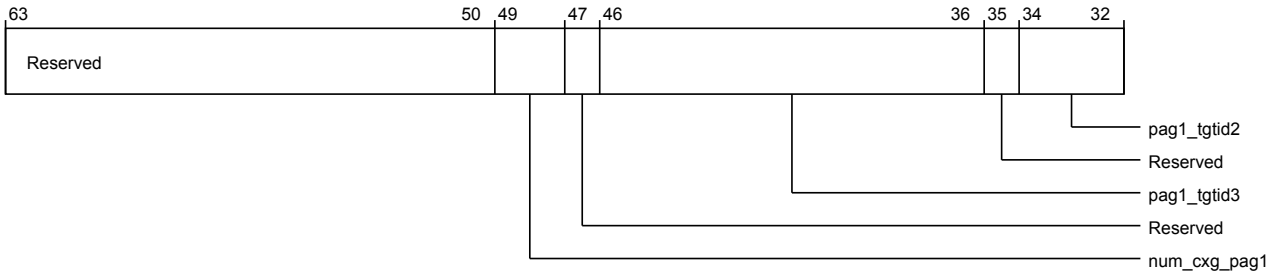

Figure 3-980 por_rnsam_cml_port_aggr_grp1_reg (high)

The following table shows the cml_port_aggr_grp1_reg higher register bit assignments.

Table 3-994 por_rnsam_cml_port_aggr_grp1_reg (high)

Bits	Field name	Description	Type	Reset
63:50	Reserved	Reserved	RO	-
49:48	num_cxg_pag1	Specifies the number of CXRAs in CPAG 1	RW	2'b0
47	Reserved	Reserved	RO	-
46:36	pag1_tgtid3	Specifies target ID 3 for CPAG 1	RW	11'b0

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Table 3-994 por_rnsam_cml_port_aggr_grp1_reg (high) (continued)

Bits	Field name	Description	Type	Reset
35	Reserved	Reserved	RO	-
34:32	pag1_tgtid2	Specifies target ID 2 for CPAG 1	RW	11'b0

The following image shows the lower register bit assignments.

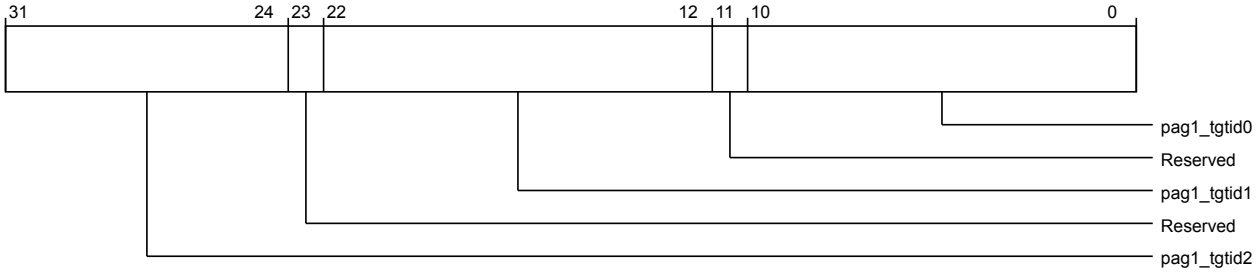

Figure 3-981 por_rnsam_cml_port_aggr_grp1_reg (low)

The following table shows the cml_port_aggr_grp1_reg lower register bit assignments.

Table 3-995 por_rnsam_cml_port_aggr_grp1_reg (low)

Bits	Field name	Description	Type	Reset
31:24	pag1_tgtid2	Specifies target ID 2 for CPAG 1	RW	11'b0
23	Reserved	Reserved	RO	-
22:12	pag1_tgtid1	Specifies target ID 1 for CPAG 1	RW	11'b0
11	Reserved	Reserved	RO	-
10:0	pag1_tgtid0	Specifies target ID 0 for CPAG 1	RW	11'b0

sys_cache_grp_secondary_reg0

Configures secondary hashed memory regions 0 and 1.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hF00

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device. and This register can be modified only with prior written permission from Arm.

Secure group override por_rnsam_secure_register_groups_override.mem_range

The following image shows the higher register bit assignments.

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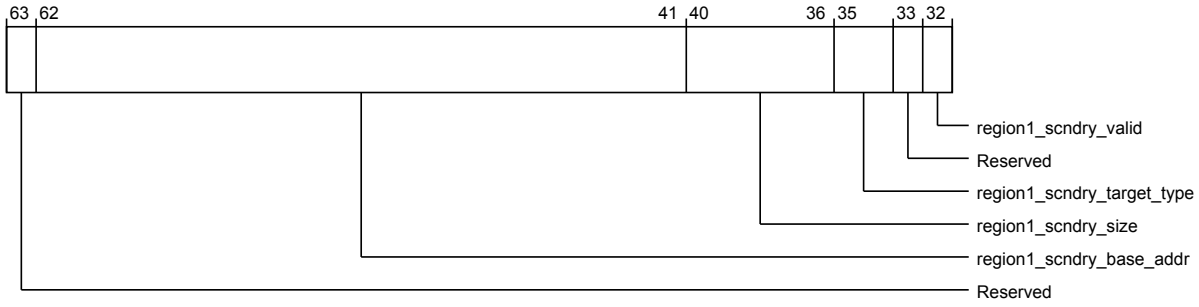

Figure 3-982 por_rnsam_sys_cache_grp_secondary_reg0 (high)

The following table shows the sys_cache_grp_secondary_reg0 higher register bit assignments.

Table 3-996 por_rnsam_sys_cache_grp_secondary_reg0 (high)

Bits	Field name	Description	Type	Reset
63	Reserved	Reserved	RO	-
62:41	region1_scndry_base_addr	Bits [47:26] of secondary base address of the range CONSTRAINT: Must be an integer multiple of region 1 size	RW	22'b0000000000000000000000
40:36	region1_scndry_size	Secondary memory region 1 size CONSTRAINT: Memory region must be a power of two, from minimum size supported to maximum memory size (2^address width).	RW	5'b00000
35:34	region1_scndry_target_type	Indicates secondary node type 2'b00: HN-F 2'b01: HN-I 2'b10: CXRA 2'b11: Reserved CONSTRAINT: Only applicable for RN-I	RW	2'b00
33	Reserved	Reserved	RO	-
32	region1_scndry_valid	Secondary memory region 1 valid 1'b0: Not valid 1'b1: Valid for memory region comparison	RW	1'b0

The following image shows the lower register bit assignments.

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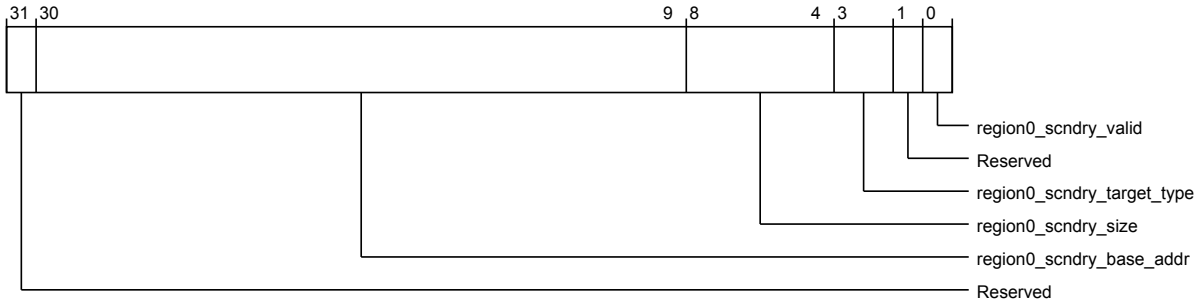

Figure 3-983 por_rnsam_sys_cache_grp_secondary_reg0 (low)

The following table shows the sys_cache_grp_secondary_reg0 lower register bit assignments.

Table 3-997 por_rnsam_sys_cache_grp_secondary_reg0 (low)

Bits	Field name	Description	Type	Reset
31	Reserved	Reserved	RO	-
30:9	region0_scndry_base_addr	Bits [47:26] of secondary base address of the range CONSTRAINT: Must be an integer multiple of region 0 size	RW	22'b0000000000000000000000
8:4	region0_scndry_size	Secondary memory region 0 size CONSTRAINT: Memory region must be a power of two, from minimum size supported to maximum memory size (2^address width).	RW	5'b00000
3:2	region0_scndry_target_type	Indicates secondary node type 2'b00: HN-F 2'b01: HN-I 2'b10: CXRA 2'b11: Reserved CONSTRAINT: Only applicable for RN-I	RW	2'b00
1	Reserved	Reserved	RO	-
0	region0_scndry_valid	Secondary memory region 0 valid 1'b0: Not valid 1'b1: Valid for memory region comparison	RW	1'b0

sys_cache_grp_secondary_reg1

Configures secondary hashed memory regions 2 and 3.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hF08
Register reset 64'b0

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Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device. and This register can be modified only with prior written permission from Arm.

Secure group override por_rnsam_secure_register_groups_override.mem_range

The following image shows the higher register bit assignments.

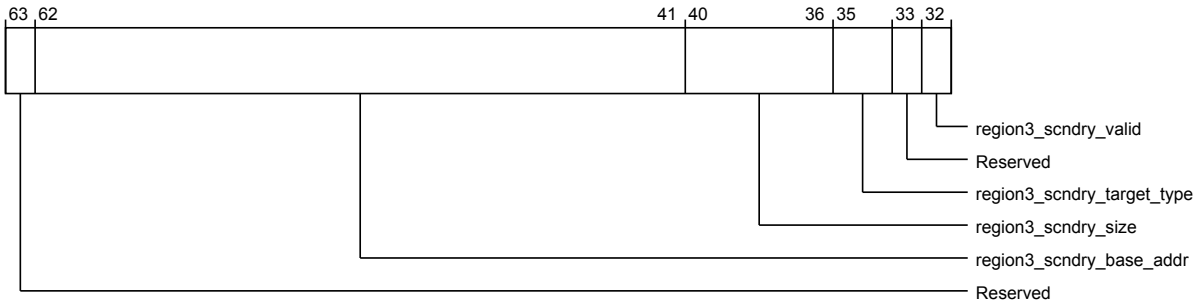

Figure 3-984 por_rnsam_sys_cache_grp_secondary_reg1 (high)

The following table shows the sys_cache_grp_secondary_reg1 higher register bit assignments.

Table 3-998 por_rnsam_sys_cache_grp_secondary_reg1 (high)

Bits	Field name	Description	Type	Reset
63	Reserved	Reserved	RO	-
62:41	region3_scndry_base_addr	Bits [47:26] of secondary base address of the range CONSTRAINT: Must be an integer multiple of region 3 size	RW	22'b0000000000000000000000
40:36	region3_scndry_size	Secondary memory region 3 size CONSTRAINT: Memory region must be a power of two, from minimum size supported to maximum memory size (2^address width).	RW	5'b00000
35:34	region3_scndry_target_type	Indicates secondary node type 2'b00: HN-F 2'b01: HN-I 2'b10: CXRA 2'b11: Reserved CONSTRAINT: Only applicable for RN-I	RW	2'b00
33	Reserved	Reserved	RO	-
32	region3_scndry_valid	Secondary memory region 3 valid 1'b0: Not valid 1'b1: Valid for memory region comparison	RW	1'b0

The following image shows the lower register bit assignments.

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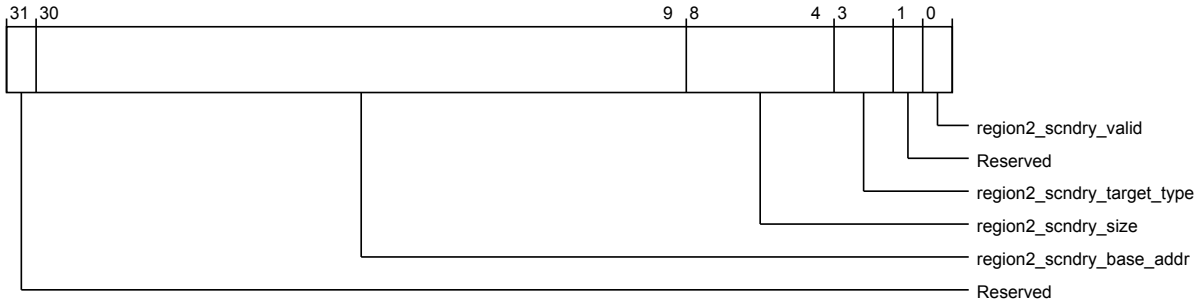

Figure 3-985 por_rnsam_sys_cache_grp_secondary_reg1 (low)

The following table shows the sys_cache_grp_secondary_reg1 lower register bit assignments.

Table 3-999 por_rnsam_sys_cache_grp_secondary_reg1 (low)

Bits	Field name	Description	Type	Reset
31	Reserved	Reserved	RO	-
30:9	region2_scndry_base_addr	Bits [47:26] of secondary base address of the range CONSTRAINT: Must be an integer multiple of region 2 size	RW	22'b0000000000000000000000
8:4	region2_scndry_size	Secondary memory region 2 size CONSTRAINT: Memory region must be a power of two, from minimum size supported to maximum memory size (2^address width).	RW	5'b00000
3:2	region2_scndry_target_type	Indicates secondary node type 2'b00: HN-F 2'b01: HN-I 2'b10: CXRA 2'b11: Reserved CONSTRAINT: Only applicable for RN-I	RW	2'b00
1	Reserved	Reserved	RO	-
0	region2_scndry_valid	Secondary memory region 2 valid 1'b0: Not valid 1'b1: Valid for memory region comparison	RW	1'b0

sys_cache_grp_cal_mode_reg

Configures the HN-F CAL mode support for all system cache groups.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hF10
Register reset 64'b0

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Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device. and This register can be modified only with prior written permission from Arm.

Secure group override por_rnsam_secure_register_groups_override.mem_range

The following image shows the higher register bit assignments.

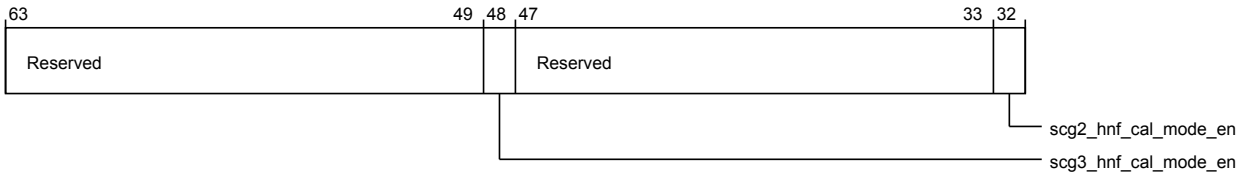

Figure 3-986 por_rnsam_sys_cache_grp_cal_mode_reg (high)

The following table shows the sys_cache_grp_cal_mode_reg higher register bit assignments.

Table 3-1000 por_rnsam_sys_cache_grp_cal_mode_reg (high)

Bits	Field name	Description	Type	Reset
63:49	Reserved	Reserved	RO	-
48	scg3_hnf_cal_mode_en	Enables support for HN-F CAL for SCG 3	RW	1'b0
47:33	Reserved	Reserved	RO	-
32	scg2_hnf_cal_mode_en	Enables support for HN-F CAL for SCG 2	RW	1'b0

The following image shows the lower register bit assignments.

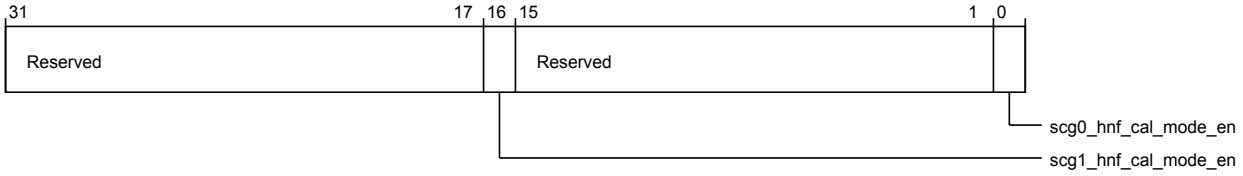

Figure 3-987 por_rnsam_sys_cache_grp_cal_mode_reg (low)

The following table shows the sys_cache_grp_cal_mode_reg lower register bit assignments.

Table 3-1001 por_rnsam_sys_cache_grp_cal_mode_reg (low)

Bits	Field name	Description	Type	Reset
31:17	Reserved	Reserved	RO	-
16	scg1_hnf_cal_mode_en	Enables support for HN-F CAL for SCG 1	RW	1'b0
15:1	Reserved	Reserved	RO	-
0	scg0_hnf_cal_mode_en	Enables support for HN-F CAL for SCG 0	RW	1'b0

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rnsam_hash_addr_mask_reg

Configures the address mask that is applied before hashing the address bits.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hF18

Register reset 64'b1111111111111111111111111111111111111111

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device. and This register can be modified only with prior written permission from Arm.

The following image shows the higher register bit assignments.

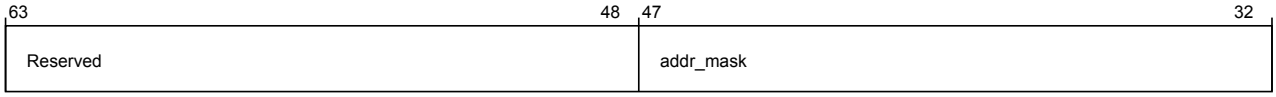

Figure 3-988 por_rnsam_rnsam_hash_addr_mask_reg (high)

The following table shows the rnsam_hash_addr_mask_reg higher register bit assignments.

Table 3-1002 por_rnsam_rnsam_hash_addr_mask_reg (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	addr_mask	Address mask applied before hashing	RW	42'h3FFFFFFFFF

The following image shows the lower register bit assignments.

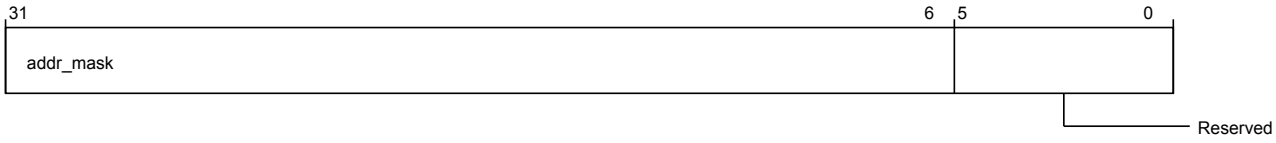

Figure 3-989 por_rnsam_rnsam_hash_addr_mask_reg (low)

The following table shows the rnsam_hash_addr_mask_reg lower register bit assignments.

Table 3-1003 por_rnsam_rnsam_hash_addr_mask_reg (low)

Bits	Field name	Description	Type	Reset
31:6	addr_mask	Address mask applied before hashing	RW	42'h3FFFFFFFFF
5:0	Reserved	Reserved	RO	-

rnsam_region_cmp_addr_mask_reg

Configures the address mask that is applied before region compare.

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Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hF20

Register reset 64'b11111111111111111111111111111111

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device. and This register can be modified only with prior written permission from Arm.

The following image shows the higher register bit assignments.

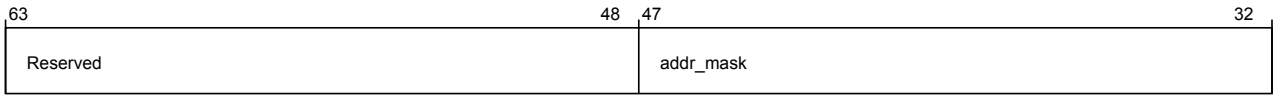

Figure 3-990 por_rnsam_rnsam_region_cmp_addr_mask_reg (high)

The following table shows the rnsam_region_cmp_addr_mask_reg higher register bit assignments.

Table 3-1004 por_rnsam_rnsam_region_cmp_addr_mask_reg (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	addr_mask	Address mask applied before memory region compare	RW	32'hFFFFFFFF

The following image shows the lower register bit assignments.

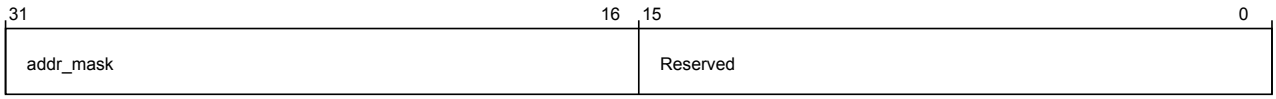

Figure 3-991 por_rnsam_rnsam_region_cmp_addr_mask_reg (low)

The following table shows the rnsam_region_cmp_addr_mask_reg lower register bit assignments.

Table 3-1005 por_rnsam_rnsam_region_cmp_addr_mask_reg (low)

Bits	Field name	Description	Type	Reset
31:16	addr_mask	Address mask applied before memory region compare	RW	32'hFFFFFFFF
15:0	Reserved	Reserved	RO	-

sys_cache_grp_hn_nodeid_reg8

Configures hashed node IDs for system cache groups. Controls target HN node IDs 32 to 35.

Its characteristics are:

Type RW

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Register width (Bits) 64

Address offset 14'hF58

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

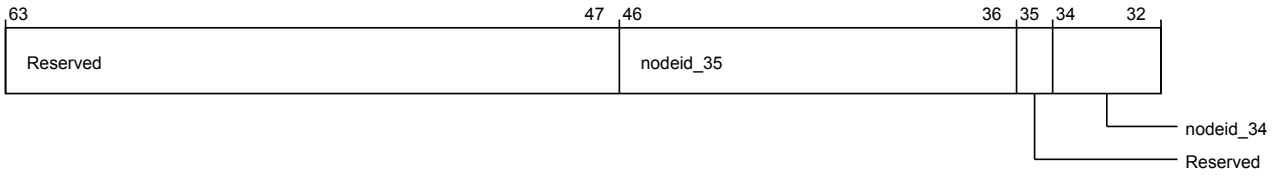

Figure 3-992 por_rnsam_sys_cache_grp_hn_nodeid_reg8 (high)

The following table shows the sys_cache_grp_hn_nodeid_reg8 higher register bit assignments.

Table 3-1006 por_rnsam_sys_cache_grp_hn_nodeid_reg8 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	nodeid_35	Hashed target node ID 35	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	nodeid_34	Hashed target node ID 34	RW	11'b00000000000

The following image shows the lower register bit assignments.

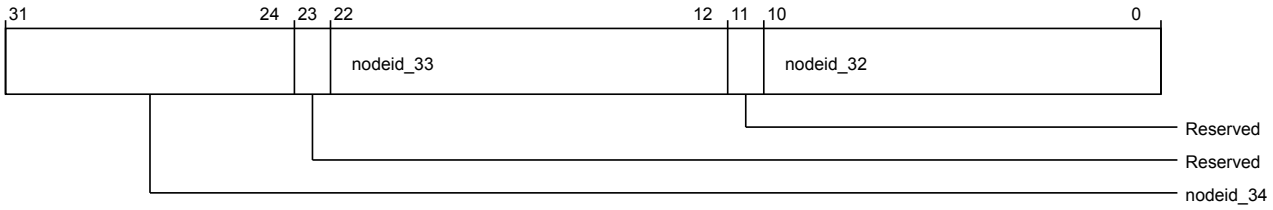

Figure 3-993 por_rnsam_sys_cache_grp_hn_nodeid_reg8 (low)

The following table shows the sys_cache_grp_hn_nodeid_reg8 lower register bit assignments.

Table 3-1007 por_rnsam_sys_cache_grp_hn_nodeid_reg8 (low)

Bits	Field name	Description	Type	Reset
31:24	nodeid_34	Hashed target node ID 34	RW	11'b00000000000
23	Reserved	Reserved	RO	-

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Table 3-1007 por_rnsam_sys_cache_grp_hn_nodeid_reg8 (low) (continued)

Bits	Field name	Description	Type	Reset
22:12	nodeid_33	Hashed target node ID 33	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	nodeid_32	Hashed target node ID 32	RW	11'b00000000000

sys_cache_grp_hn_nodeid_reg9

Configures hashed node IDs for system cache groups. Controls target HN node IDs 36 to 39.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hF60

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

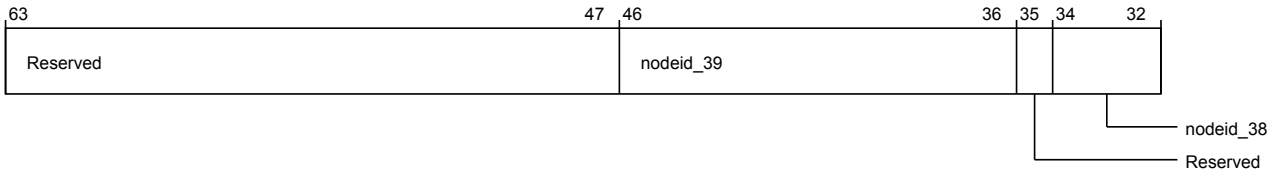

Figure 3-994 por_rnsam_sys_cache_grp_hn_nodeid_reg9 (high)

The following table shows the sys_cache_grp_hn_nodeid_reg9 higher register bit assignments.

Table 3-1008 por_rnsam_sys_cache_grp_hn_nodeid_reg9 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	nodeid_39	Hashed target node ID 39	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	nodeid_38	Hashed target node ID 38	RW	11'b00000000000

The following image shows the lower register bit assignments.

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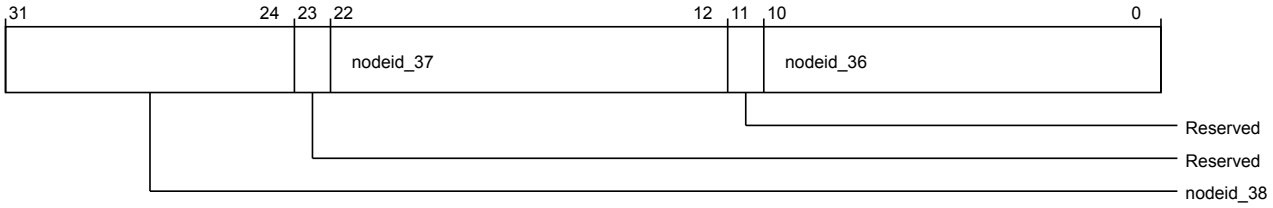

Figure 3-995 por_rnsam_sys_cache_grp_hn_nodeid_reg9 (low)

The following table shows the sys_cache_grp_hn_nodeid_reg9 lower register bit assignments.

Table 3-1009 por_rnsam_sys_cache_grp_hn_nodeid_reg9 (low)

Bits	Field name	Description	Type	Reset
31:24	nodeid_38	Hashed target node ID 38	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	nodeid_37	Hashed target node ID 37	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	nodeid_36	Hashed target node ID 36	RW	11'b00000000000

sys_cache_grp_hn_nodeid_reg10

Configures hashed node IDs for system cache groups. Controls target HN node IDs 40 to 43.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hF68

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

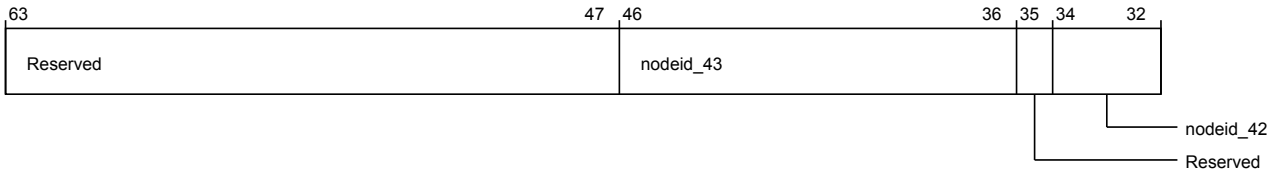

Figure 3-996 por_rnsam_sys_cache_grp_hn_nodeid_reg10 (high)

The following table shows the sys_cache_grp_hn_nodeid_reg10 higher register bit assignments.

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Table 3-1010 por_rnsam_sys_cache_grp_hn_nodeid_reg10 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	nodeid_43	Hashed target node ID 43	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	nodeid_42	Hashed target node ID 42	RW	11'b00000000000

The following image shows the lower register bit assignments.

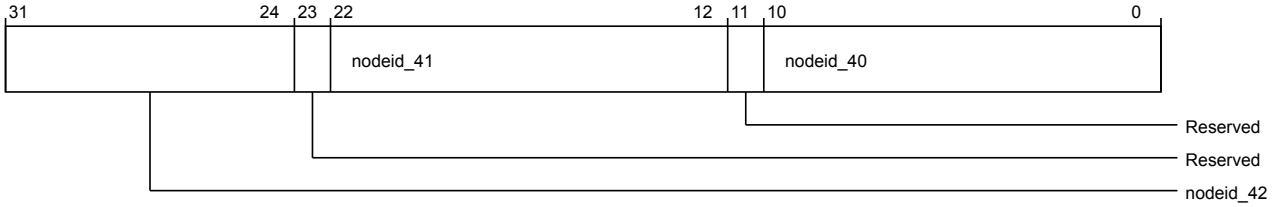

Figure 3-997 por_rnsam_sys_cache_grp_hn_nodeid_reg10 (low)

The following table shows the sys_cache_grp_hn_nodeid_reg10 lower register bit assignments.

Table 3-1011 por_rnsam_sys_cache_grp_hn_nodeid_reg10 (low)

Bits	Field name	Description	Type	Reset
31:24	nodeid_42	Hashed target node ID 42	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	nodeid_41	Hashed target node ID 41	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	nodeid_40	Hashed target node ID 40	RW	11'b00000000000

sys_cache_grp_hn_nodeid_reg11

Configures hashed node IDs for system cache groups. Controls target HN node IDs 44 to 47.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hF70

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

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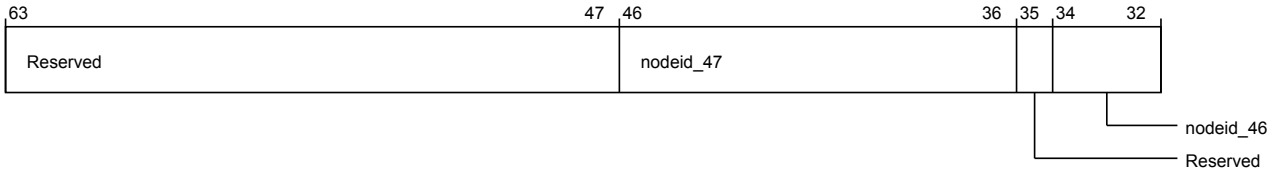

Figure 3-998 por_rnsam_sys_cache_grp_hn_nodeid_reg11 (high)

The following table shows the sys_cache_grp_hn_nodeid_reg11 higher register bit assignments.

Table 3-1012 por_rnsam_sys_cache_grp_hn_nodeid_reg11 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	nodeid_47	Hashed target node ID 47	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	nodeid_46	Hashed target node ID 46	RW	11'b00000000000

The following image shows the lower register bit assignments.

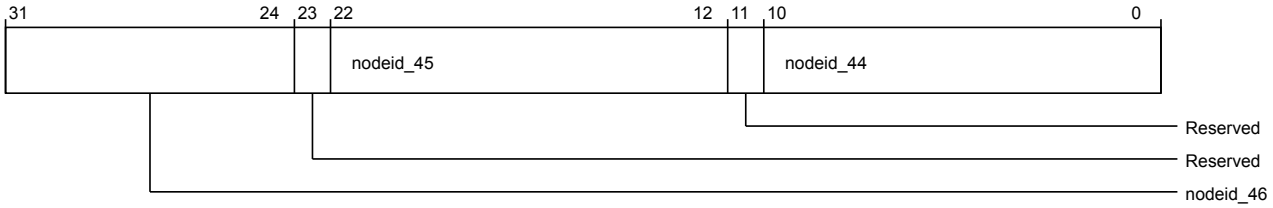

Figure 3-999 por_rnsam_sys_cache_grp_hn_nodeid_reg11 (low)

The following table shows the sys_cache_grp_hn_nodeid_reg11 lower register bit assignments.

Table 3-1013 por_rnsam_sys_cache_grp_hn_nodeid_reg11 (low)

Bits	Field name	Description	Type	Reset
31:24	nodeid_46	Hashed target node ID 46	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	nodeid_45	Hashed target node ID 45	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	nodeid_44	Hashed target node ID 44	RW	11'b00000000000

sys_cache_grp_hn_nodeid_reg12

Configures hashed node IDs for system cache groups. Controls target HN node IDs 48 to 51.

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Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hF78

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

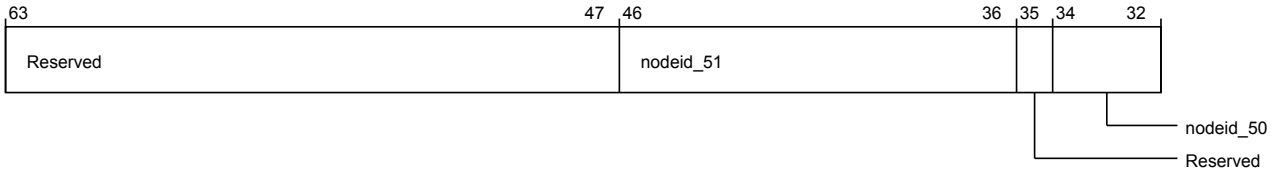

Figure 3-1000 por_rnsam_sys_cache_grp_hn_nodeid_reg12 (high)

The following table shows the sys_cache_grp_hn_nodeid_reg12 higher register bit assignments.

Table 3-1014 por_rnsam_sys_cache_grp_hn_nodeid_reg12 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	nodeid_51	Hashed target node ID 51	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	nodeid_50	Hashed target node ID 50	RW	11'b00000000000

The following image shows the lower register bit assignments.

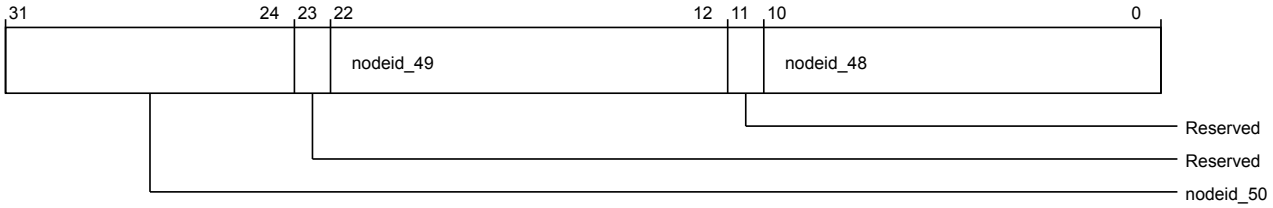

Figure 3-1001 por_rnsam_sys_cache_grp_hn_nodeid_reg12 (low)

The following table shows the sys_cache_grp_hn_nodeid_reg12 lower register bit assignments.

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Table 3-1015 por_rnsam_sys_cache_grp_hn_nodeid_reg12 (low)

Bits	Field name	Description	Type	Reset
31:24	nodeid_50	Hashed target node ID 50	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	nodeid_49	Hashed target node ID 49	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	nodeid_48	Hashed target node ID 48	RW	11'b00000000000

sys_cache_grp_hn_nodeid_reg13

Configures hashed node IDs for system cache groups. Controls target HN node IDs 52 to 55.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hF80

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

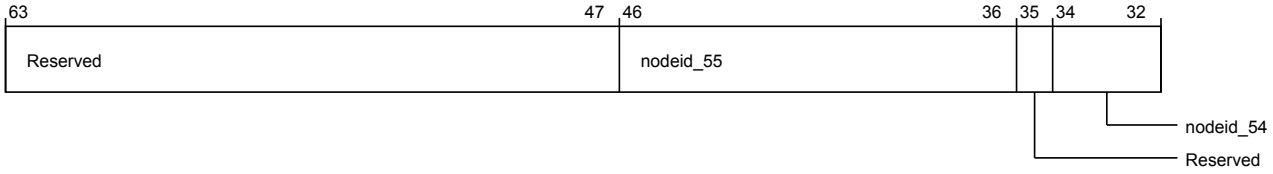

Figure 3-1002 por_rnsam_sys_cache_grp_hn_nodeid_reg13 (high)

The following table shows the sys_cache_grp_hn_nodeid_reg13 higher register bit assignments.

Table 3-1016 por_rnsam_sys_cache_grp_hn_nodeid_reg13 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	nodeid_55	Hashed target node ID 55	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	nodeid_54	Hashed target node ID 54	RW	11'b00000000000

The following image shows the lower register bit assignments.

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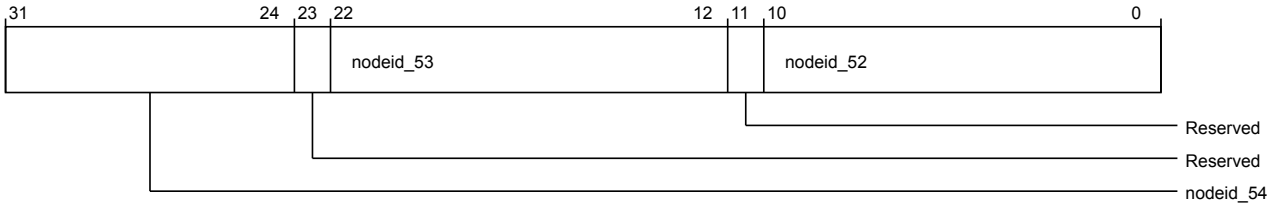

Figure 3-1003 por_rnsam_sys_cache_grp_hn_nodeid_reg13 (low)

The following table shows the sys_cache_grp_hn_nodeid_reg13 lower register bit assignments.

Table 3-1017 por_rnsam_sys_cache_grp_hn_nodeid_reg13 (low)

Bits	Field name	Description	Type	Reset
31:24	nodeid_54	Hashed target node ID 54	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	nodeid_53	Hashed target node ID 53	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	nodeid_52	Hashed target node ID 52	RW	11'b00000000000

sys_cache_grp_hn_nodeid_reg14

Configures hashed node IDs for system cache groups. Controls target HN node IDs 56 to 59.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hF88

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

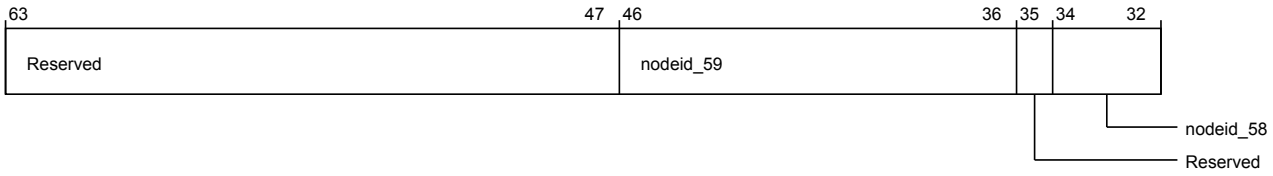

Figure 3-1004 por_rnsam_sys_cache_grp_hn_nodeid_reg14 (high)

The following table shows the sys_cache_grp_hn_nodeid_reg14 higher register bit assignments.

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Table 3-1018 por_rnsam_sys_cache_grp_hn_nodeid_reg14 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	nodeid_59	Hashed target node ID 59	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	nodeid_58	Hashed target node ID 58	RW	11'b00000000000

The following image shows the lower register bit assignments.

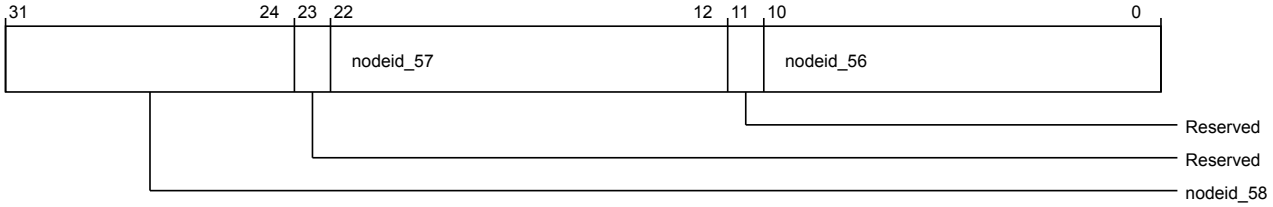

Figure 3-1005 por_rnsam_sys_cache_grp_hn_nodeid_reg14 (low)

The following table shows the sys_cache_grp_hn_nodeid_reg14 lower register bit assignments.

Table 3-1019 por_rnsam_sys_cache_grp_hn_nodeid_reg14 (low)

Bits	Field name	Description	Type	Reset
31:24	nodeid_58	Hashed target node ID 58	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	nodeid_57	Hashed target node ID 57	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	nodeid_56	Hashed target node ID 56	RW	11'b00000000000

sys_cache_grp_hn_nodeid_reg15

Configures hashed node IDs for system cache groups. Controls target HN node IDs 60 to 63.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hF90

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

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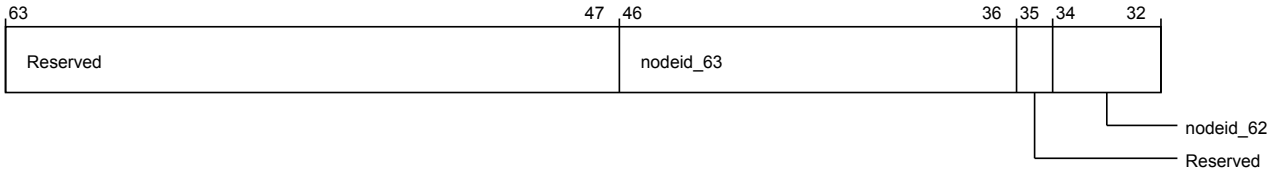

Figure 3-1006 por_rnsam_sys_cache_grp_hn_nodeid_reg15 (high)

The following table shows the sys_cache_grp_hn_nodeid_reg15 higher register bit assignments.

Table 3-1020 por_rnsam_sys_cache_grp_hn_nodeid_reg15 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	nodeid_63	Hashed target node ID 63	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	nodeid_62	Hashed target node ID 62	RW	11'b00000000000

The following image shows the lower register bit assignments.

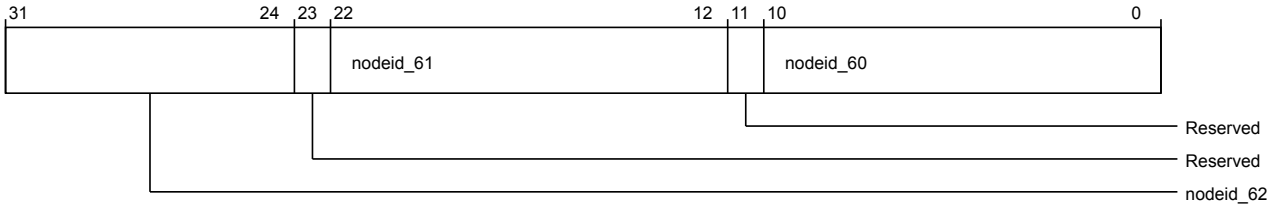

Figure 3-1007 por_rnsam_sys_cache_grp_hn_nodeid_reg15 (low)

The following table shows the sys_cache_grp_hn_nodeid_reg15 lower register bit assignments.

Table 3-1021 por_rnsam_sys_cache_grp_hn_nodeid_reg15 (low)

Bits	Field name	Description	Type	Reset
31:24	nodeid_62	Hashed target node ID 62	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	nodeid_61	Hashed target node ID 61	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	nodeid_60	Hashed target node ID 60	RW	11'b00000000000

sys_cache_grp_sn_nodeid_reg8

Configures hashed node IDs for system cache groups. Controls target SN node IDs 32 to 35.

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Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h1008

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

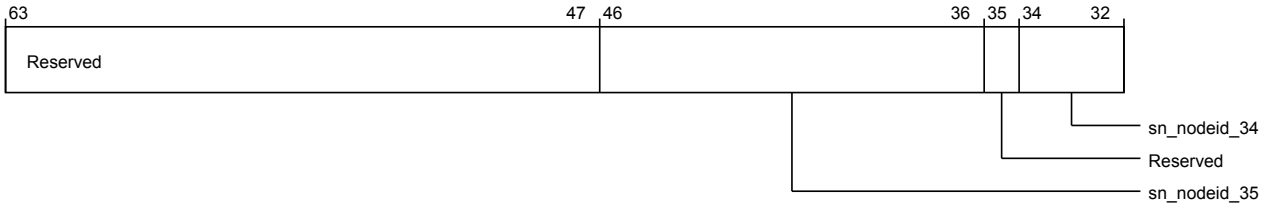

Figure 3-1008 por_rnsam_sys_cache_grp_sn_nodeid_reg8 (high)

The following table shows the sys_cache_grp_sn_nodeid_reg8 higher register bit assignments.

Table 3-1022 por_rnsam_sys_cache_grp_sn_nodeid_reg8 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	sn_nodeid_35	Hashed target SN node ID 35	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	sn_nodeid_34	Hashed target SN node ID 34	RW	11'b00000000000

The following image shows the lower register bit assignments.

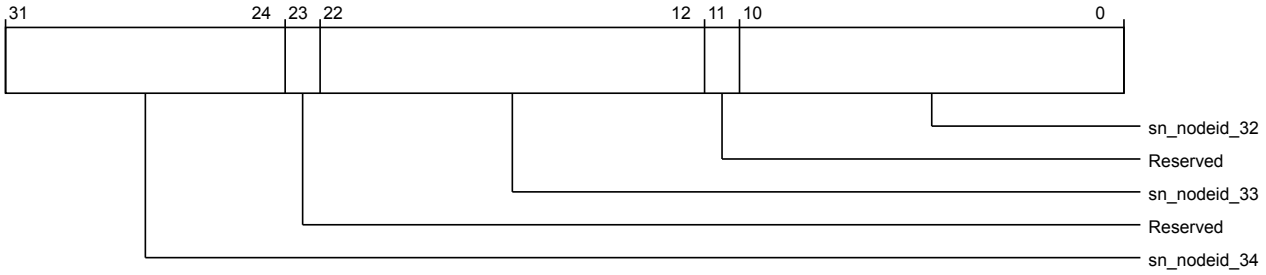

Figure 3-1009 por_rnsam_sys_cache_grp_sn_nodeid_reg8 (low)

The following table shows the sys_cache_grp_sn_nodeid_reg8 lower register bit assignments.

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Table 3-1023 por_rnsam_sys_cache_grp_sn_nodeid_reg8 (low)

Bits	Field name	Description	Type	Reset
31:24	sn_nodeid_34	Hashed target SN node ID 34	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	sn_nodeid_33	Hashed target SN node ID 33	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	sn_nodeid_32	Hashed target SN node ID 32	RW	11'b00000000000

sys_cache_grp_sn_nodeid_reg9

Configures hashed node IDs for system cache groups. Controls target SN node IDs 36 to 39.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h1010

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

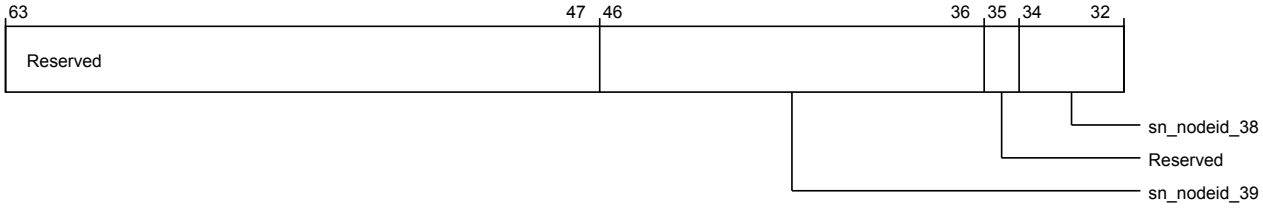

Figure 3-1010 por_rnsam_sys_cache_grp_sn_nodeid_reg9 (high)

The following table shows the sys_cache_grp_sn_nodeid_reg9 higher register bit assignments.

Table 3-1024 por_rnsam_sys_cache_grp_sn_nodeid_reg9 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	sn_nodeid_39	Hashed target SN node ID 39	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	sn_nodeid_38	Hashed target SN node ID 38	RW	11'b00000000000

The following image shows the lower register bit assignments.

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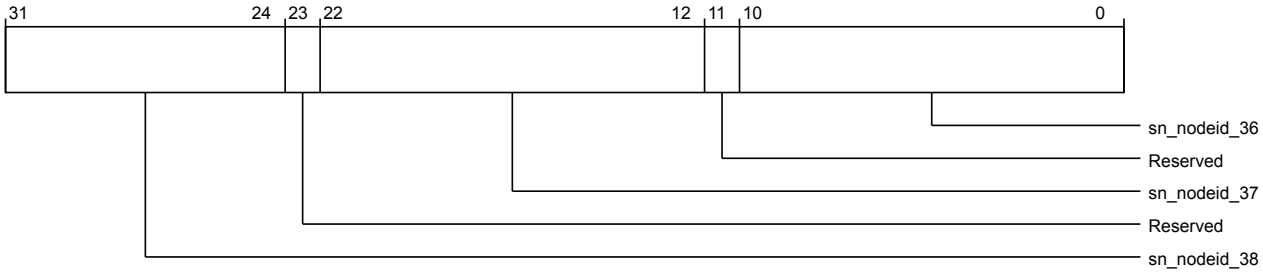

Figure 3-1011 por_rnsam_sys_cache_grp_sn_nodeid_reg9 (low)

The following table shows the sys_cache_grp_sn_nodeid_reg9 lower register bit assignments.

Table 3-1025 por_rnsam_sys_cache_grp_sn_nodeid_reg9 (low)

Bits	Field name	Description	Type	Reset
31:24	sn_nodeid_38	Hashed target SN node ID 38	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	sn_nodeid_37	Hashed target SN node ID 37	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	sn_nodeid_36	Hashed target SN node ID 36	RW	11'b00000000000

sys_cache_grp_sn_nodeid_reg10

Configures hashed node IDs for system cache groups. Controls target SN node IDs 40 to 43.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h1018

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

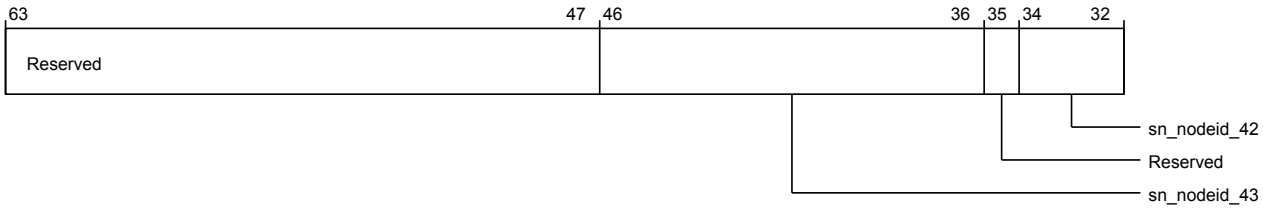

Figure 3-1012 por_rnsam_sys_cache_grp_sn_nodeid_reg10 (high)

The following table shows the sys_cache_grp_sn_nodeid_reg10 higher register bit assignments.

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Table 3-1026 por_rnsam_sys_cache_grp_sn_nodeid_reg10 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	sn_nodeid_43	Hashed target SN node ID 43	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	sn_nodeid_42	Hashed target SN node ID 42	RW	11'b00000000000

The following image shows the lower register bit assignments.

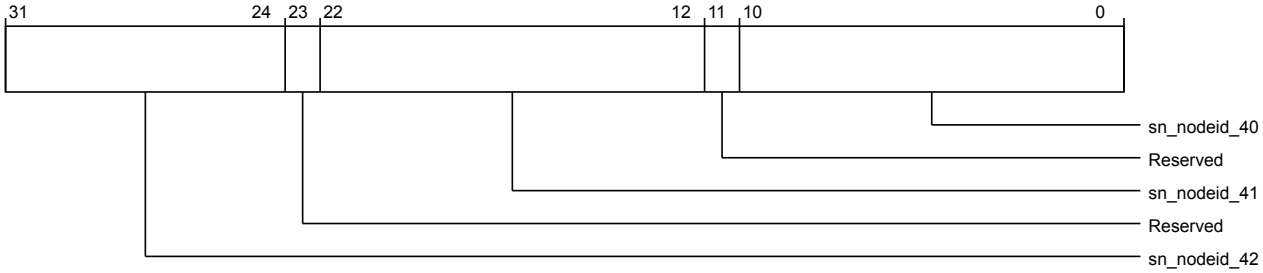

Figure 3-1013 por_rnsam_sys_cache_grp_sn_nodeid_reg10 (low)

The following table shows the sys_cache_grp_sn_nodeid_reg10 lower register bit assignments.

Table 3-1027 por_rnsam_sys_cache_grp_sn_nodeid_reg10 (low)

Bits	Field name	Description	Type	Reset
31:24	sn_nodeid_42	Hashed target SN node ID 42	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	sn_nodeid_41	Hashed target SN node ID 41	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	sn_nodeid_40	Hashed target SN node ID 40	RW	11'b00000000000

sys_cache_grp_sn_nodeid_reg11

Configures hashed node IDs for system cache groups. Controls target SN node IDs 44 to 47.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h1020

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

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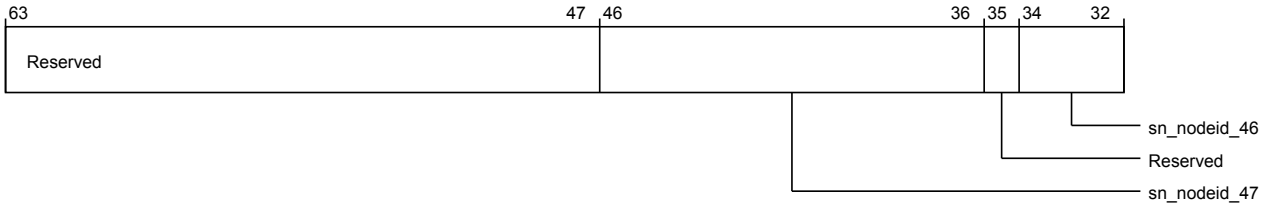

Figure 3-1014 por_rnsam_sys_cache_grp_sn_nodeid_reg11 (high)

The following table shows the sys_cache_grp_sn_nodeid_reg11 higher register bit assignments.

Table 3-1028 por_rnsam_sys_cache_grp_sn_nodeid_reg11 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	sn_nodeid_47	Hashed target SN node ID 47	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	sn_nodeid_46	Hashed target SN node ID 46	RW	11'b00000000000

The following image shows the lower register bit assignments.

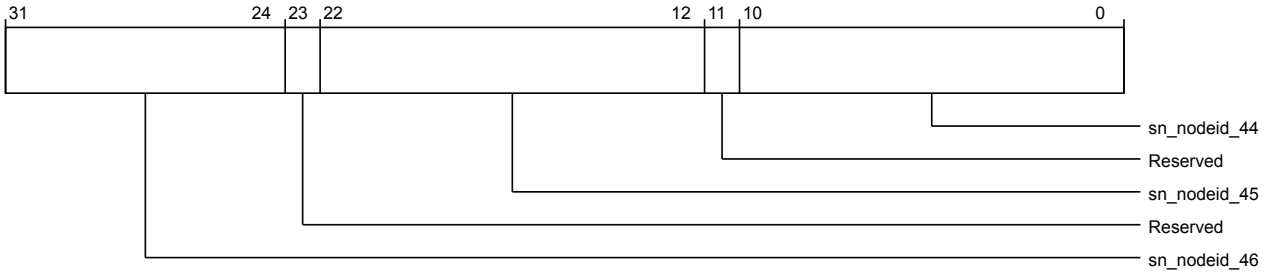

Figure 3-1015 por_rnsam_sys_cache_grp_sn_nodeid_reg11 (low)

The following table shows the sys_cache_grp_sn_nodeid_reg11 lower register bit assignments.

Table 3-1029 por_rnsam_sys_cache_grp_sn_nodeid_reg11 (low)

Bits	Field name	Description	Type	Reset
31:24	sn_nodeid_46	Hashed target SN node ID 46	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	sn_nodeid_45	Hashed target SN node ID 45	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	sn_nodeid_44	Hashed target SN node ID 44	RW	11'b00000000000

sys_cache_grp_sn_nodeid_reg12

Configures hashed node IDs for system cache groups. Controls target SN node IDs 48 to 51.

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Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h1028

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

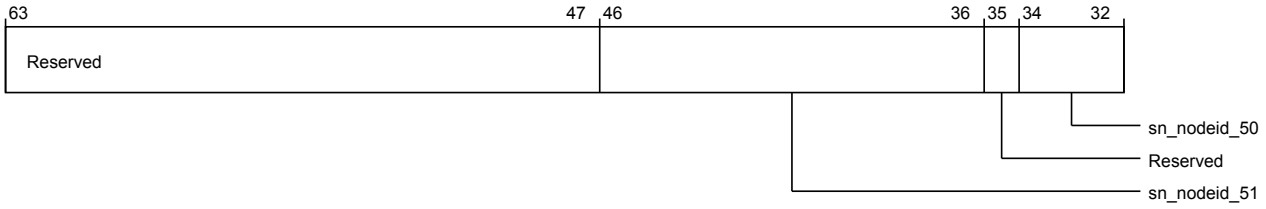

Figure 3-1016 por_rnsam_sys_cache_grp_sn_nodeid_reg12 (high)

The following table shows the sys_cache_grp_sn_nodeid_reg12 higher register bit assignments.

Table 3-1030 por_rnsam_sys_cache_grp_sn_nodeid_reg12 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	sn_nodeid_51	Hashed target SN node ID 51	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	sn_nodeid_50	Hashed target SN node ID 50	RW	11'b00000000000

The following image shows the lower register bit assignments.

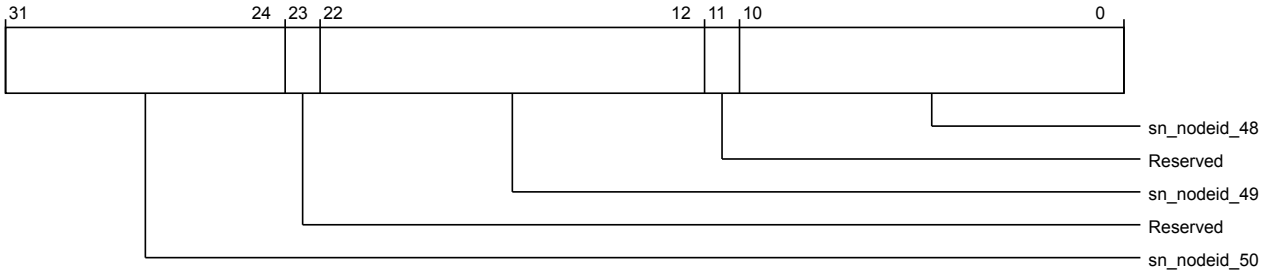

Figure 3-1017 por_rnsam_sys_cache_grp_sn_nodeid_reg12 (low)

The following table shows the sys_cache_grp_sn_nodeid_reg12 lower register bit assignments.

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Table 3-1031 por_rnsam_sys_cache_grp_sn_nodeid_reg12 (low)

Bits	Field name	Description	Type	Reset
31:24	sn_nodeid_50	Hashed target SN node ID 50	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	sn_nodeid_49	Hashed target SN node ID 49	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	sn_nodeid_48	Hashed target SN node ID 48	RW	11'b00000000000

sys_cache_grp_sn_nodeid_reg13

Configures hashed node IDs for system cache groups. Controls target SN node IDs 52 to 55.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h1030

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

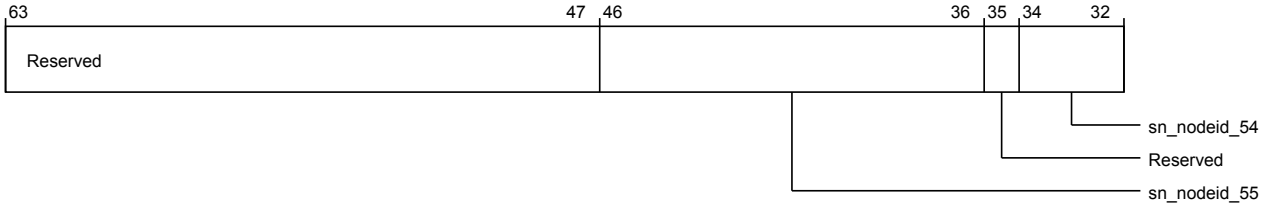

Figure 3-1018 por_rnsam_sys_cache_grp_sn_nodeid_reg13 (high)

The following table shows the sys_cache_grp_sn_nodeid_reg13 higher register bit assignments.

Table 3-1032 por_rnsam_sys_cache_grp_sn_nodeid_reg13 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	sn_nodeid_55	Hashed target SN node ID 55	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	sn_nodeid_54	Hashed target SN node ID 54	RW	11'b00000000000

The following image shows the lower register bit assignments.

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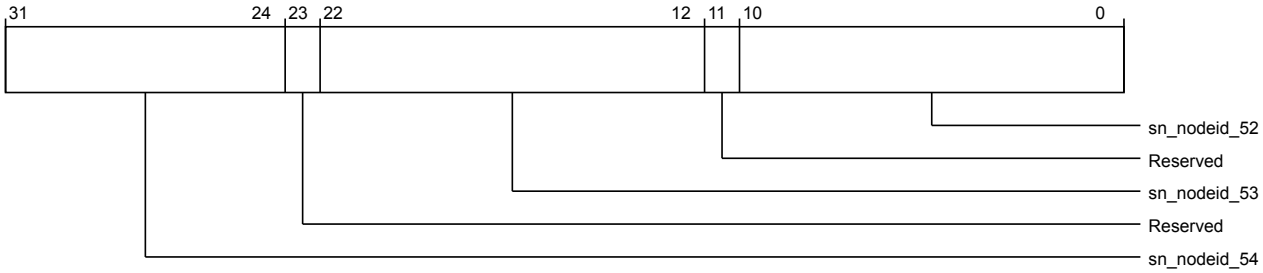

Figure 3-1019 por_rnsam_sys_cache_grp_sn_nodeid_reg13 (low)

The following table shows the sys_cache_grp_sn_nodeid_reg13 lower register bit assignments.

Table 3-1033 por_rnsam_sys_cache_grp_sn_nodeid_reg13 (low)

Bits	Field name	Description	Type	Reset
31:24	sn_nodeid_54	Hashed target SN node ID 54	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	sn_nodeid_53	Hashed target SN node ID 53	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	sn_nodeid_52	Hashed target SN node ID 52	RW	11'b00000000000

sys_cache_grp_sn_nodeid_reg14

Configures hashed node IDs for system cache groups. Controls target SN node IDs 56 to 59.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h1038

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

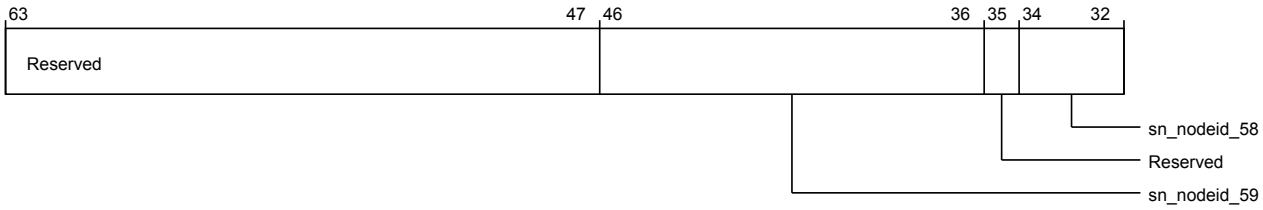

Figure 3-1020 por_rnsam_sys_cache_grp_sn_nodeid_reg14 (high)

The following table shows the sys_cache_grp_sn_nodeid_reg14 higher register bit assignments.

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Table 3-1034 por_rnsam_sys_cache_grp_sn_nodeid_reg14 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	sn_nodeid_59	Hashed target SN node ID 59	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	sn_nodeid_58	Hashed target SN node ID 58	RW	11'b00000000000

The following image shows the lower register bit assignments.

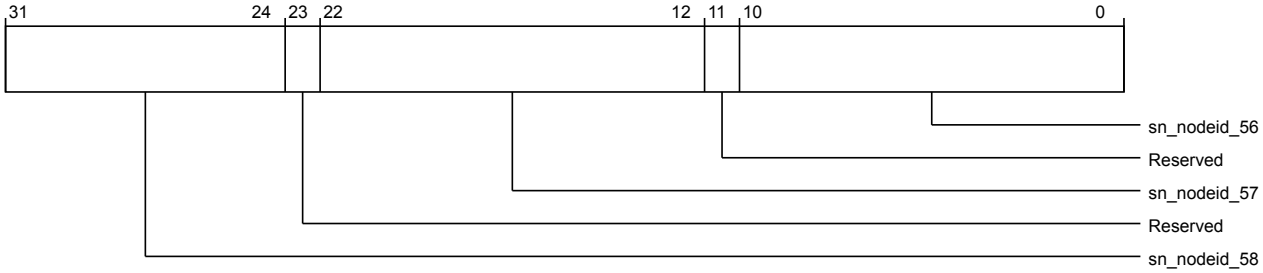

Figure 3-1021 por_rnsam_sys_cache_grp_sn_nodeid_reg14 (low)

The following table shows the sys_cache_grp_sn_nodeid_reg14 lower register bit assignments.

Table 3-1035 por_rnsam_sys_cache_grp_sn_nodeid_reg14 (low)

Bits	Field name	Description	Type	Reset
31:24	sn_nodeid_58	Hashed target SN node ID 58	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	sn_nodeid_57	Hashed target SN node ID 57	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	sn_nodeid_56	Hashed target SN node ID 56	RW	11'b00000000000

sys_cache_grp_sn_nodeid_reg15

Configures hashed node IDs for system cache groups. Controls target SN node IDs 60 to 63.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h1040

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

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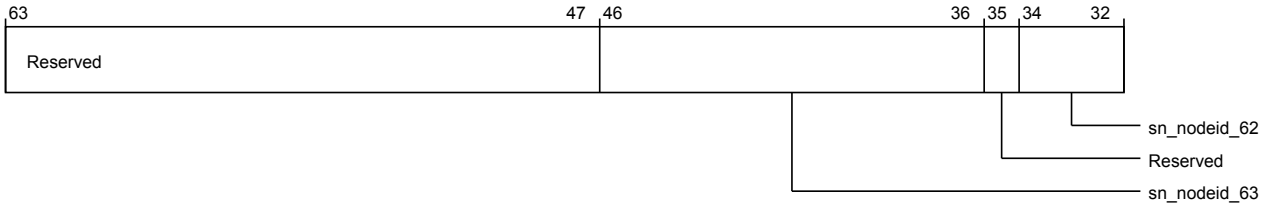

Figure 3-1022 por_rnsam_sys_cache_grp_sn_nodeid_reg15 (high)

The following table shows the sys_cache_grp_sn_nodeid_reg15 higher register bit assignments.

Table 3-1036 por_rnsam_sys_cache_grp_sn_nodeid_reg15 (high)

Bits	Field name	Description	Type	Reset
63:47	Reserved	Reserved	RO	-
46:36	sn_nodeid_63	Hashed target SN node ID 63	RW	11'b00000000000
35	Reserved	Reserved	RO	-
34:32	sn_nodeid_62	Hashed target SN node ID 62	RW	11'b00000000000

The following image shows the lower register bit assignments.

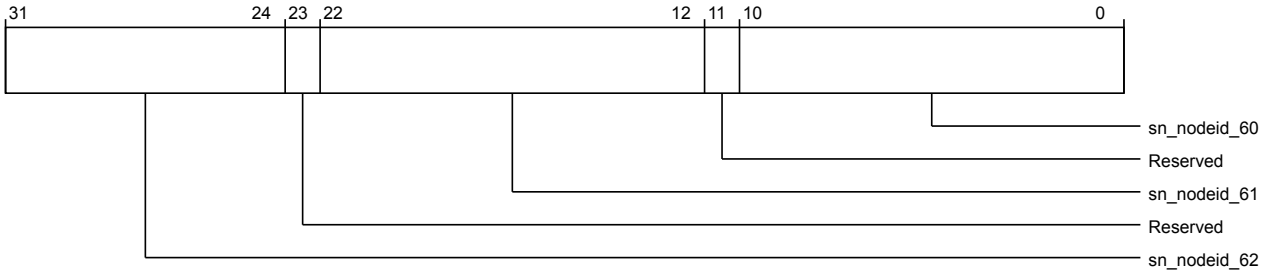

Figure 3-1023 por_rnsam_sys_cache_grp_sn_nodeid_reg15 (low)

The following table shows the sys_cache_grp_sn_nodeid_reg15 lower register bit assignments.

Table 3-1037 por_rnsam_sys_cache_grp_sn_nodeid_reg15 (low)

Bits	Field name	Description	Type	Reset
31:24	sn_nodeid_62	Hashed target SN node ID 62	RW	11'b00000000000
23	Reserved	Reserved	RO	-
22:12	sn_nodeid_61	Hashed target SN node ID 61	RW	11'b00000000000
11	Reserved	Reserved	RO	-
10:0	sn_nodeid_60	Hashed target SN node ID 60	RW	11'b00000000000

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3.3.10 SBSX register descriptions

This section lists the SBSX registers.

por_sbsx_node_info

Provides component identification information.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h0
Register reset Configuration dependent
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

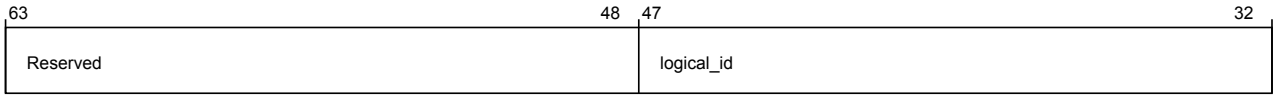

Figure 3-1024 por_sbsx_node_info (high)

The following table shows the por_sbsx_node_info higher register bit assignments.

Table 3-1038 por_sbsx_node_info (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	logical_id	Component logical ID	RO	Configuration dependent

The following image shows the lower register bit assignments.

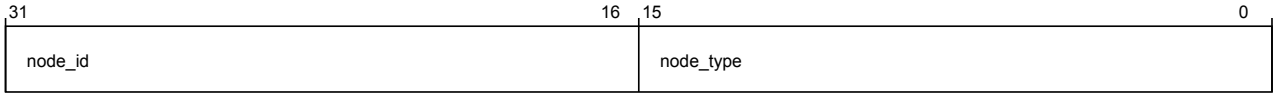

Figure 3-1025 por_sbsx_node_info (low)

The following table shows the por_sbsx_node_info lower register bit assignments.

Table 3-1039 por_sbsx_node_info (low)

Bits	Field name	Description	Type	Reset
31:16	node_id	Component node ID	RO	Configuration dependent
15:0	node_type	CMN-600 node type identifier	RO	16'h0007

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por_sbsx_child_info

Provides component child identification information.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h80
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

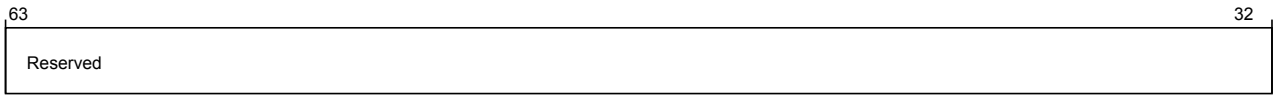

Figure 3-1026 por_sbsx_child_info (high)

The following table shows the por_sbsx_child_info higher register bit assignments.

Table 3-1040 por_sbsx_child_info (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

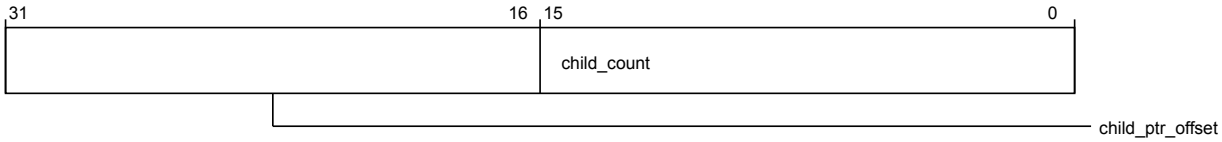

Figure 3-1027 por_sbsx_child_info (low)

The following table shows the por_sbsx_child_info lower register bit assignments.

Table 3-1041 por_sbsx_child_info (low)

Bits	Field name	Description	Type	Reset
31:16	child_ptr_offset	Starting register offset which contains pointers to the child nodes	RO	16'h0
15:0	child_count	Number of child nodes; used in discovery process	RO	16'b0

por_sbsx_unit_info

Provides component identification information for SBSX.

Its characteristics are:

Type RO
Register width (Bits) 64

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Address offset 14'h900

Register reset Configuration dependent

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

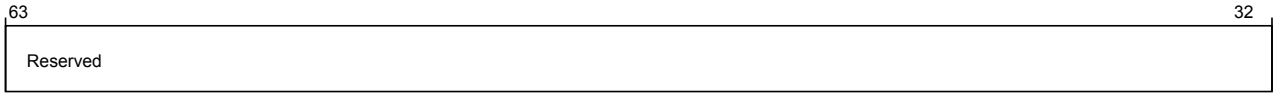

Figure 3-1028 por_sbsx_unit_info (high)

The following table shows the por_sbsx_unit_info higher register bit assignments.

Table 3-1042 por_sbsx_unit_info (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

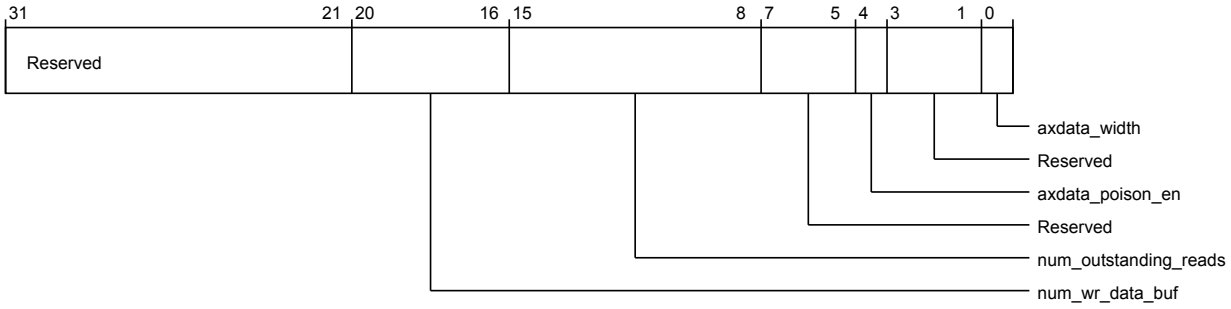

Figure 3-1029 por_sbsx_unit_info (low)

The following table shows the por_sbsx_unit_info lower register bit assignments.

Table 3-1043 por_sbsx_unit_info (low)

Bits	Field name	Description	Type	Reset
31:21	Reserved	Reserved	RO	-
20:16	num_wr_data_buf	Number of write data buffers in SBSX	RO	Configuration dependent
15:8	num_outstanding_reads	Maximum number of outstanding AXI read requests from SBSX	RO	Configuration dependent
7:5	Reserved	Reserved	RO	-
4	axdata_poison_en	Data poison support on ACE-Lite/AXI4 interface 1'b0: Not supported 1'b1: Supported	RO	Configuration dependent

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Table 3-1043 por_sbsx_unit_info (low) (continued)

Bits	Field name	Description	Type	Reset
3:1	Reserved	Reserved	RO	-
0	axdata_width	Data width on ACE-Lite/AXI4 interface 1'b0: 128 bits 1'b1: 256 bits	RO	Configuration dependent

por_sbsx_aux_ctl

Functions as the auxiliary control register for the SBSX bridge.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hA08

Register reset 64'b0

Usage constraints Only accessible by secure accesses. This register can be modified only with prior written permission from Arm.

The following image shows the higher register bit assignments.

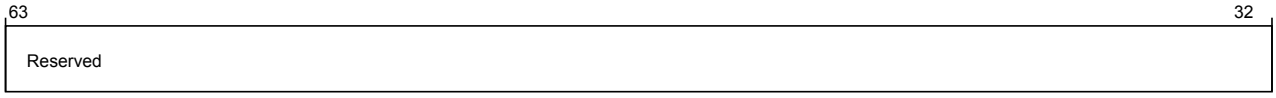

Figure 3-1030 por_sbsx_aux_ctl (high)

The following table shows the por_sbsx_aux_ctl higher register bit assignments.

Table 3-1044 por_sbsx_aux_ctl (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

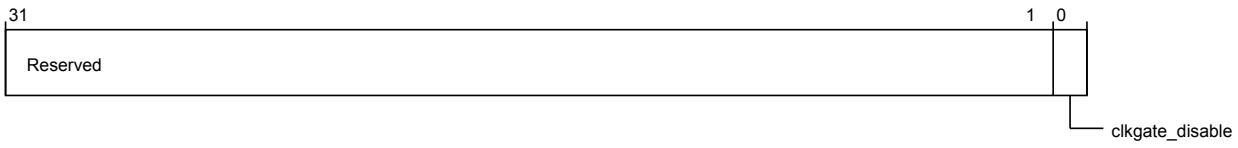

Figure 3-1031 por_sbsx_aux_ctl (low)

The following table shows the por_sbsx_aux_ctl lower register bit assignments.

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Table 3-1045 por_sbsx_aux_ctl (low)

Bits	Field name	Description	Type	Reset
31:1	Reserved	Reserved	RO	-
0	clkgate_disable	Disables internal clock gating in SBSX bridge	RW	1'b0

por_sbsx_errfr

Functions as the error feature register.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h3000
Register reset 64'b0000010100001
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

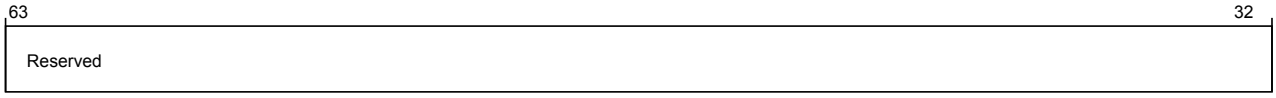

Figure 3-1032 por_sbsx_errfr (high)

The following table shows the por_sbsx_errfr higher register bit assignments.

Table 3-1046 por_sbsx_errfr (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

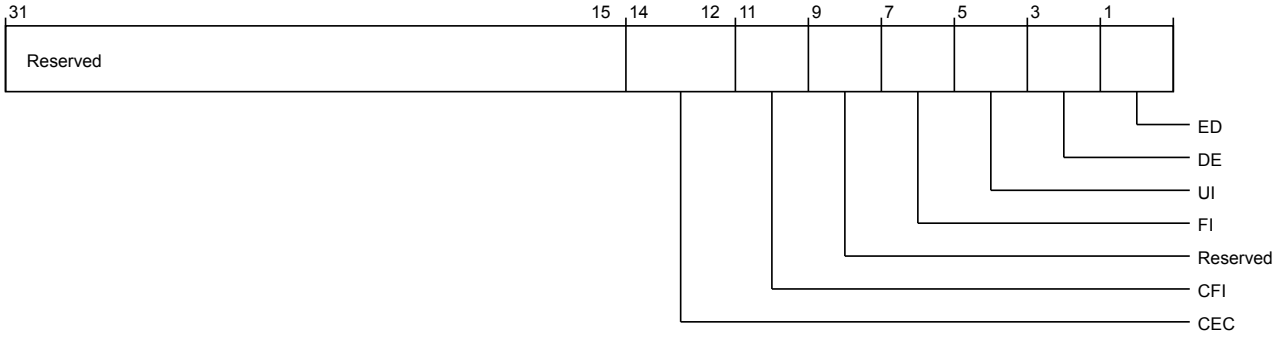

Figure 3-1033 por_sbsx_errfr (low)

The following table shows the por_sbsx_errfr lower register bit assignments.

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Table 3-1047 por_sbsx_errfr (low)

Bits	Field name	Description	Type	Reset
31:15	Reserved	Reserved	RO	-
14:12	CEC	Standard corrected error count mechanism 3'b000: Does not implement standardized error counter model	RO	3'b000
11:10	CFI	Corrected error interrupt	RO	2'b00
9:8	Reserved	Reserved	RO	-
7:6	FI	Fault handling interrupt	RO	2'b10
5:4	UI	Uncorrected error interrupt	RO	2'b10
3:2	DE	Deferred errors	RO	2'b00
1:0	ED	Error detection	RO	2'b01

por_sbsx_errctlr

Functions as the error control register. Controls whether specific error-handling interrupts and error detection/deferment are enabled.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h3008
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

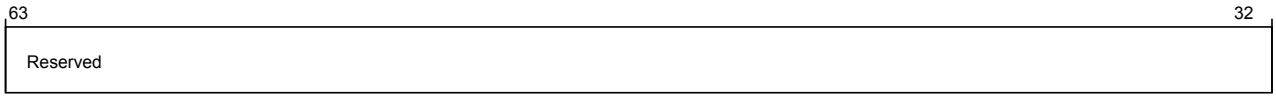

Figure 3-1034 por_sbsx_errctlr (high)

The following table shows the por_sbsx_errctlr higher register bit assignments.

Table 3-1048 por_sbsx_errctlr (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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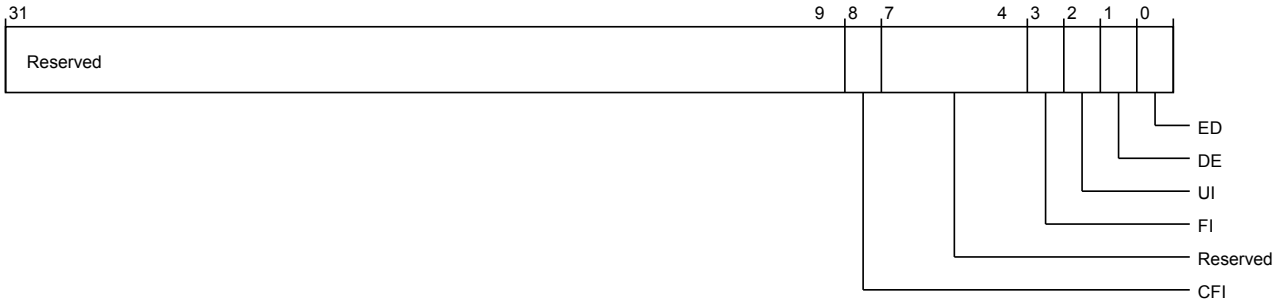

Figure 3-1035 por_sbsx_errctlr (low)

The following table shows the por_sbsx_errctlr lower register bit assignments.

Table 3-1049 por_sbsx_errctlr (low)

Bits	Field name	Description	Type	Reset
31:9	Reserved	Reserved	RO	-
8	CFI	Enables corrected error interrupt as specified in por_sbsx_errfr.CFI	RW	1'b0
7:4	Reserved	Reserved	RO	-
3	FI	Enables fault handling interrupt for all detected deferred errors as specified in por_sbsx_errfr.FI	RW	1'b0
2	UI	Enables uncorrected error interrupt as specified in por_sbsx_errfr.UI	RW	1'b0
1	DE	Enables error deferment as specified in por_sbsx_errfr.DE	RW	1'b0
0	ED	Enables error detection as specified in por_sbsx_errfr.ED	RW	1'b0

por_sbsx_errstatus

Functions as the error status register. AV and MV bits must be cleared in the same cycle, otherwise the error record does not have a consistent view.

Its characteristics are:

Type W1C
Register width (Bits) 64
Address offset 14'h3010
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

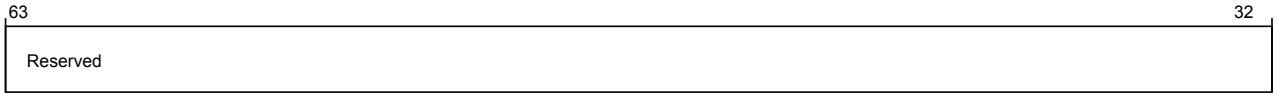

Figure 3-1036 por_sbsx_errstatus (high)

The following table shows the por_sbsx_errstatus higher register bit assignments.

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Table 3-1050 por_sbsx_errstatus (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

Figure 3-1037 por_sbsx_errstatus (low)

The following table shows the por_sbsx_errstatus lower register bit assignments.

Table 3-1051 por_sbsx_errstatus (low)

Bits	Field name	Description	Type	Reset
31	AV	Address register valid; writes to this bit are ignored if any of the UE, DE, or CE bits are set to 1, and the highest priority are not cleared to 0 in the same write; write a 1 to clear 1'b1: Address is valid; por_sbsx_erraddr contains a physical address for that recorded error 1'b0: Address is not valid	W1C	1'b0
30	V	Register valid; writes to this bit are ignored if any of the UE, DE, or CE bits are set to 1, and are not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one error recorded; register is valid 1'b0: No errors recorded	W1C	1'b0
29	UE	Uncorrected errors; writes to this bit are ignored if the OF bit is set to 1, and is not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one error detected that is not corrected and is not deferred to a slave 1'b0: No uncorrected errors detected	W1C	1'b0
28	Reserved	Reserved	RO	-
27	OF	Overflow; asserted when multiple errors of the highest priority type are detected; write a 1 to clear 1'b1: More than one error detected 1'b0: Only one error of the highest priority type detected as described by UE/DE/CE fields	W1C	1'b0

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Table 3-1051 por_sbsx_errstatus (low) (continued)

Bits	Field name	Description	Type	Reset
26	MV	por_sbsx_errmisc valid; writes to this bit are ignored if any of the UE, DE, or CE bits are set to 1, and the highest priority are not cleared to 0 in the same write; write a 1 to clear 1'b1: Miscellaneous registers are valid 1'b0: Miscellaneous registers are not valid	W1C	1'b0
25	Reserved	Reserved	RO	-
24	CE	Corrected errors; writes to this bit are ignored if the OF bit is set to 1, and is not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one transient corrected error recorded 1'b0: No corrected errors recorded	W1C	1'b0
23	DE	Deferred errors; writes to this bit are ignored if the OF bit is set to 1, and is not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one error is not corrected and is deferred 1'b0: No errors deferred	W1C	1'b0
22:0	Reserved	Reserved	RO	-

por_sbsx_erraddr

Contains the error record address.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h3018
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

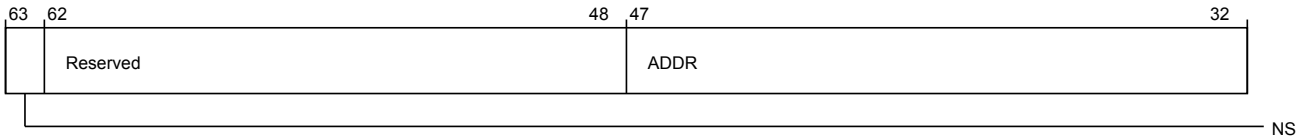

Figure 3-1038 por_sbsx_erraddr (high)

The following table shows the por_sbsx_erraddr higher register bit assignments.

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Table 3-1052 por_sbsx_erraddr (high)

Bits	Field name	Description	Type	Reset
63	NS	Security status of transaction 1'b1: Non-secure transaction 1'b0: Secure transaction CONSTRAINT: por_sbsx_erraddr.NS is redundant. Since it is writable, it cannot be used for logic qualification.	RW	1'b0
62:48	Reserved	Reserved	RO	-
47:32	ADDR	Transaction address	RW	48'b0

The following image shows the lower register bit assignments.

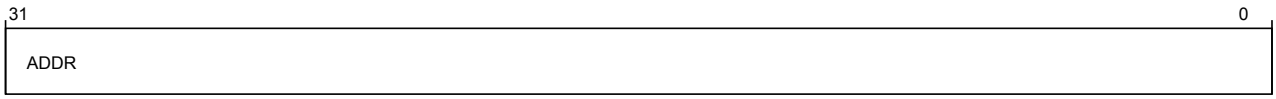

Figure 3-1039 por_sbsx_erraddr (low)

The following table shows the por_sbsx_erraddr lower register bit assignments.

Table 3-1053 por_sbsx_erraddr (low)

Bits	Field name	Description	Type	Reset
31:0	ADDR	Transaction address	RW	48'b0

por_sbsx_errmisc

Functions as the miscellaneous error register. Contains miscellaneous information about deferred/uncorrected errors.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h3020
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

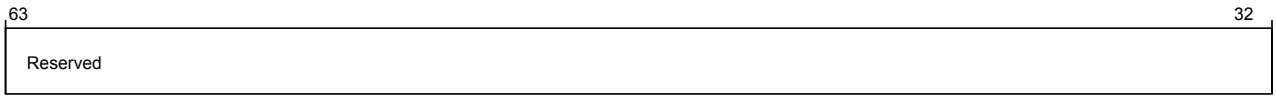

Figure 3-1040 por_sbsx_errmisc (high)

The following table shows the por_sbsx_errmisc higher register bit assignments.

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Table 3-1054 por_sbsx_errmisc (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

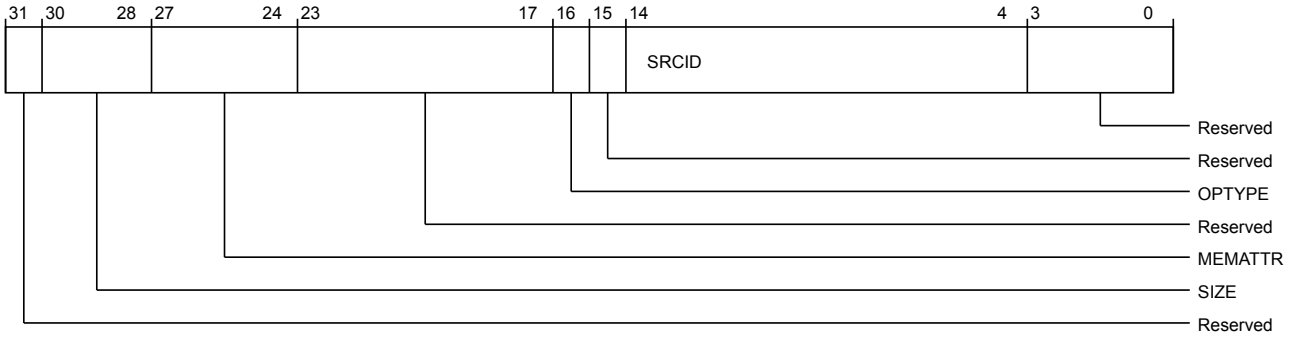

Figure 3-1041 por_sbsx_errmisc (low)

The following table shows the por_sbsx_errmisc lower register bit assignments.

Table 3-1055 por_sbsx_errmisc (low)

Bits	Field name	Description	Type	Reset
31	Reserved	Reserved	RO	-
30:28	SIZE	Error transaction size	RW	3'b0
27:24	MEMATTR	Error memory attributes	RW	4'b0
23:17	Reserved	Reserved	RO	-
16	OPTYPE	Error opcode type 1'b1: WR_NO_SNP_PTL (partial) 1'b0: WR_NO_SNP_FULL	RW	1'b0
15	Reserved	Reserved	RO	-
14:4	SRCID	Error source ID	RW	11'b0
3:0	Reserved	Reserved	RO	-

por_sbsx_errfr_NS

Functions as the non-secure error feature register.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h3100
Register reset 64'b0000010100001

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Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

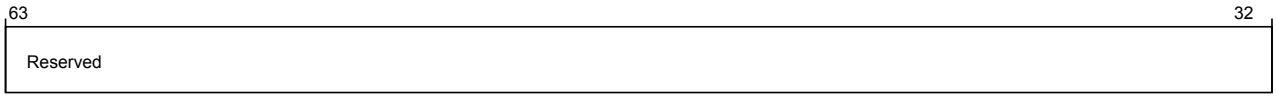

Figure 3-1042 por_sbsx_errfr_ns (high)

The following table shows the por_sbsx_errfr_NS higher register bit assignments.

Table 3-1056 por_sbsx_errfr_ns (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

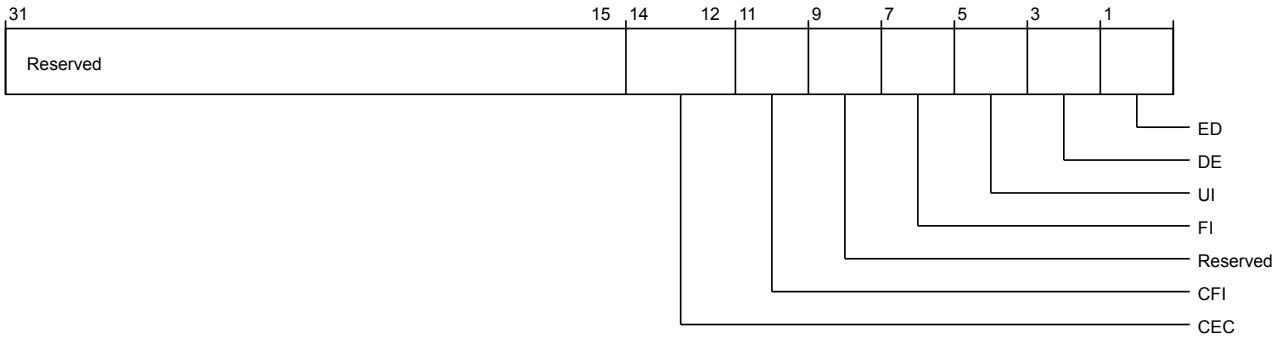

Figure 3-1043 por_sbsx_errfr_ns (low)

The following table shows the por_sbsx_errfr_NS lower register bit assignments.

Table 3-1057 por_sbsx_errfr_ns (low)

Bits	Field name	Description	Type	Reset
31:15	Reserved	Reserved	RO	-
14:12	CEC	Standard corrected error count mechanism 3'b000: Does not implement standardized error counter model	RO	3'b000
11:10	CFI	Corrected error interrupt	RO	2'b00
9:8	Reserved	Reserved	RO	-
7:6	FI	Fault handling interrupt	RO	2'b10
5:4	UI	Uncorrected error interrupt	RO	2'b10

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Table 3-1057 por_sbsx_errfr_ns (low) (continued)

Bits	Field name	Description	Type	Reset
3:2	DE	Deferred errors	RO	2'b00
1:0	ED	Error detection	RO	2'b01

por_sbsx_errctlr_NS

Functions as the non-secure error control register. Controls whether specific error-handling interrupts and error detection/deferment are enabled.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h3108

Register reset 64'b0

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

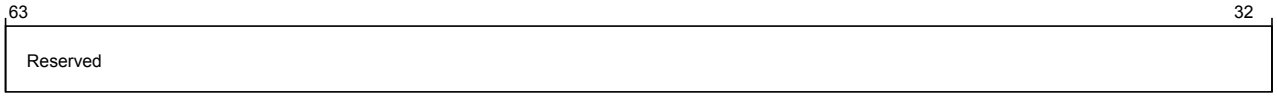

Figure 3-1044 por_sbsx_errctlr_ns (high)

The following table shows the por_sbsx_errctlr_NS higher register bit assignments.

Table 3-1058 por_sbsx_errctlr_ns (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

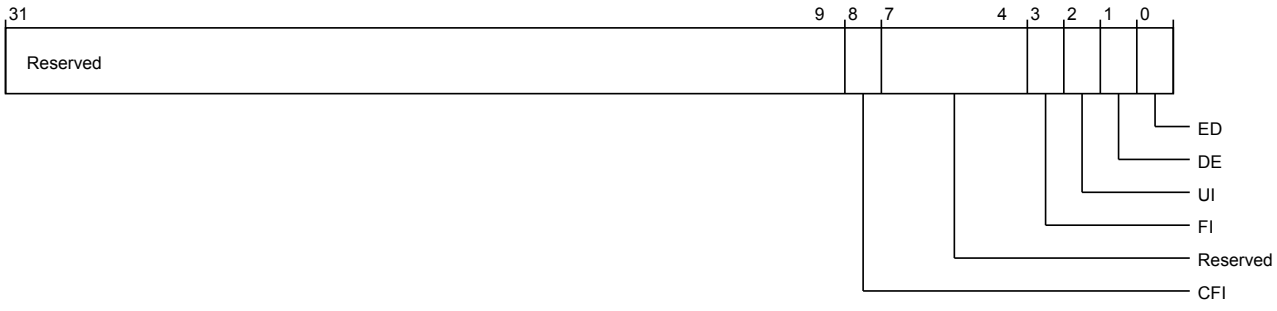

Figure 3-1045 por_sbsx_errctlr_ns (low)

The following table shows the por_sbsx_errctlr_NS lower register bit assignments.

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Table 3-1059 por_sbsx_errctlr_ns (low)

Bits	Field name	Description	Type	Reset
31:9	Reserved	Reserved	RO	-
8	CFI	Enables corrected error interrupt as specified in por_sbsx_errfr_NS.CFI	RW	1'b0
7:4	Reserved	Reserved	RO	-
3	FI	Enables fault handling interrupt for all detected deferred errors as specified in por_sbsx_errfr_NS.FI	RW	1'b0
2	UI	Enables uncorrected error interrupt as specified in por_sbsx_errfr_NS.UI	RW	1'b0
1	DE	Enables error deferment as specified in por_sbsx_errfr_NS.DE	RW	1'b0
0	ED	Enables error detection as specified in por_sbsx_errfr_NS.ED	RW	1'b0

por_sbsx_errstatus_NS

Functions as the non-secure error status register.

Its characteristics are:

Type W1C
Register width (Bits) 64
Address offset 14'h3110
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

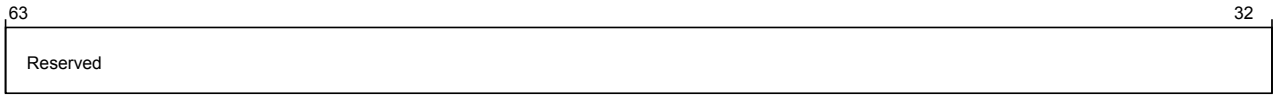

Figure 3-1046 por_sbsx_errstatus_ns (high)

The following table shows the por_sbsx_errstatus_NS higher register bit assignments.

Table 3-1060 por_sbsx_errstatus_ns (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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Figure 3-1047 por_sbsx_errstatus_ns (low)

The following table shows the por_sbsx_errstatus_NS lower register bit assignments.

Table 3-1061 por_sbsx_errstatus_ns (low)

Bits	Field name	Description	Type	Reset
31	AV	Address register valid; writes to this bit are ignored if any of the UE, DE, or CE bits are set to 1, and the highest priority are not cleared to 0 in the same write; write a 1 to clear 1'b1: Address is valid; por_sbsx_erraddr_NS contains a physical address for that recorded error 1'b0: Address is not valid	W1C	1'b0
30	V	Register valid; writes to this bit are ignored if any of the UE, DE, or CE bits are set to 1, and are not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one error recorded; register is valid 1'b0: No errors recorded	W1C	1'b0
29	UE	Uncorrected errors; writes to this bit are ignored if the OF bit is set to 1, and is not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one error detected that is not corrected and is not deferred to a slave 1'b0: No uncorrected errors detected	W1C	1'b0
28	Reserved	Reserved	RO	-
27	OF	Overflow; asserted when multiple errors of the highest priority type are detected; write a 1 to clear 1'b1: More than one error detected 1'b0: Only one error of the highest priority type detected as described by UE/DE/CE fields	W1C	1'b0
26	MV	por_sbsx_errmisc_NS valid; writes to this bit are ignored if any of the UE, DE, or CE bits are set to 1, and the highest priority are not cleared to 0 in the same write; write a 1 to clear 1'b1: Miscellaneous registers are valid 1'b0: Miscellaneous registers are not valid	W1C	1'b0
25	Reserved	Reserved	RO	-

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Table 3-1061 por_sbsx_errstatus_ns (low) (continued)

Bits	Field name	Description	Type	Reset
24	CE	Corrected errors; writes to this bit are ignored if the OF bit is set to 1, and is not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one transient corrected error recorded 1'b0: No corrected errors recorded	W1C	1'b0
23	DE	Deferred errors; writes to this bit are ignored if the OF bit is set to 1, and is not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one error is not corrected and is deferred 1'b0: No errors deferred	W1C	1'b0
22:0	Reserved	Reserved	RO	-

por_sbsx_erraddr_NS

Contains the non-secure error record address.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h3118
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

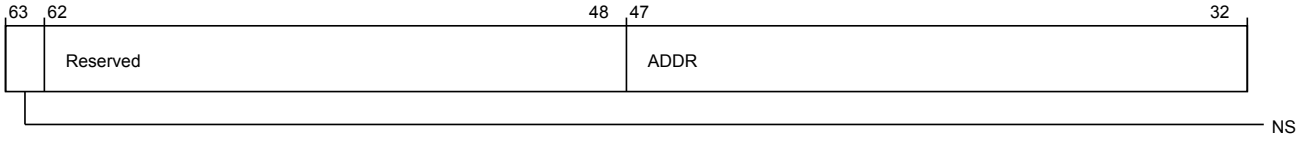

Figure 3-1048 por_sbsx_erraddr_ns (high)

The following table shows the por_sbsx_erraddr_NS higher register bit assignments.

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Table 3-1062 por_sbsx_erraddr_ns (high)

Bits	Field name	Description	Type	Reset
63	NS	Security status of transaction 1'b1: Non-secure transaction 1'b0: Secure transaction CONSTRAINT: por_sbsx_erraddr_NS.NS is redundant. Since it is writable, it cannot be used for logic qualification.	RW	1'b0
62:48	Reserved	Reserved	RO	-
47:32	ADDR	Transaction address	RW	48'b0

The following image shows the lower register bit assignments.

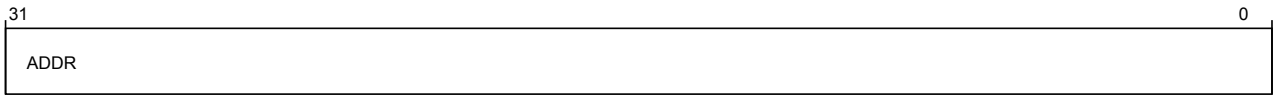

Figure 3-1049 por_sbsx_erraddr_ns (low)

The following table shows the por_sbsx_erraddr_NS lower register bit assignments.

Table 3-1063 por_sbsx_erraddr_ns (low)

Bits	Field name	Description	Type	Reset
31:0	ADDR	Transaction address	RW	48'b0

por_sbsx_errmisc_NS

Functions as the non-secure miscellaneous error register. Contains miscellaneous information about deferred/uncorrected errors.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h3120

Register reset 64'b0

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

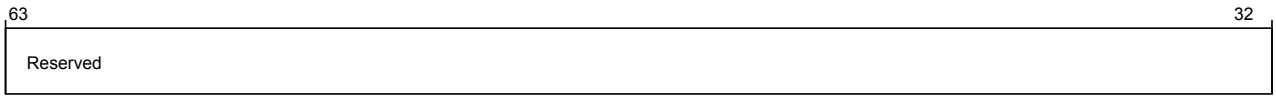

Figure 3-1050 por_sbsx_errmisc_ns (high)

The following table shows the por_sbsx_errmisc_NS higher register bit assignments.

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Table 3-1064 por_sbsx_errmisc_ns (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

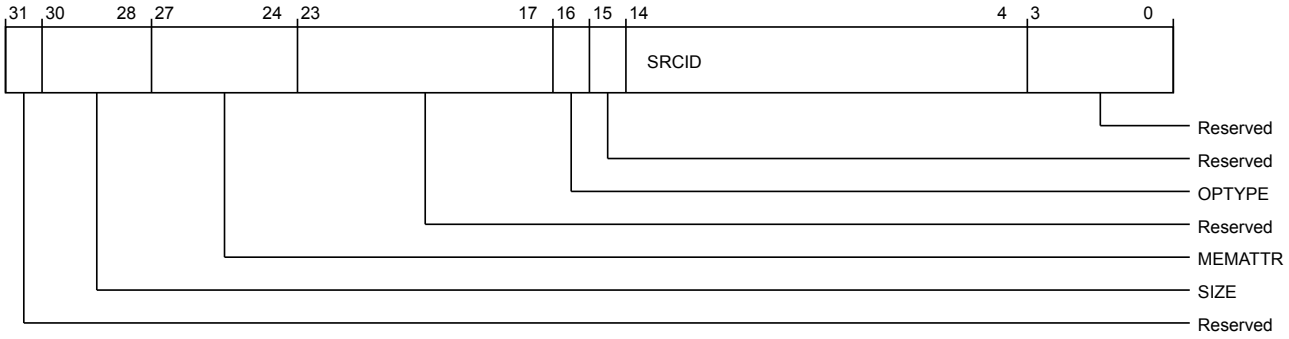

Figure 3-1051 por_sbsx_errmisc_ns (low)

The following table shows the por_sbsx_errmisc_NS lower register bit assignments.

Table 3-1065 por_sbsx_errmisc_ns (low)

Bits	Field name	Description	Type	Reset
31	Reserved	Reserved	RO	-
30:28	SIZE	Error transaction size	RW	3'b0
27:24	MEMATTR	Error memory attributes	RW	4'b0
23:17	Reserved	Reserved	RO	-
16	OPTYPE	Error opcode type 1'b1: WR_NO_SNP_PTL (partial) 1'b0: WR_NO_SNP_FULL	RW	1'b0
15	Reserved	Reserved	RO	-
14:4	SRCID	Error source ID	RW	11'b0
3:0	Reserved	Reserved	RO	-

por_sbsx_pmu_event_sel

Specifies the PMU event to be counted.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h2000
Register reset 64'b0

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Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

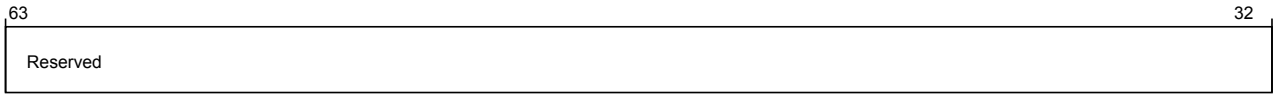

Figure 3-1052 por_sbsx_pmu_event_sel (high)

The following table shows the por_sbsx_pmu_event_sel higher register bit assignments.

Table 3-1066 por_sbsx_pmu_event_sel (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

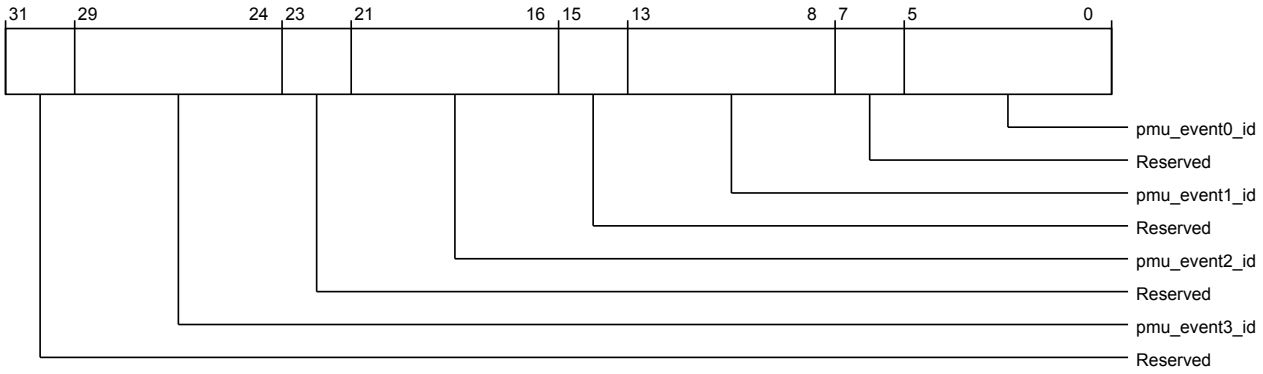

Figure 3-1053 por_sbsx_pmu_event_sel (low)

The following table shows the por_sbsx_pmu_event_sel lower register bit assignments.

Table 3-1067 por_sbsx_pmu_event_sel (low)

Bits	Field name	Description	Type	Reset
31:30	Reserved	Reserved	RO	-
29:24	pmu_event3_id	SBSX PMU Event 3 select; see pmu_event0_id for encodings	RW	6'b0
23:22	Reserved	Reserved	RO	-
21:16	pmu_event2_id	SBSX PMU Event 2 select; see pmu_event0_id for encodings	RW	6'b0
15:14	Reserved	Reserved	RO	-
13:8	pmu_event1_id	SBSX PMU Event 1 select; see pmu_event0_id for encodings	RW	6'b0

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Table 3-1067 por_sbsx_pmu_event_sel (low) (continued)

Bits	Field name	Description	Type	Reset
7:6	Reserved	Reserved	RO	-
5:0	pmu_event0_id	SBSX PMU Event 0 select 6'h00: No event 6'h01: Read request 6'h02: Write request 6'h03: CMO request 6'h04: RETRYACK TXRSP flit sent 6'h05: TXDAT flit seen 6'h06: TXRSP flit seen 6'h11: Read request tracker occupancy count overflow 6'h12: Write request tracker occupancy count overflow 6'h13: CMO request tracker occupancy count overflow 6'h14: WDB occupancy count overflow 6'h15: Read AXI pending tracker occupancy count overflow 6'h16: CMO AXI pending tracker occupancy count overflow 6'h21: ARVALID set without ARREADY 6'h22: AWVALID set without AWREADY 6'h23: WVALID set without WREADY 6'h24: TXDAT stall (TXDAT valid but no link credit available) 6'h25: TXRSP stall (TXRSP valid but no link credit available) ——————— **Note** ——————— All other encodings are reserved. ———————————————	RW	6'b0

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3.3.11 CXHA configuration registers

This section lists the CXHA configuration registers.

por_cxg_ha_node_info

Provides component identification information.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h0
Register reset Configuration dependent
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

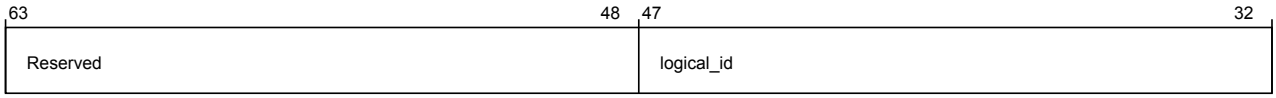

Figure 3-1054 por_cxg_ha_node_info (high)

The following table shows the por_cxg_ha_node_info higher register bit assignments.

Table 3-1068 por_cxg_ha_node_info (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	logical_id	Component logical ID	RO	Configuration dependent

The following image shows the lower register bit assignments.

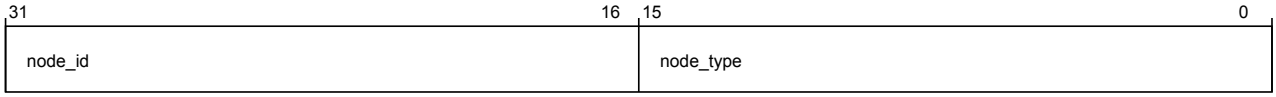

Figure 3-1055 por_cxg_ha_node_info (low)

The following table shows the por_cxg_ha_node_info lower register bit assignments.

Table 3-1069 por_cxg_ha_node_info (low)

Bits	Field name	Description	Type	Reset
31:16	node_id	Component CHI node ID	RO	Configuration dependent
15:0	node_type	CMN-600 node type identifier	RO	16'h0101

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por_cxg_ha_id

Contains the CCIX-assigned HAID.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h8
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

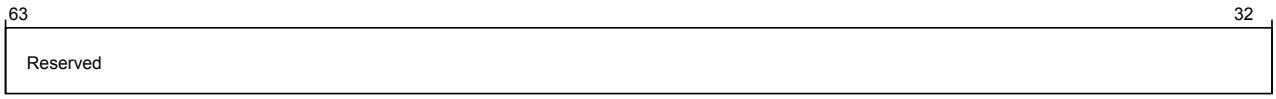

Figure 3-1056 por_cxg_ha_id (high)

The following table shows the por_cxg_ha_id higher register bit assignments.

Table 3-1070 por_cxg_ha_id (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

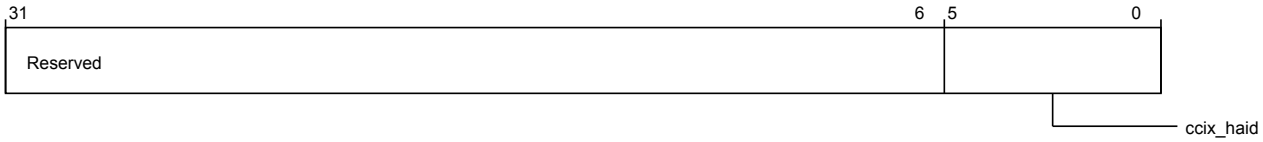

Figure 3-1057 por_cxg_ha_id (low)

The following table shows the por_cxg_ha_id lower register bit assignments.

Table 3-1071 por_cxg_ha_id (low)

Bits	Field name	Description	Type	Reset
31:6	Reserved	Reserved	RO	-
5:0	ccix_haid	CCIX HAID	RW	6'h0

por_cxg_ha_child_info

Provides component child identification information.

Its characteristics are:

Type RO
Register width (Bits) 64

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Address offset 14'h80

Register reset 64'b0

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

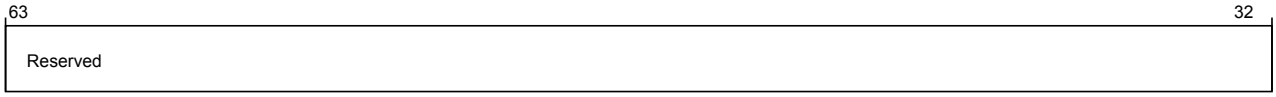

Figure 3-1058 por_cxg_ha_child_info (high)

The following table shows the por_cxg_ha_child_info higher register bit assignments.

Table 3-1072 por_cxg_ha_child_info (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

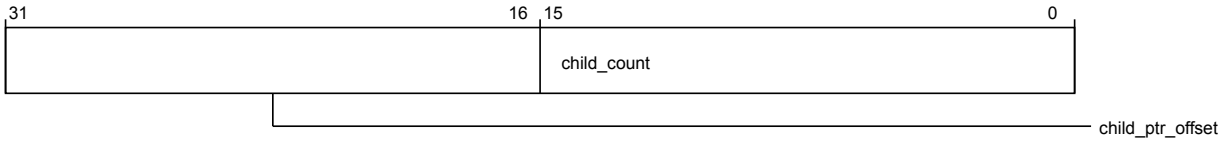

Figure 3-1059 por_cxg_ha_child_info (low)

The following table shows the por_cxg_ha_child_info lower register bit assignments.

Table 3-1073 por_cxg_ha_child_info (low)

Bits	Field name	Description	Type	Reset
31:16	child_ptr_offset	Starting register offset which contains pointers to the child nodes	RO	16'h0
15:0	child_count	Number of child nodes; used in discovery process	RO	16'h0

por_cxg_ha_aux_ctl

Functions as the auxiliary control register for CXHA.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hA08

Register reset Configuration dependent

Usage constraints Only accessible by secure accesses. This register can be modified only with prior written permission from Arm.

The following image shows the higher register bit assignments.

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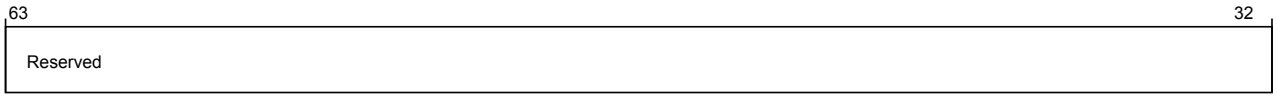

Figure 3-1060 por_cxg_ha_aux_ctl (high)

The following table shows the por_cxg_ha_aux_ctl higher register bit assignments.

Table 3-1074 por_cxg_ha_aux_ctl (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

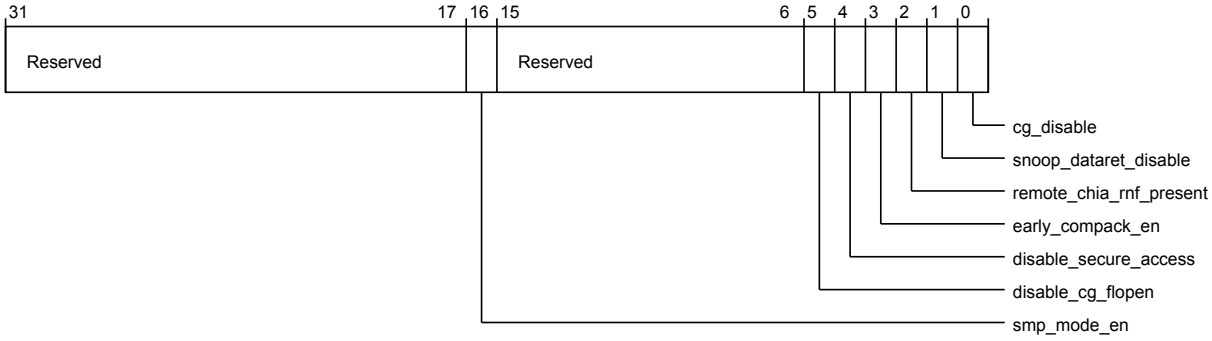

Figure 3-1061 por_cxg_ha_aux_ctl (low)

The following table shows the por_cxg_ha_aux_ctl lower register bit assignments.

Table 3-1075 por_cxg_ha_aux_ctl (low)

Bits	Field name	Description	Type	Reset
31:17	Reserved	Reserved	RO	-
16	smp_mode_en	When set, enables Symmetric Multiprocessor Mode (SMP) Mode.	RW	1'b0
15:6	Reserved	Reserved	RO	-
5	disable_cg_flopen	Disables enhanced flop enable control for dynamic power savings	RW	1'b0
4	disable_secure_access	Converts all accesses to non-secure	RW	1'b0
3	early_compack_en	Early CompAck enable; enables sending early CompAck on CCIX for requests that require CompAck	RW	1'b1
2	remote_chia_rnf_present	Indicates existence of CHIA RN-F in system; HA uses this indication to send SnpToS or SnpToSC 1'b0: HA converts SnpShared, SnpClean, and SnpNotSharedDirty to SnpToSC 1'b1: HA converts SnpShared, SnpClean, and SnpNotSharedDirty to SnpToS	RW	1'b0

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Table 3-1075 por_cxg_ha_aux_ctl (low) (continued)

Bits	Field name	Description	Type	Reset
1	snoop_dataret_disable	Disables setting data return for CCIX snoop requests for all CHI snoop opcodes	RW	1'b0
0	cg_disable	Disables clock gating when set	RW	1'b0

por_cxg_ha_secure_register_groups_override

Allows non-secure access to predefined groups of secure registers.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h980

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

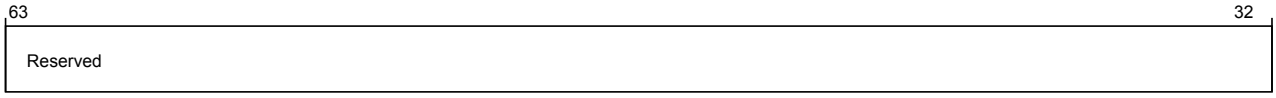

Figure 3-1062 por_cxg_ha_secure_register_groups_override (high)

The following table shows the por_cxg_ha_secure_register_groups_override higher register bit assignments.

Table 3-1076 por_cxg_ha_secure_register_groups_override (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

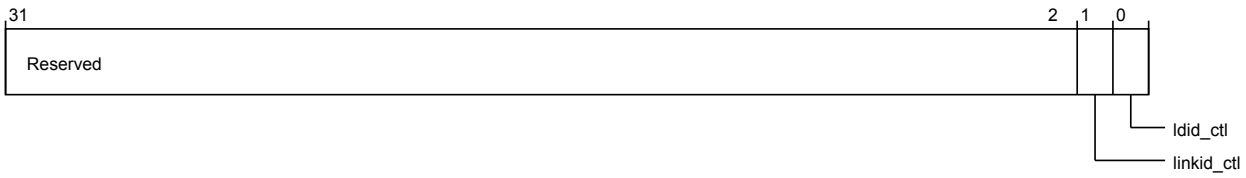

Figure 3-1063 por_cxg_ha_secure_register_groups_override (low)

The following table shows the por_cxg_ha_secure_register_groups_override lower register bit assignments.

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Table 3-1077 por_cxg_ha_secure_register_groups_override (low)

Bits	Field name	Description	Type	Reset
31:2	Reserved	Reserved	RO	-
1	linkid_ctl	Allows non-secure access to secure HA Link ID registers	RW	1'b0
0	ldid_ctl	Allows non-secure access to secure HA LDID registers	RW	1'b0

por_cxg_ha_unit_info

Provides component identification information for CXHA.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h900
Register reset Configuration dependent
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

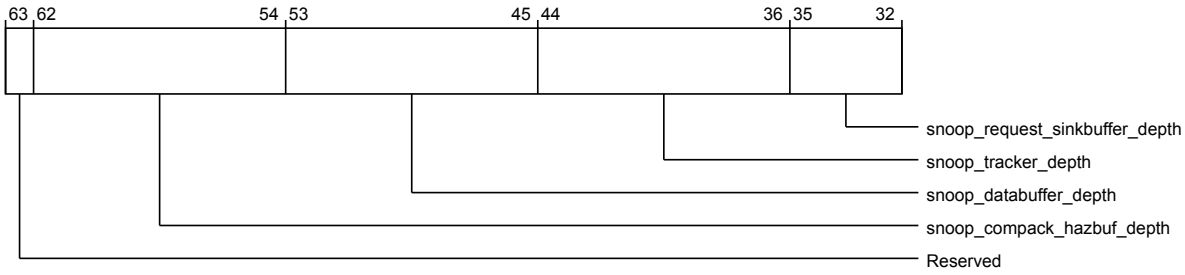

Figure 3-1064 por_cxg_ha_unit_info (high)

The following table shows the por_cxg_ha_unit_info higher register bit assignments.

Table 3-1078 por_cxg_ha_unit_info (high)

Bits	Field name	Description	Type	Reset
63	Reserved	Reserved	RO	-
62:54	snoop_compack_hazbuf_depth	Depth of CompAck snoop hazard buffer	RO	Configuration dependent
53:45	snoop_databuffer_depth	Depth of snoop data buffer	RO	Configuration dependent
44:36	snoop_tracker_depth	Depth of snoop tracker; number of outstanding SNP requests on CCIX	RO	Configuration dependent
35:32	snoop_request_sinkbuffer_depth	Depth of snoop request sink buffer; number of CHI SNP requests that can be sunk by CXHA	RO	Configuration dependent

The following image shows the lower register bit assignments.

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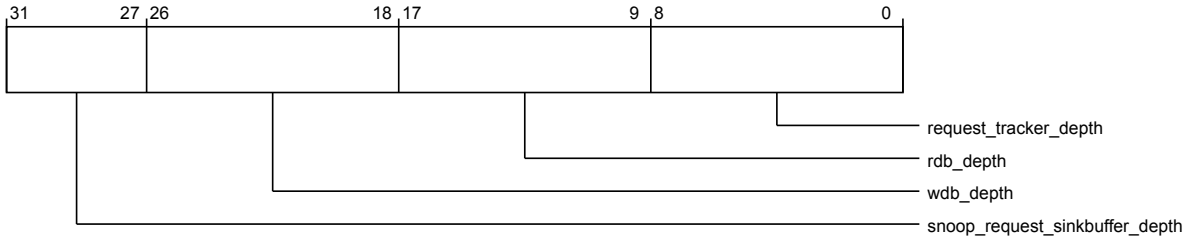

Figure 3-1065 por_cxg_ha_unit_info (low)

The following table shows the por_cxg_ha_unit_info lower register bit assignments.

Table 3-1079 por_cxg_ha_unit_info (low)

Bits	Field name	Description	Type	Reset
31:27	snoop_request_sinkbuffer_depth	Depth of snoop request sink buffer; number of CHI SNP requests that can be sunk by CXHA	RO	Configuration dependent
26:18	wdb_depth	Depth of write data buffer	RO	Configuration dependent
17:9	rdb_depth	Depth of read data buffer	RO	Configuration dependent
8:0	request_tracker_depth	Depth of request tracker	RO	Configuration dependent

por_cxg_ha_rnf_raid_to_ldid_reg0

Specifies the mapping of RAID to RN-F LDID for RAIDs 0 to 7.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC00

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ha_secure_register_groups_override.ldid_ctl

The following image shows the higher register bit assignments.

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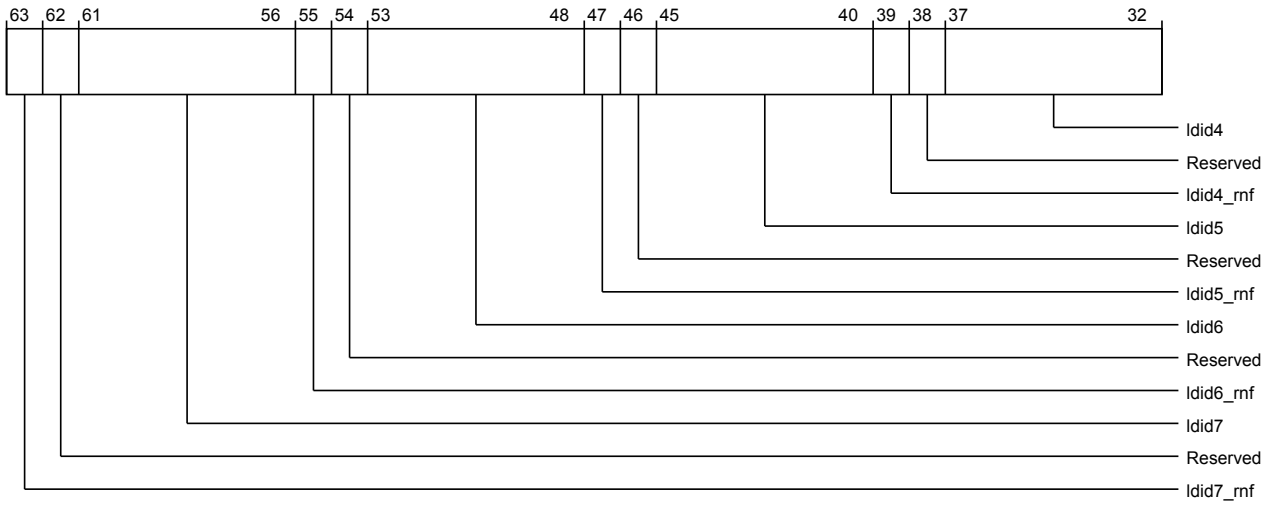

Figure 3-1066 por_cxg_ha_rnf_raid_to_ldid_reg0 (high)

The following table shows the por_cxg_ha_rnf_raid_to_ldid_reg0 higher register bit assignments.

Table 3-1080 por_cxg_ha_rnf_raid_to_ldid_reg0 (high)

Bits	Field name	Description	Type	Reset
63	ldid7_rnf	Specifies if RAID 7 is RN-F	RW	1'b0
62	Reserved	Reserved	RO	-
61:56	ldid7	Specifies the LDID for RAID 7	RW	6'h0
55	ldid6_rnf	Specifies if RAID 6 is RN-F	RW	1'b0
54	Reserved	Reserved	RO	-
53:48	ldid6	Specifies the LDID for RAID 6	RW	6'h0
47	ldid5_rnf	Specifies if RAID 5 is RN-F	RW	1'b0
46	Reserved	Reserved	RO	-
45:40	ldid5	Specifies the LDID for RAID 5	RW	6'h0
39	ldid4_rnf	Specifies if RAID 4 is RN-F	RW	1'b0
38	Reserved	Reserved	RO	-
37:32	ldid4	Specifies the LDID for RAID 4	RW	6'h0

The following image shows the lower register bit assignments.

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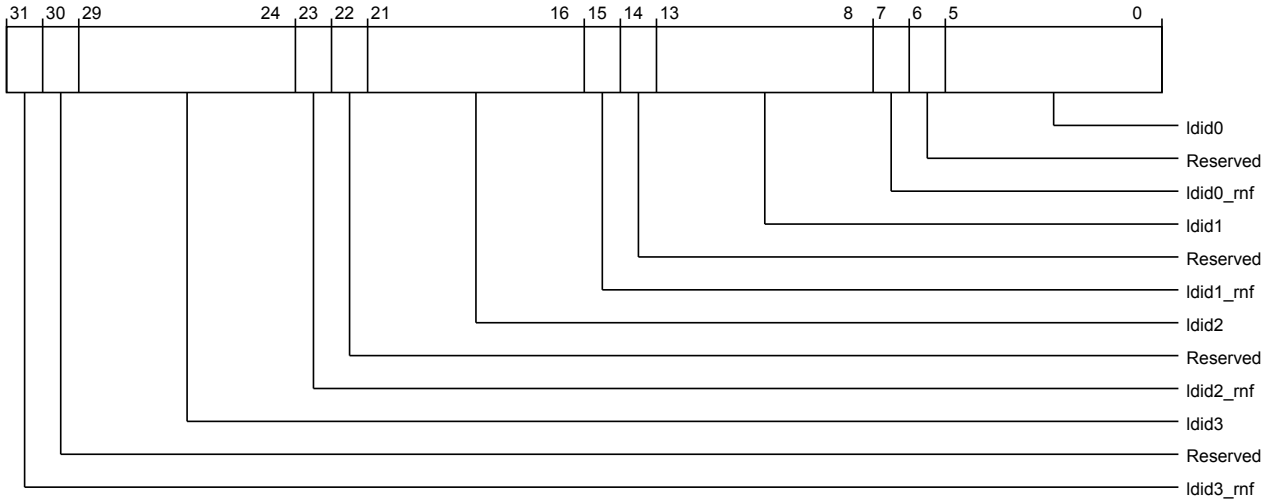

Figure 3-1067 por_cxg_ha_rnf_raid_to_ldid_reg0 (low)

The following table shows the por_cxg_ha_rnf_raid_to_ldid_reg0 lower register bit assignments.

Table 3-1081 por_cxg_ha_rnf_raid_to_ldid_reg0 (low)

Bits	Field name	Description	Type	Reset
31	ldid3_rnf	Specifies if RAID 3 is RN-F	RW	1'b0
30	Reserved	Reserved	RO	-
29:24	ldid3	Specifies the LDID for RAID 3	RW	6'h0
23	ldid2_rnf	Specifies if RAID 2 is RN-F	RW	1'b0
22	Reserved	Reserved	RO	-
21:16	ldid2	Specifies the LDID for RAID 2	RW	6'h0
15	ldid1_rnf	Specifies if RAID 1 is RN-F	RW	1'b0
14	Reserved	Reserved	RO	-
13:8	ldid1	Specifies the LDID for RAID 1	RW	6'h0
7	ldid0_rnf	Specifies if RAID 0 is RN-F	RW	1'b0
6	Reserved	Reserved	RO	-
5:0	ldid0	Specifies the LDID for RAID 0	RW	6'h0

por_cxg_ha_rnf_raid_to_ldid_reg1

Specifies the mapping of RAID to RN-F LDID for RAIDs 8 to 15.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hC08

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ha_secure_register_groups_override.ldid_ctl

The following image shows the higher register bit assignments.

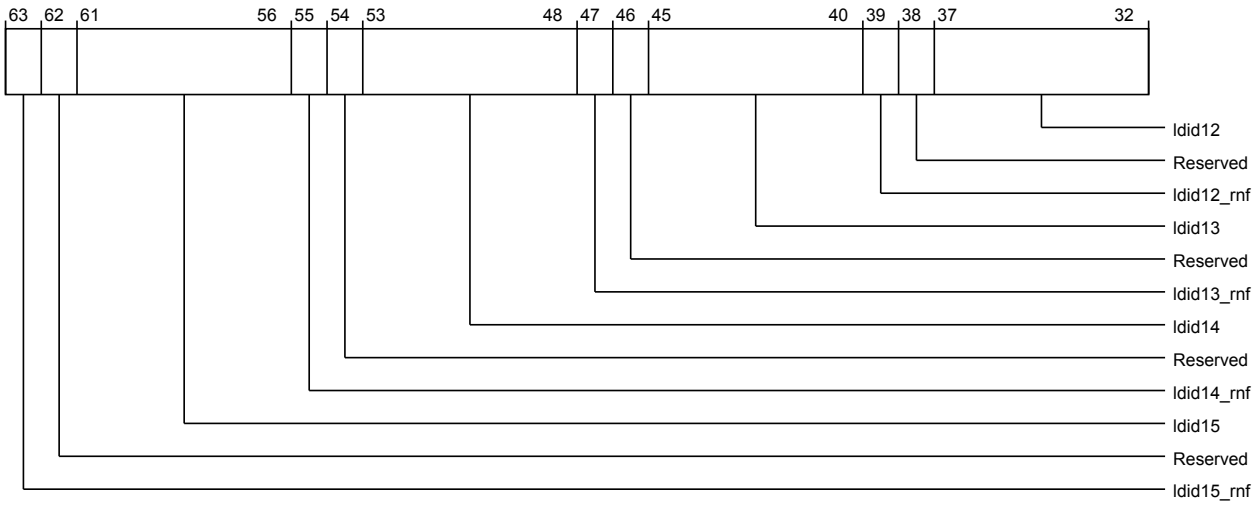

Figure 3-1068 por_cxg_ha_rnf_raid_to_ldid_reg1 (high)

The following table shows the por_cxg_ha_rnf_raid_to_ldid_reg1 higher register bit assignments.

Table 3-1082 por_cxg_ha_rnf_raid_to_ldid_reg1 (high)

Bits	Field name	Description	Type	Reset
63	ldid15_rnf	Specifies if RAID 15 is RN-F	RW	1'b0
62	Reserved	Reserved	RO	-
61:56	ldid15	Specifies the LDID for RAID 15	RW	6'h0
55	ldid14_rnf	Specifies if RAID 14 is RN-F	RW	1'b0
54	Reserved	Reserved	RO	-
53:48	ldid14	Specifies the LDID for RAID 14	RW	6'h0
47	ldid13_rnf	Specifies if RAID 13 is RN-F	RW	1'b0
46	Reserved	Reserved	RO	-
45:40	ldid13	Specifies the LDID for RAID 13	RW	6'h0
39	ldid12_rnf	Specifies if RAID 12 is RN-F	RW	1'b0
38	Reserved	Reserved	RO	-
37:32	ldid12	Specifies the LDID for RAID 12	RW	6'h0

The following image shows the lower register bit assignments.

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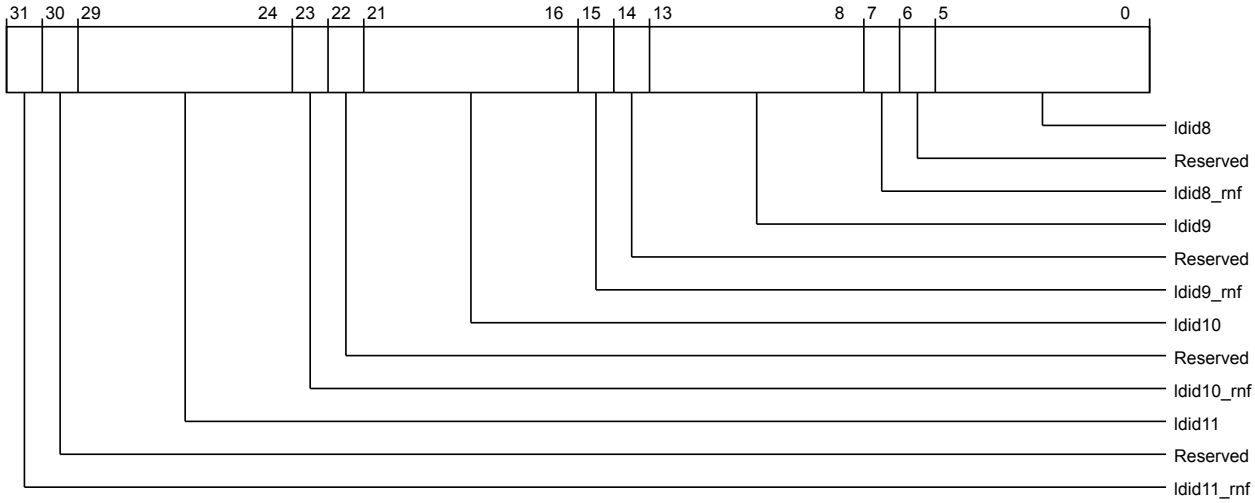

Figure 3-1069 por_cxg_ha_rnf_raid_to_ldid_reg1 (low)

The following table shows the por_cxg_ha_rnf_raid_to_ldid_reg1 lower register bit assignments.

Table 3-1083 por_cxg_ha_rnf_raid_to_ldid_reg1 (low)

Bits	Field name	Description	Type	Reset
31	ldid11_rnf	Specifies if RAID 11 is RN-F	RW	1'b0
30	Reserved	Reserved	RO	-
29:24	ldid11	Specifies the LDID for RAID 11	RW	6'h0
23	ldid10_rnf	Specifies if RAID 10 is RN-F	RW	1'b0
22	Reserved	Reserved	RO	-
21:16	ldid10	Specifies the LDID for RAID 10	RW	6'h0
15	ldid9_rnf	Specifies if RAID 9 is RN-F	RW	1'b0
14	Reserved	Reserved	RO	-
13:8	ldid9	Specifies the LDID for RAID 9	RW	6'h0
7	ldid8_rnf	Specifies if RAID 8 is RN-F	RW	1'b0
6	Reserved	Reserved	RO	-
5:0	ldid8	Specifies the LDID for RAID 8	RW	6'h0

por_cxg_ha_rnf_raid_to_ldid_reg2

Specifies the mapping of RAID to RN-F LDID for RAIDs 16 to 23.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hC10

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ha_secure_register_groups_override.ldid_ctl

The following image shows the higher register bit assignments.

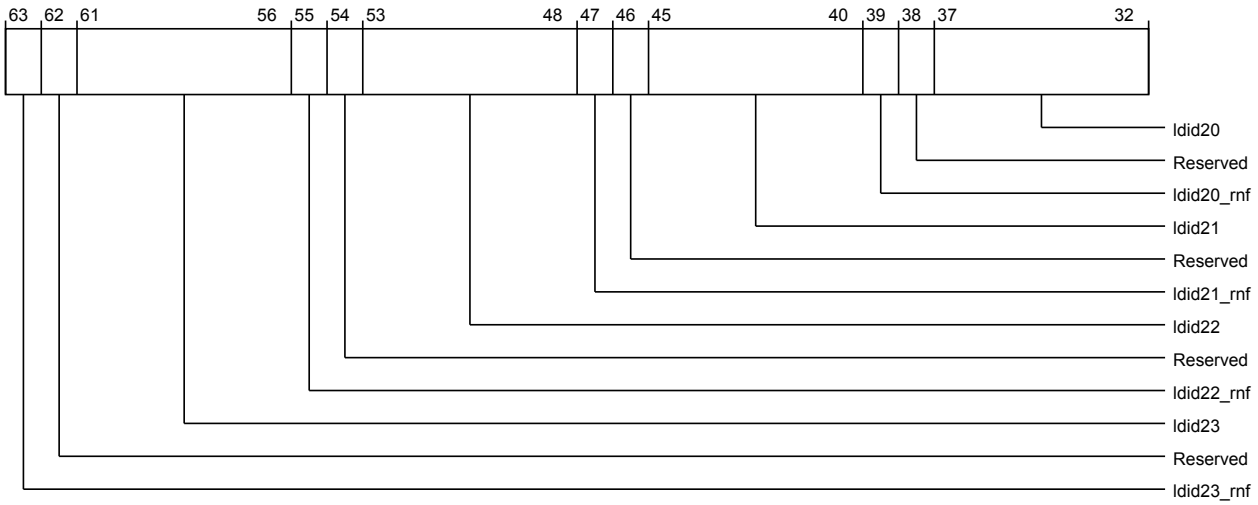

Figure 3-1070 por_cxg_ha_rnf_raid_to_ldid_reg2 (high)

The following table shows the por_cxg_ha_rnf_raid_to_ldid_reg2 higher register bit assignments.

Table 3-1084 por_cxg_ha_rnf_raid_to_ldid_reg2 (high)

Bits	Field name	Description	Type	Reset
63	ldid23_rnf	Specifies if RAID 23 is RN-F	RW	1'b0
62	Reserved	Reserved	RO	-
61:56	ldid23	Specifies the LDID for RAID 23	RW	6'h0
55	ldid22_rnf	Specifies if RAID 22 is RN-F	RW	1'b0
54	Reserved	Reserved	RO	-
53:48	ldid22	Specifies the LDID for RAID 22	RW	6'h0
47	ldid21_rnf	Specifies if RAID 21 is RN-F	RW	1'b0
46	Reserved	Reserved	RO	-
45:40	ldid21	Specifies the LDID for RAID 21	RW	6'h0
39	ldid20_rnf	Specifies if RAID 20 is RN-F	RW	1'b0
38	Reserved	Reserved	RO	-
37:32	ldid20	Specifies the LDID for RAID 20	RW	6'h0

The following image shows the lower register bit assignments.

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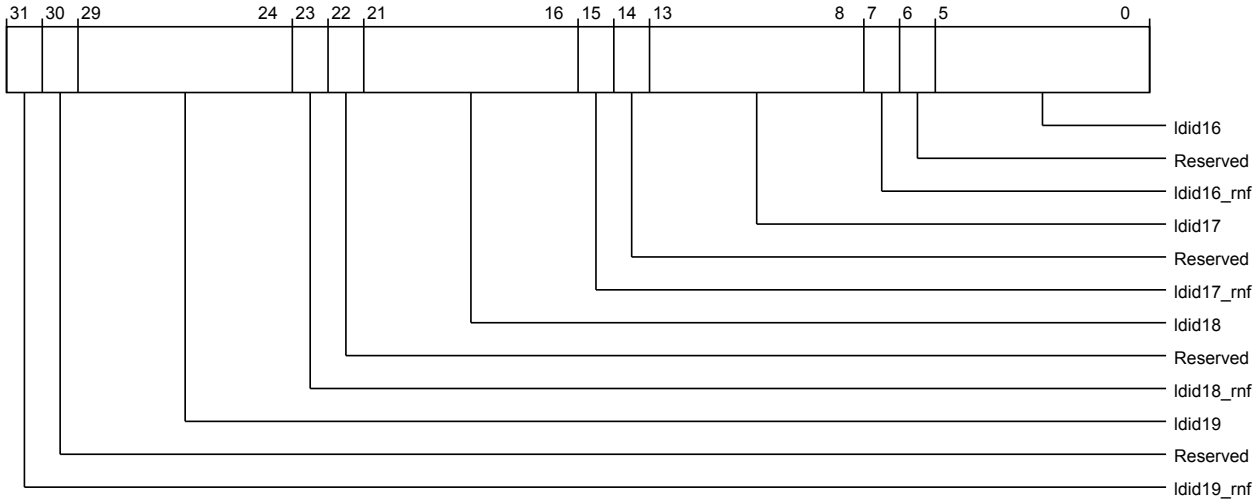

Figure 3-1071 por_cxg_ha_rnf_raid_to_ldid_reg2 (low)

The following table shows the por_cxg_ha_rnf_raid_to_ldid_reg2 lower register bit assignments.

Table 3-1085 por_cxg_ha_rnf_raid_to_ldid_reg2 (low)

Bits	Field name	Description	Type	Reset
31	ldid19_rnf	Specifies if RAID 19 is RN-F	RW	1'b0
30	Reserved	Reserved	RO	-
29:24	ldid19	Specifies the LDID for RAID 19	RW	6'h0
23	ldid18_rnf	Specifies if RAID 18 is RN-F	RW	1'b0
22	Reserved	Reserved	RO	-
21:16	ldid18	Specifies the LDID for RAID 18	RW	6'h0
15	ldid17_rnf	Specifies if RAID 17 is RN-F	RW	1'b0
14	Reserved	Reserved	RO	-
13:8	ldid17	Specifies the LDID for RAID 17	RW	6'h0
7	ldid16_rnf	Specifies if RAID 16 is RN-F	RW	1'b0
6	Reserved	Reserved	RO	-
5:0	ldid16	Specifies the LDID for RAID 16	RW	6'h0

por_cxg_ha_rnf_raid_to_ldid_reg3

Specifies the mapping of RAID to RN-F LDID for RAIDs 24 to 31.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hC18

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ha_secure_register_groups_override.ldid_ctl

The following image shows the higher register bit assignments.

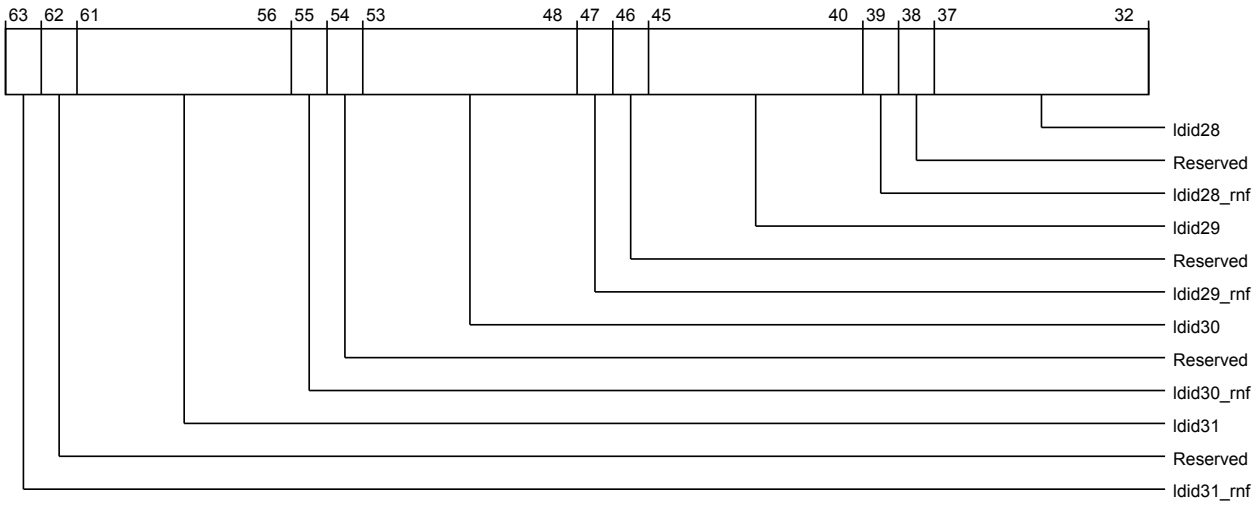

Figure 3-1072 por_cxg_ha_rnf_raid_to_ldid_reg3 (high)

The following table shows the por_cxg_ha_rnf_raid_to_ldid_reg3 higher register bit assignments.

Table 3-1086 por_cxg_ha_rnf_raid_to_ldid_reg3 (high)

Bits	Field name	Description	Type	Reset
63	ldid31_rnf	Specifies if RAID 31 is RN-F	RW	1'b0
62	Reserved	Reserved	RO	-
61:56	ldid31	Specifies the LDID for RAID 31	RW	6'h0
55	ldid30_rnf	Specifies if RAID 30 is RN-F	RW	1'b0
54	Reserved	Reserved	RO	-
53:48	ldid30	Specifies the LDID for RAID 30	RW	6'h0
47	ldid29_rnf	Specifies if RAID 29 is RN-F	RW	1'b0
46	Reserved	Reserved	RO	-
45:40	ldid29	Specifies the LDID for RAID 29	RW	6'h0
39	ldid28_rnf	Specifies if RAID 28 is RN-F	RW	1'b0
38	Reserved	Reserved	RO	-
37:32	ldid28	Specifies the LDID for RAID 28	RW	6'h0

The following image shows the lower register bit assignments.

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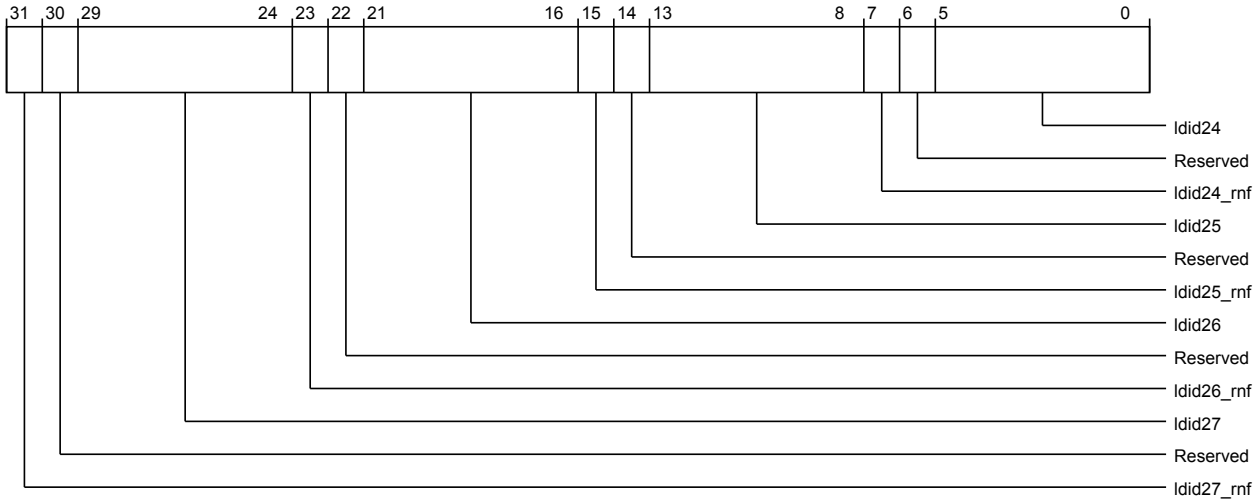

Figure 3-1073 por_cxg_ha_rnf_raid_to_ldid_reg3 (low)

The following table shows the por_cxg_ha_rnf_raid_to_ldid_reg3 lower register bit assignments.

Table 3-1087 por_cxg_ha_rnf_raid_to_ldid_reg3 (low)

Bits	Field name	Description	Type	Reset
31	ldid27_rnf	Specifies if RAID 27 is RN-F	RW	1'b0
30	Reserved	Reserved	RO	-
29:24	ldid27	Specifies the LDID for RAID 27	RW	6'h0
23	ldid26_rnf	Specifies if RAID 26 is RN-F	RW	1'b0
22	Reserved	Reserved	RO	-
21:16	ldid26	Specifies the LDID for RAID 26	RW	6'h0
15	ldid25_rnf	Specifies if RAID 25 is RN-F	RW	1'b0
14	Reserved	Reserved	RO	-
13:8	ldid25	Specifies the LDID for RAID 25	RW	6'h0
7	ldid24_rnf	Specifies if RAID 24 is RN-F	RW	1'b0
6	Reserved	Reserved	RO	-
5:0	ldid24	Specifies the LDID for RAID 24	RW	6'h0

por_cxg_ha_rnf_raid_to_ldid_reg4

Specifies the mapping of RAID to RN-F LDID for RAIDs 32 to 39.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hC20

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ha_secure_register_groups_override.ldid_ctl

The following image shows the higher register bit assignments.

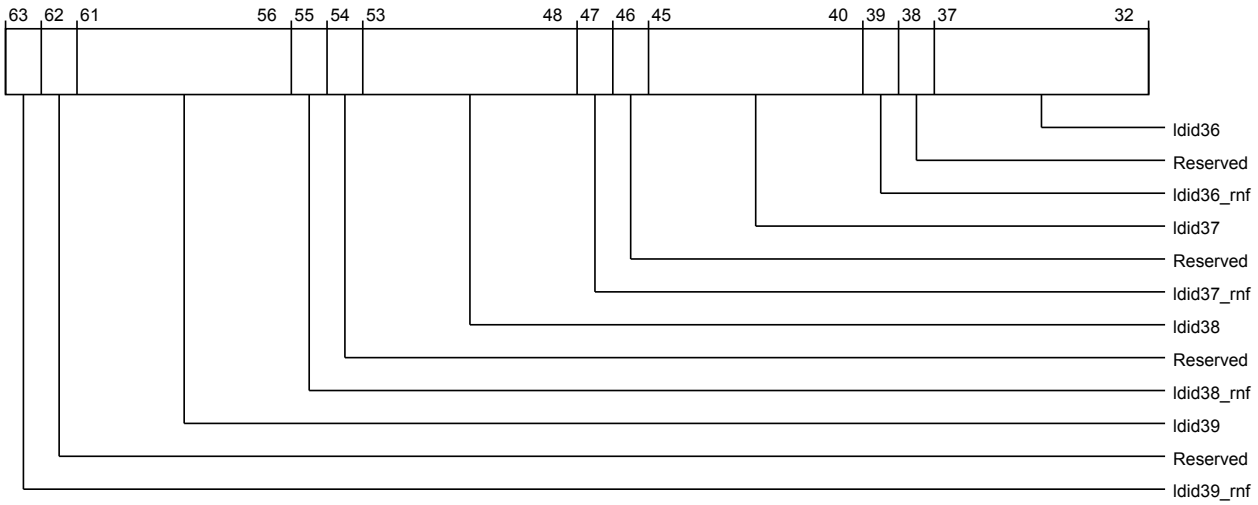

Figure 3-1074 por_cxg_ha_rnf_raid_to_ldid_reg4 (high)

The following table shows the por_cxg_ha_rnf_raid_to_ldid_reg4 higher register bit assignments.

Table 3-1088 por_cxg_ha_rnf_raid_to_ldid_reg4 (high)

Bits	Field name	Description	Type	Reset
63	ldid39_rnf	Specifies if RAID 39 is RN-F	RW	1'b0
62	Reserved	Reserved	RO	-
61:56	ldid39	Specifies the LDID for RAID 39	RW	6'h0
55	ldid38_rnf	Specifies if RAID 38 is RN-F	RW	1'b0
54	Reserved	Reserved	RO	-
53:48	ldid38	Specifies the LDID for RAID 38	RW	6'h0
47	ldid37_rnf	Specifies if RAID 37 is RN-F	RW	1'b0
46	Reserved	Reserved	RO	-
45:40	ldid37	Specifies the LDID for RAID 37	RW	6'h0
39	ldid36_rnf	Specifies if RAID 36 is RN-F	RW	1'b0
38	Reserved	Reserved	RO	-
37:32	ldid36	Specifies the LDID for RAID 36	RW	6'h0

The following image shows the lower register bit assignments.

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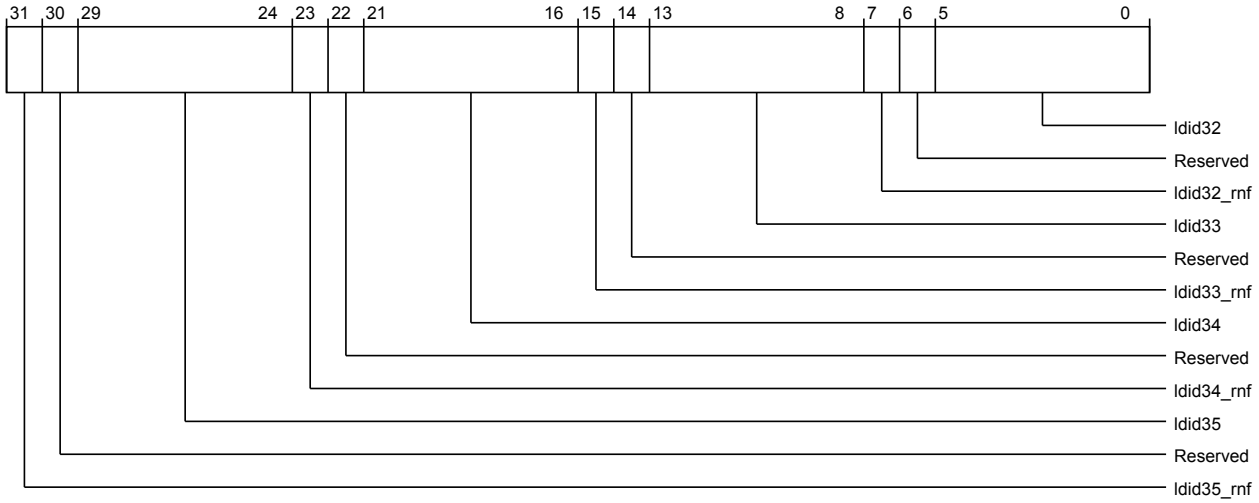

Figure 3-1075 por_cxg_ha_rnf_raid_to_ldid_reg4 (low)

The following table shows the por_cxg_ha_rnf_raid_to_ldid_reg4 lower register bit assignments.

Table 3-1089 por_cxg_ha_rnf_raid_to_ldid_reg4 (low)

Bits	Field name	Description	Type	Reset
31	ldid35_rnf	Specifies if RAID 35 is RN-F	RW	1'b0
30	Reserved	Reserved	RO	-
29:24	ldid35	Specifies the LDID for RAID 35	RW	6'h0
23	ldid34_rnf	Specifies if RAID 34 is RN-F	RW	1'b0
22	Reserved	Reserved	RO	-
21:16	ldid34	Specifies the LDID for RAID 34	RW	6'h0
15	ldid33_rnf	Specifies if RAID 33 is RN-F	RW	1'b0
14	Reserved	Reserved	RO	-
13:8	ldid33	Specifies the LDID for RAID 33	RW	6'h0
7	ldid32_rnf	Specifies if RAID 32 is RN-F	RW	1'b0
6	Reserved	Reserved	RO	-
5:0	ldid32	Specifies the LDID for RAID 32	RW	6'h0

por_cxg_ha_rnf_raid_to_ldid_reg5

Specifies the mapping of RAID to RN-F LDID for RAIDs 40 to 47.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hC28

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ha_secure_register_groups_override.ldid_ctl

The following image shows the higher register bit assignments.

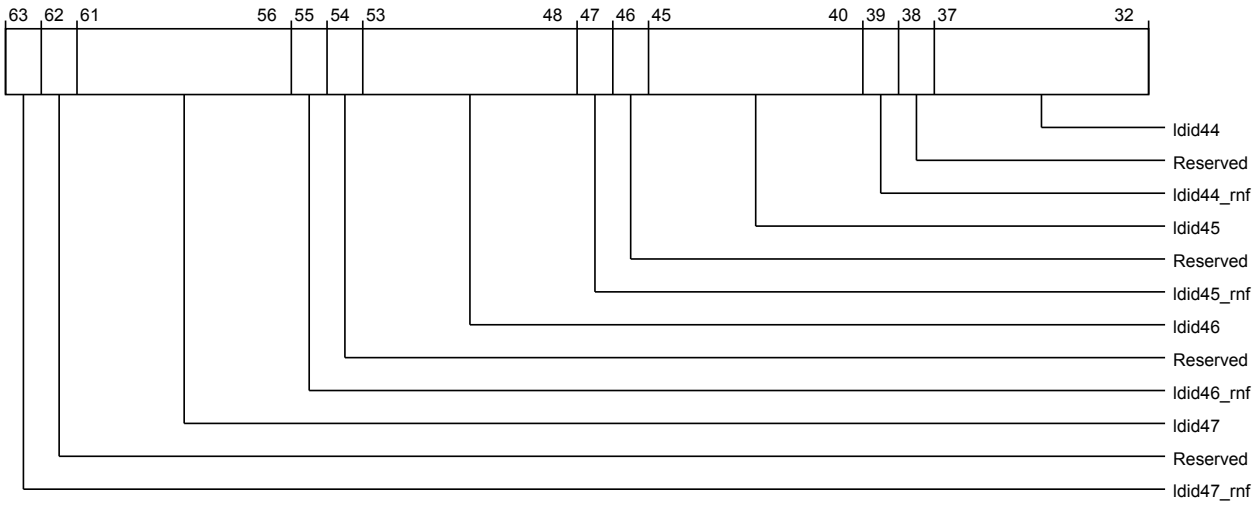

Figure 3-1076 por_cxg_ha_rnf_raid_to_ldid_reg5 (high)

The following table shows the por_cxg_ha_rnf_raid_to_ldid_reg5 higher register bit assignments.

Table 3-1090 por_cxg_ha_rnf_raid_to_ldid_reg5 (high)

Bits	Field name	Description	Type	Reset
63	ldid47_rnf	Specifies if RAID 47 is RN-F	RW	1'b0
62	Reserved	Reserved	RO	-
61:56	ldid47	Specifies the LDID for RAID 47	RW	6'h0
55	ldid46_rnf	Specifies if RAID 46 is RN-F	RW	1'b0
54	Reserved	Reserved	RO	-
53:48	ldid46	Specifies the LDID for RAID 46	RW	6'h0
47	ldid45_rnf	Specifies if RAID 45 is RN-F	RW	1'b0
46	Reserved	Reserved	RO	-
45:40	ldid45	Specifies the LDID for RAID 45	RW	6'h0
39	ldid44_rnf	Specifies if RAID 44 is RN-F	RW	1'b0
38	Reserved	Reserved	RO	-
37:32	ldid44	Specifies the LDID for RAID 44	RW	6'h0

The following image shows the lower register bit assignments.

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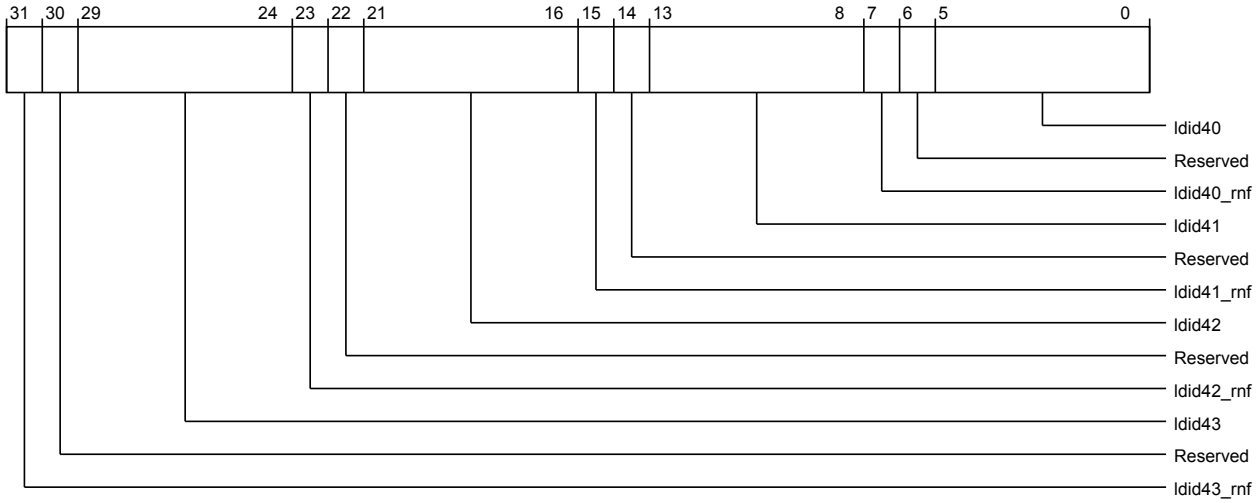

Figure 3-1077 por_cxg_ha_rnf_raid_to_ldid_reg5 (low)

The following table shows the por_cxg_ha_rnf_raid_to_ldid_reg5 lower register bit assignments.

Table 3-1091 por_cxg_ha_rnf_raid_to_ldid_reg5 (low)

Bits	Field name	Description	Type	Reset
31	ldid43_rnf	Specifies if RAID 43 is RN-F	RW	1'b0
30	Reserved	Reserved	RO	-
29:24	ldid43	Specifies the LDID for RAID 43	RW	6'h0
23	ldid42_rnf	Specifies if RAID 42 is RN-F	RW	1'b0
22	Reserved	Reserved	RO	-
21:16	ldid42	Specifies the LDID for RAID 42	RW	6'h0
15	ldid41_rnf	Specifies if RAID 41 is RN-F	RW	1'b0
14	Reserved	Reserved	RO	-
13:8	ldid41	Specifies the LDID for RAID 41	RW	6'h0
7	ldid40_rnf	Specifies if RAID 40 is RN-F	RW	1'b0
6	Reserved	Reserved	RO	-
5:0	ldid40	Specifies the LDID for RAID 40	RW	6'h0

por_cxg_ha_rnf_raid_to_ldid_reg6

Specifies the mapping of RAID to RN-F LDID for RAIDs 48 to 55.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hC30

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ha_secure_register_groups_override.ldid_ctl

The following image shows the higher register bit assignments.

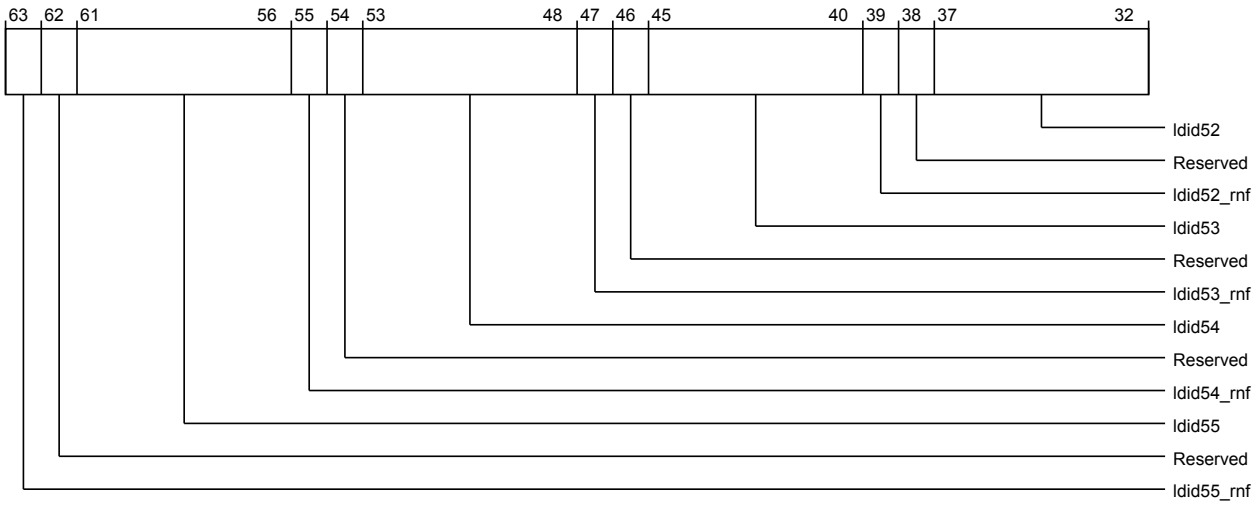

Figure 3-1078 por_cxg_ha_rnf_raid_to_ldid_reg6 (high)

The following table shows the por_cxg_ha_rnf_raid_to_ldid_reg6 higher register bit assignments.

Table 3-1092 por_cxg_ha_rnf_raid_to_ldid_reg6 (high)

Bits	Field name	Description	Type	Reset
63	ldid55_rnf	Specifies if RAID 55 is RN-F	RW	1'b0
62	Reserved	Reserved	RO	-
61:56	ldid55	Specifies the LDID for RAID 55	RW	6'h0
55	ldid54_rnf	Specifies if RAID 54 is RN-F	RW	1'b0
54	Reserved	Reserved	RO	-
53:48	ldid54	Specifies the LDID for RAID 54	RW	6'h0
47	ldid53_rnf	Specifies if RAID 53 is RN-F	RW	1'b0
46	Reserved	Reserved	RO	-
45:40	ldid53	Specifies the LDID for RAID 53	RW	6'h0
39	ldid52_rnf	Specifies if RAID 52 is RN-F	RW	1'b0
38	Reserved	Reserved	RO	-
37:32	ldid52	Specifies the LDID for RAID 52	RW	6'h0

The following image shows the lower register bit assignments.

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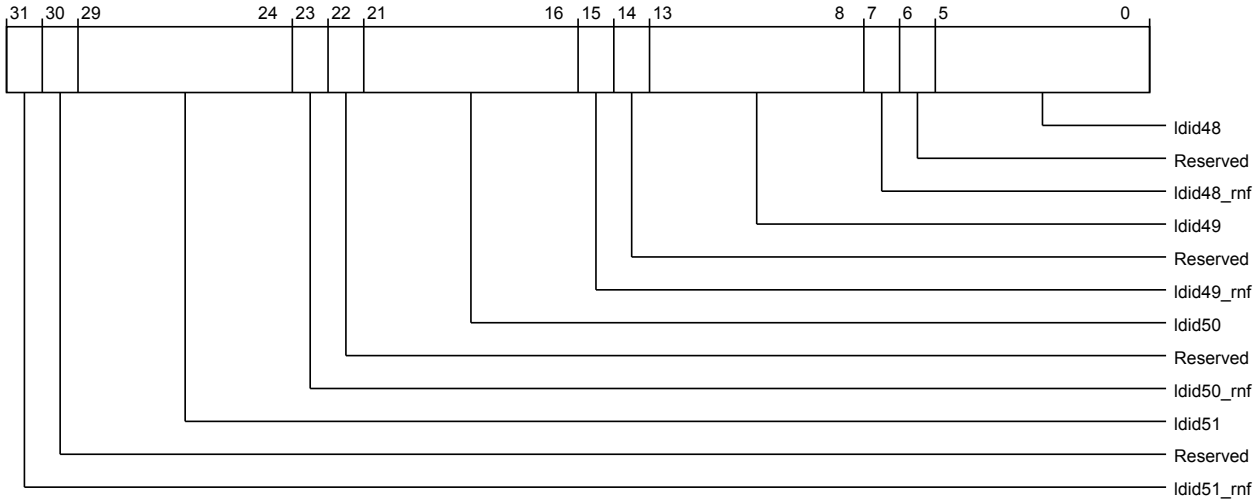

Figure 3-1079 por_cxg_ha_rnf_raid_to_ldid_reg6 (low)

The following table shows the por_cxg_ha_rnf_raid_to_ldid_reg6 lower register bit assignments.

Table 3-1093 por_cxg_ha_rnf_raid_to_ldid_reg6 (low)

Bits	Field name	Description	Type	Reset
31	ldid51_rnf	Specifies if RAID 51 is RN-F	RW	1'b0
30	Reserved	Reserved	RO	-
29:24	ldid51	Specifies the LDID for RAID 51	RW	6'h0
23	ldid50_rnf	Specifies if RAID 50 is RN-F	RW	1'b0
22	Reserved	Reserved	RO	-
21:16	ldid50	Specifies the LDID for RAID 50	RW	6'h0
15	ldid49_rnf	Specifies if RAID 49 is RN-F	RW	1'b0
14	Reserved	Reserved	RO	-
13:8	ldid49	Specifies the LDID for RAID 49	RW	6'h0
7	ldid48_rnf	Specifies if RAID 48 is RN-F	RW	1'b0
6	Reserved	Reserved	RO	-
5:0	ldid48	Specifies the LDID for RAID 48	RW	6'h0

por_cxg_ha_rnf_raid_to_ldid_reg7

Specifies the mapping of RAID to RN-F LDID for RAIDs 56 to 63.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hC38

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ha_secure_register_groups_override.ldid_ctl

The following image shows the higher register bit assignments.

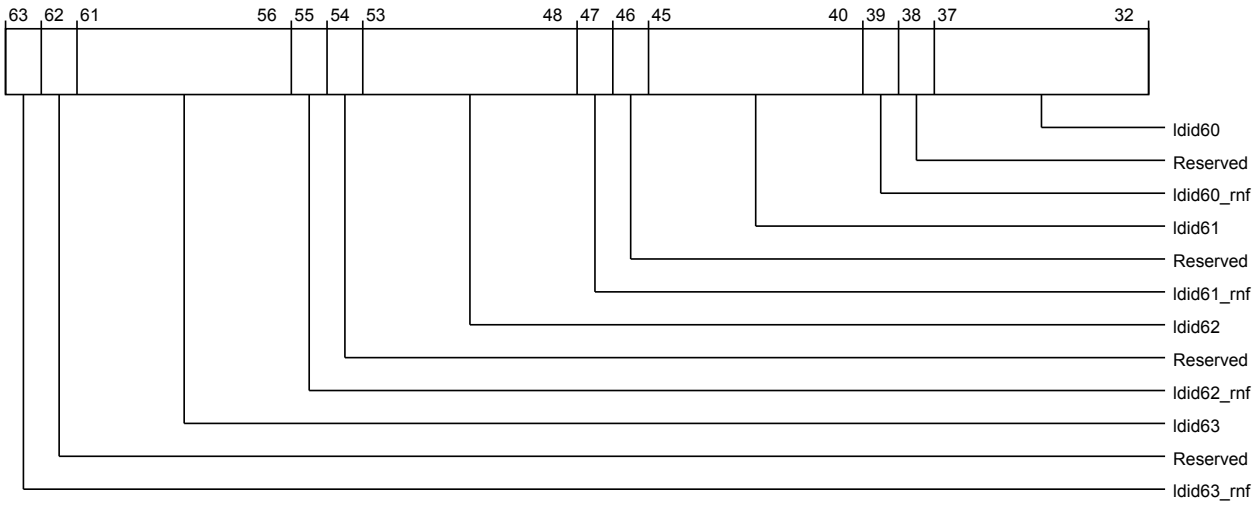

Figure 3-1080 por_cxg_ha_rnf_raid_to_ldid_reg7 (high)

The following table shows the por_cxg_ha_rnf_raid_to_ldid_reg7 higher register bit assignments.

Table 3-1094 por_cxg_ha_rnf_raid_to_ldid_reg7 (high)

Bits	Field name	Description	Type	Reset
63	ldid63_rnf	Specifies if RAID 63 is RN-F	RW	1'b0
62	Reserved	Reserved	RO	-
61:56	ldid63	Specifies the LDID for RAID 63	RW	6'h0
55	ldid62_rnf	Specifies if RAID 62 is RN-F	RW	1'b0
54	Reserved	Reserved	RO	-
53:48	ldid62	Specifies the LDID for RAID 62	RW	6'h0
47	ldid61_rnf	Specifies if RAID 61 is RN-F	RW	1'b0
46	Reserved	Reserved	RO	-
45:40	ldid61	Specifies the LDID for RAID 61	RW	6'h0
39	ldid60_rnf	Specifies if RAID 60 is RN-F	RW	1'b0
38	Reserved	Reserved	RO	-
37:32	ldid60	Specifies the LDID for RAID 60	RW	6'h0

The following image shows the lower register bit assignments.

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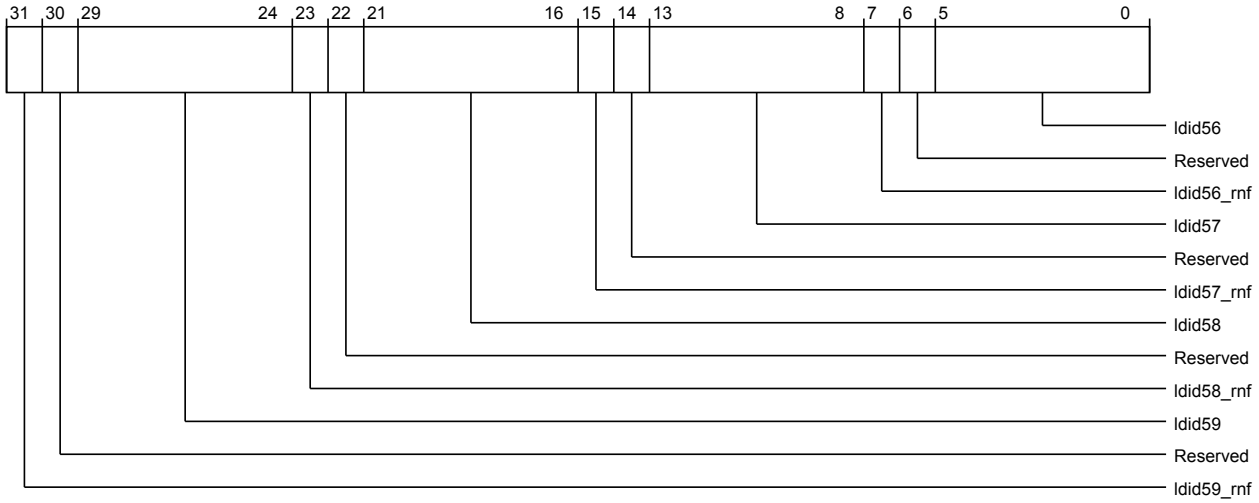

Figure 3-1081 por_cxg_ha_rnf_raid_to_ldid_reg7 (low)

The following table shows the por_cxg_ha_rnf_raid_to_ldid_reg7 lower register bit assignments.

Table 3-1095 por_cxg_ha_rnf_raid_to_ldid_reg7 (low)

Bits	Field name	Description	Type	Reset
31	ldid59_rnf	Specifies if RAID 59 is RN-F	RW	1'b0
30	Reserved	Reserved	RO	-
29:24	ldid59	Specifies the LDID for RAID 59	RW	6'h0
23	ldid58_rnf	Specifies if RAID 58 is RN-F	RW	1'b0
22	Reserved	Reserved	RO	-
21:16	ldid58	Specifies the LDID for RAID 58	RW	6'h0
15	ldid57_rnf	Specifies if RAID 57 is RN-F	RW	1'b0
14	Reserved	Reserved	RO	-
13:8	ldid57	Specifies the LDID for RAID 57	RW	6'h0
7	ldid56_rnf	Specifies if RAID 56 is RN-F	RW	1'b0
6	Reserved	Reserved	RO	-
5:0	ldid56	Specifies the LDID for RAID 56	RW	6'h0

por_cxg_ha_agentid_to_linkid_reg0

Specifies the mapping of Agent ID to Link ID for Agent IDs 0 to 7.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hC40

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Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ha_secure_register_groups_override.linkid_ctl

The following image shows the higher register bit assignments.

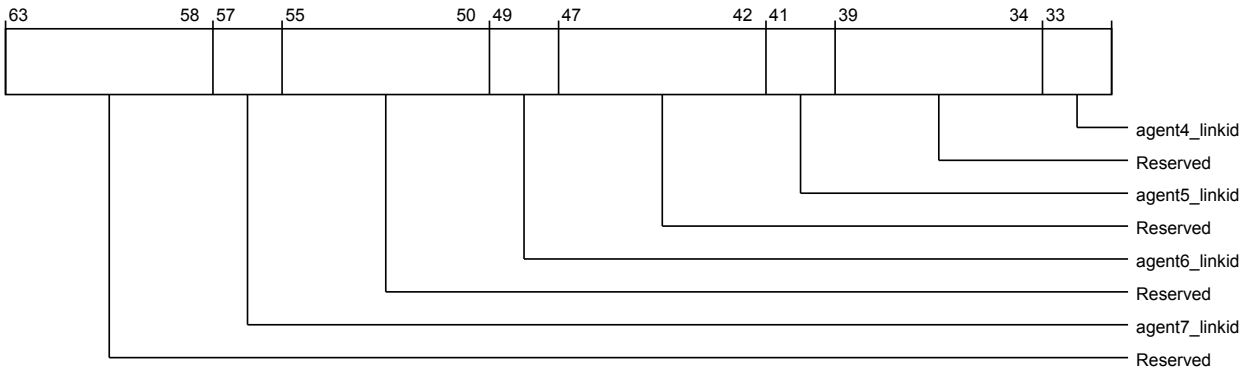

Figure 3-1082 por_cxg_ha_agentid_to_linkid_reg0 (high)

The following table shows the por_cxg_ha_agentid_to_linkid_reg0 higher register bit assignments.

Table 3-1096 por_cxg_ha_agentid_to_linkid_reg0 (high)

Bits	Field name	Description	Type	Reset
63:58	Reserved	Reserved	RO	-
57:56	agent7_linkid	Specifies Link ID 7	RW	2'h0
55:50	Reserved	Reserved	RO	-
49:48	agent6_linkid	Specifies Link ID 6	RW	2'h0
47:42	Reserved	Reserved	RO	-
41:40	agent5_linkid	Specifies Link ID 5	RW	2'h0
39:34	Reserved	Reserved	RO	-
33:32	agent4_linkid	Specifies Link ID 4	RW	2'h0

The following image shows the lower register bit assignments.

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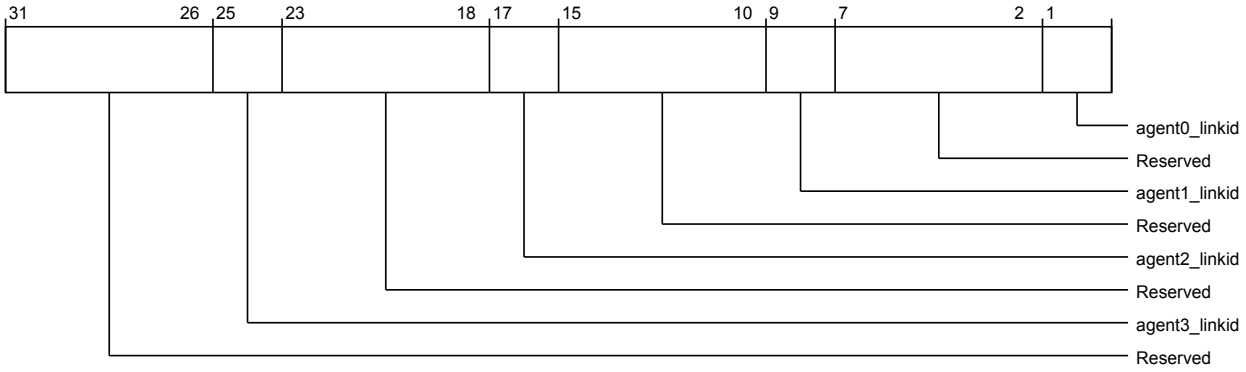

Figure 3-1083 por_cxg_ha_agentid_to_linkid_reg0 (low)

The following table shows the por_cxg_ha_agentid_to_linkid_reg0 lower register bit assignments.

Table 3-1097 por_cxg_ha_agentid_to_linkid_reg0 (low)

Bits	Field name	Description	Type	Reset
31:26	Reserved	Reserved	RO	-
25:24	agent3_linkid	Specifies Link ID 3	RW	2'h0
23:18	Reserved	Reserved	RO	-
17:16	agent2_linkid	Specifies Link ID 2	RW	2'h0
15:10	Reserved	Reserved	RO	-
9:8	agent1_linkid	Specifies Link ID 1	RW	2'h0
7:2	Reserved	Reserved	RO	-
1:0	agent0_linkid	Specifies Link ID 0	RW	2'h0

por_cxg_ha_agentid_to_linkid_reg1

Specifies the mapping of Agent ID to Link ID for Agent IDs 8 to 15.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC48

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ha_secure_register_groups_override.linkid_ctl

The following image shows the higher register bit assignments.

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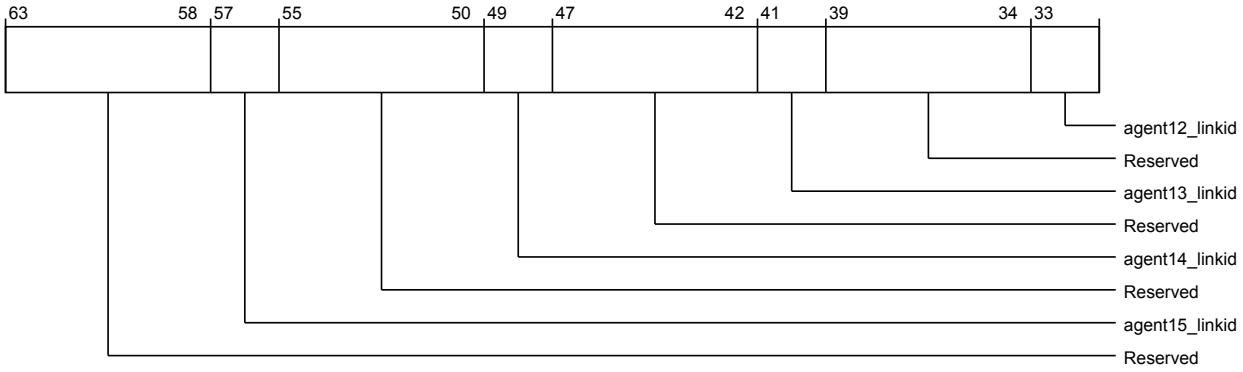

Figure 3-1084 por_cxg_ha_agentid_to_linkid_reg1 (high)

The following table shows the por_cxg_ha_agentid_to_linkid_reg1 higher register bit assignments.

Table 3-1098 por_cxg_ha_agentid_to_linkid_reg1 (high)

Bits	Field name	Description	Type	Reset
63:58	Reserved	Reserved	RO	-
57:56	agent15_linkid	Specifies Link ID 15	RW	2'h0
55:50	Reserved	Reserved	RO	-
49:48	agent14_linkid	Specifies Link ID 14	RW	2'h0
47:42	Reserved	Reserved	RO	-
41:40	agent13_linkid	Specifies Link ID 13	RW	2'h0
39:34	Reserved	Reserved	RO	-
33:32	agent12_linkid	Specifies Link ID 12	RW	2'h0

The following image shows the lower register bit assignments.

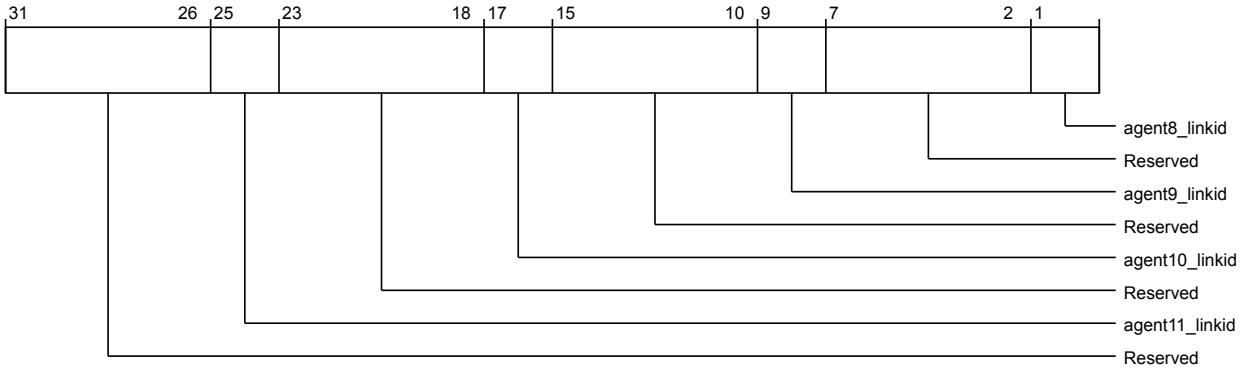

Figure 3-1085 por_cxg_ha_agentid_to_linkid_reg1 (low)

The following table shows the por_cxg_ha_agentid_to_linkid_reg1 lower register bit assignments.

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Table 3-1099 por_cxg_ha_agentid_to_linkid_reg1 (low)

Bits	Field name	Description	Type	Reset
31:26	Reserved	Reserved	RO	-
25:24	agent11_linkid	Specifies Link ID 11	RW	2'h0
23:18	Reserved	Reserved	RO	-
17:16	agent10_linkid	Specifies Link ID 10	RW	2'h0
15:10	Reserved	Reserved	RO	-
9:8	agent9_linkid	Specifies Link ID 9	RW	2'h0
7:2	Reserved	Reserved	RO	-
1:0	agent8_linkid	Specifies Link ID 8	RW	2'h0

por_cxg_ha_agentid_to_linkid_reg2

Specifies the mapping of Agent ID to Link ID for Agent IDs 16 to 23.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC50

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ha_secure_register_groups_override.linkid_ctl

The following image shows the higher register bit assignments.

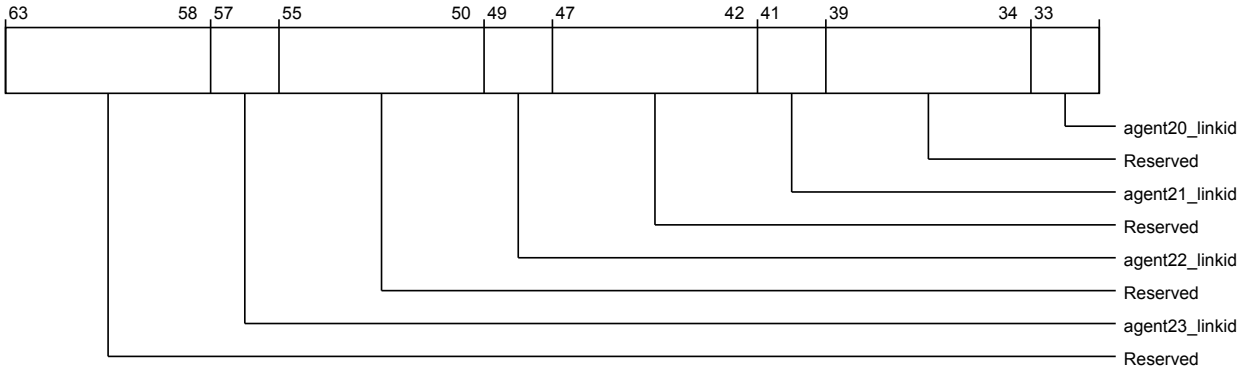

Figure 3-1086 por_cxg_ha_agentid_to_linkid_reg2 (high)

The following table shows the por_cxg_ha_agentid_to_linkid_reg2 higher register bit assignments.

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Table 3-1100 por_cxg_ha_agentid_to_linkid_reg2 (high)

Bits	Field name	Description	Type	Reset
63:58	Reserved	Reserved	RO	-
57:56	agent23_linkid	Specifies Link ID 23	RW	2'h0
55:50	Reserved	Reserved	RO	-
49:48	agent22_linkid	Specifies Link ID 22	RW	2'h0
47:42	Reserved	Reserved	RO	-
41:40	agent21_linkid	Specifies Link ID 21	RW	2'h0
39:34	Reserved	Reserved	RO	-
33:32	agent20_linkid	Specifies Link ID 20	RW	2'h0

The following image shows the lower register bit assignments.

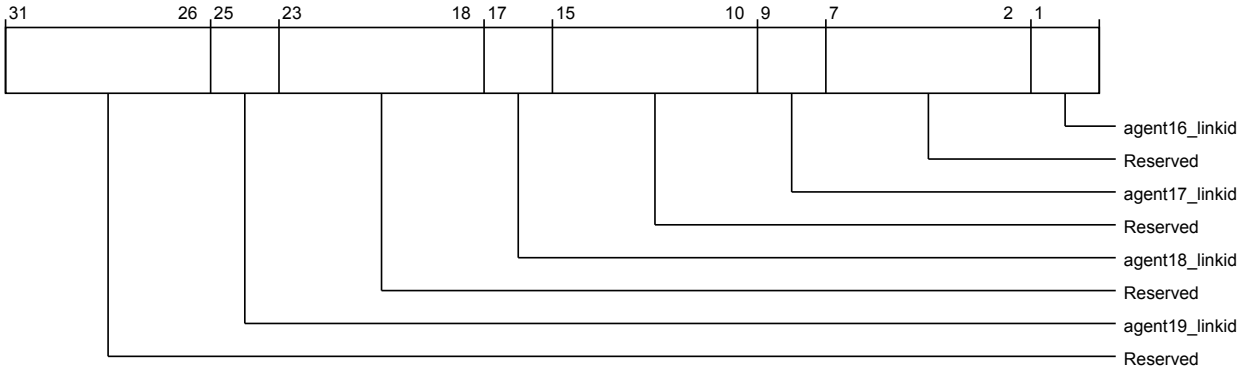

Figure 3-1087 por_cxg_ha_agentid_to_linkid_reg2 (low)

The following table shows the por_cxg_ha_agentid_to_linkid_reg2 lower register bit assignments.

Table 3-1101 por_cxg_ha_agentid_to_linkid_reg2 (low)

Bits	Field name	Description	Type	Reset
31:26	Reserved	Reserved	RO	-
25:24	agent19_linkid	Specifies Link ID 19	RW	2'h0
23:18	Reserved	Reserved	RO	-
17:16	agent18_linkid	Specifies Link ID 18	RW	2'h0
15:10	Reserved	Reserved	RO	-
9:8	agent17_linkid	Specifies Link ID 17	RW	2'h0
7:2	Reserved	Reserved	RO	-
1:0	agent16_linkid	Specifies Link ID 16	RW	2'h0

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por_cxg_ha_agentid_to_linkid_reg3

Specifies the mapping of Agent ID to Link ID for Agent IDs 24 to 31.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC58

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ha_secure_register_groups_override.linkid_ctl

The following image shows the higher register bit assignments.

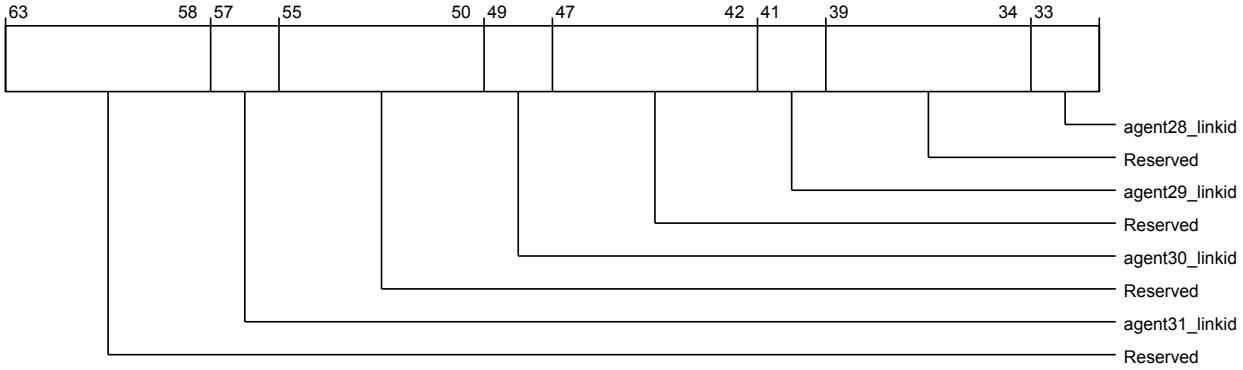

Figure 3-1088 por_cxg_ha_agentid_to_linkid_reg3 (high)

The following table shows the por_cxg_ha_agentid_to_linkid_reg3 higher register bit assignments.

Table 3-1102 por_cxg_ha_agentid_to_linkid_reg3 (high)

Bits	Field name	Description	Type	Reset
63:58	Reserved	Reserved	RO	-
57:56	agent31_linkid	Specifies Link ID 31	RW	2'h0
55:50	Reserved	Reserved	RO	-
49:48	agent30_linkid	Specifies Link ID 30	RW	2'h0
47:42	Reserved	Reserved	RO	-
41:40	agent29_linkid	Specifies Link ID 29	RW	2'h0
39:34	Reserved	Reserved	RO	-
33:32	agent28_linkid	Specifies Link ID 28	RW	2'h0

The following image shows the lower register bit assignments.

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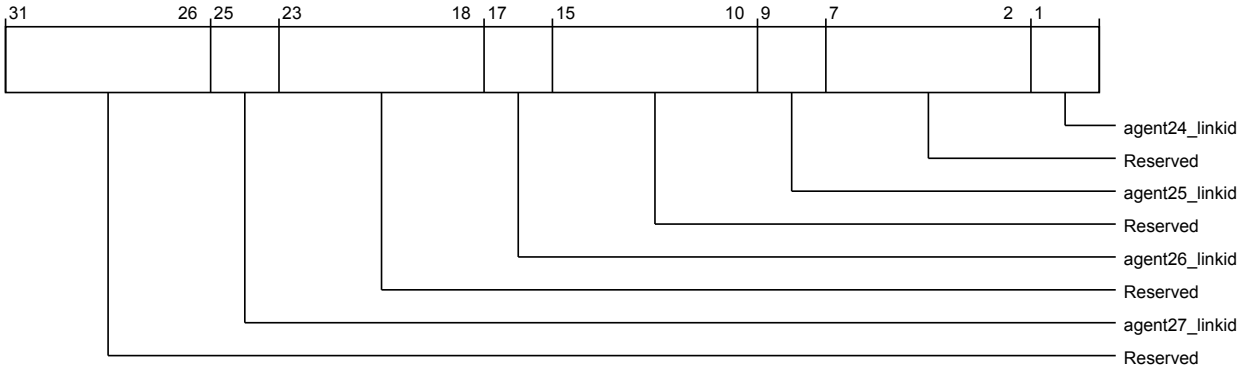

Figure 3-1089 por_cxg_ha_agentid_to_linkid_reg3 (low)

The following table shows the por_cxg_ha_agentid_to_linkid_reg3 lower register bit assignments.

Table 3-1103 por_cxg_ha_agentid_to_linkid_reg3 (low)

Bits	Field name	Description	Type	Reset
31:26	Reserved	Reserved	RO	-
25:24	agent27_linkid	Specifies Link ID 27	RW	2'h0
23:18	Reserved	Reserved	RO	-
17:16	agent26_linkid	Specifies Link ID 26	RW	2'h0
15:10	Reserved	Reserved	RO	-
9:8	agent25_linkid	Specifies Link ID 25	RW	2'h0
7:2	Reserved	Reserved	RO	-
1:0	agent24_linkid	Specifies Link ID 24	RW	2'h0

por_cxg_ha_agentid_to_linkid_reg4

Specifies the mapping of Agent ID to Link ID for Agent IDs 32 to 39.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC60

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ha_secure_register_groups_override.linkid_ctl

The following image shows the higher register bit assignments.

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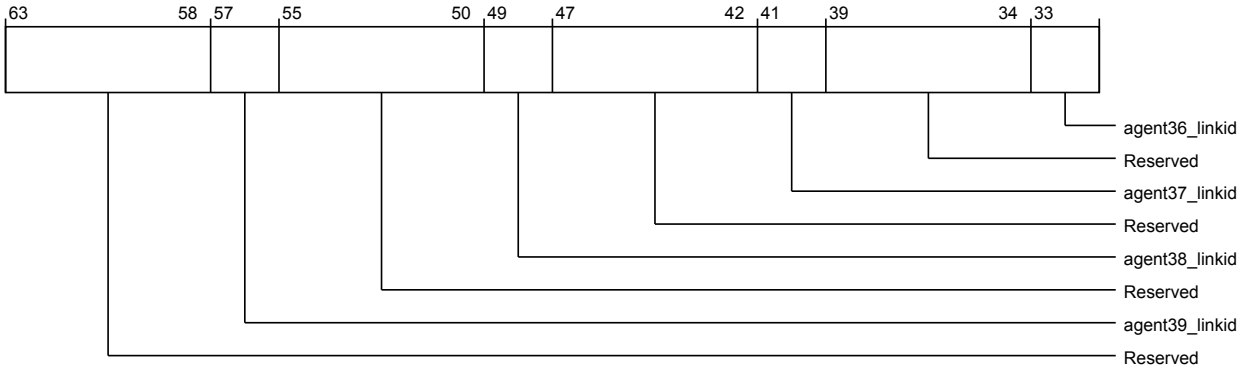

Figure 3-1090 por_cxg_ha_agentid_to_linkid_reg4 (high)

The following table shows the por_cxg_ha_agentid_to_linkid_reg4 higher register bit assignments.

Table 3-1104 por_cxg_ha_agentid_to_linkid_reg4 (high)

Bits	Field name	Description	Type	Reset
63:58	Reserved	Reserved	RO	-
57:56	agent39_linkid	Specifies Link ID 39	RW	2'h0
55:50	Reserved	Reserved	RO	-
49:48	agent38_linkid	Specifies Link ID 38	RW	2'h0
47:42	Reserved	Reserved	RO	-
41:40	agent37_linkid	Specifies Link ID 37	RW	2'h0
39:34	Reserved	Reserved	RO	-
33:32	agent36_linkid	Specifies Link ID 36	RW	2'h0

The following image shows the lower register bit assignments.

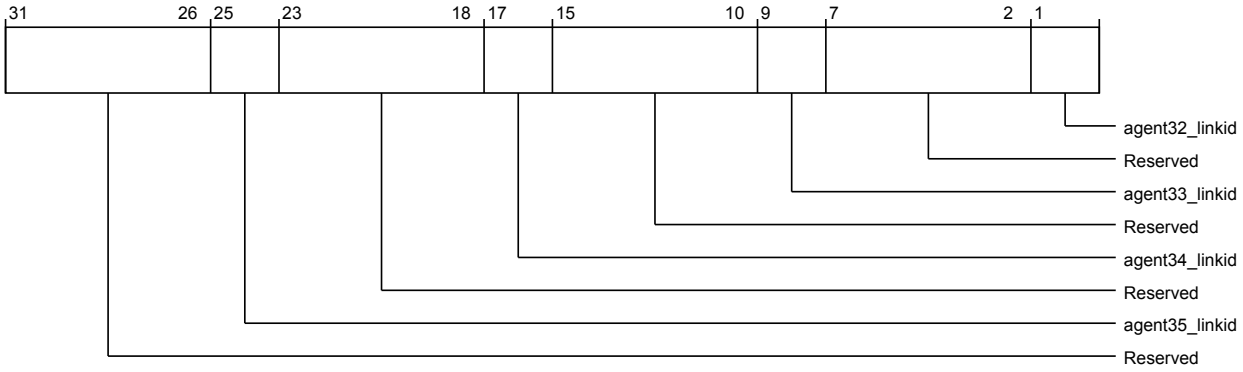

Figure 3-1091 por_cxg_ha_agentid_to_linkid_reg4 (low)

The following table shows the por_cxg_ha_agentid_to_linkid_reg4 lower register bit assignments.

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Table 3-1105 por_cxg_ha_agentid_to_linkid_reg4 (low)

Bits	Field name	Description	Type	Reset
31:26	Reserved	Reserved	RO	-
25:24	agent35_linkid	Specifies Link ID 35	RW	2'h0
23:18	Reserved	Reserved	RO	-
17:16	agent34_linkid	Specifies Link ID 34	RW	2'h0
15:10	Reserved	Reserved	RO	-
9:8	agent33_linkid	Specifies Link ID 33	RW	2'h0
7:2	Reserved	Reserved	RO	-
1:0	agent32_linkid	Specifies Link ID 32	RW	2'h0

por_cxg_ha_agentid_to_linkid_reg5

Specifies the mapping of Agent ID to Link ID for Agent IDs 40 to 47.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC68

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ha_secure_register_groups_override.linkid_ctl

The following image shows the higher register bit assignments.

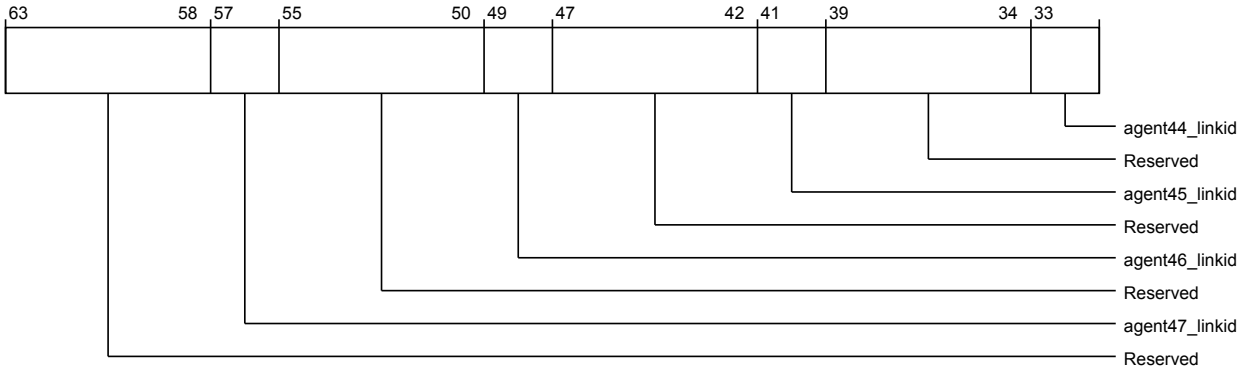

Figure 3-1092 por_cxg_ha_agentid_to_linkid_reg5 (high)

The following table shows the por_cxg_ha_agentid_to_linkid_reg5 higher register bit assignments.

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Table 3-1106 por_cxg_ha_agentid_to_linkid_reg5 (high)

Bits	Field name	Description	Type	Reset
63:58	Reserved	Reserved	RO	-
57:56	agent47_linkid	Specifies Link ID 47	RW	2'h0
55:50	Reserved	Reserved	RO	-
49:48	agent46_linkid	Specifies Link ID 46	RW	2'h0
47:42	Reserved	Reserved	RO	-
41:40	agent45_linkid	Specifies Link ID 45	RW	2'h0
39:34	Reserved	Reserved	RO	-
33:32	agent44_linkid	Specifies Link ID 44	RW	2'h0

The following image shows the lower register bit assignments.

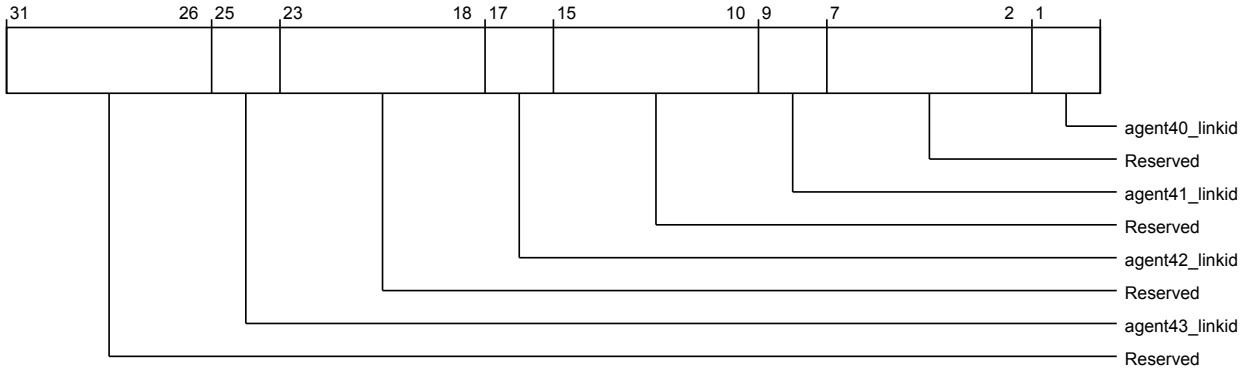

Figure 3-1093 por_cxg_ha_agentid_to_linkid_reg5 (low)

The following table shows the por_cxg_ha_agentid_to_linkid_reg5 lower register bit assignments.

Table 3-1107 por_cxg_ha_agentid_to_linkid_reg5 (low)

Bits	Field name	Description	Type	Reset
31:26	Reserved	Reserved	RO	-
25:24	agent43_linkid	Specifies Link ID 43	RW	2'h0
23:18	Reserved	Reserved	RO	-
17:16	agent42_linkid	Specifies Link ID 42	RW	2'h0
15:10	Reserved	Reserved	RO	-
9:8	agent41_linkid	Specifies Link ID 41	RW	2'h0
7:2	Reserved	Reserved	RO	-
1:0	agent40_linkid	Specifies Link ID 40	RW	2'h0

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por_cxg_ha_agentid_to_linkid_reg6

Specifies the mapping of Agent ID to Link ID for Agent IDs 48 to 55.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC70

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ha_secure_register_groups_override.linkid_ctl

The following image shows the higher register bit assignments.

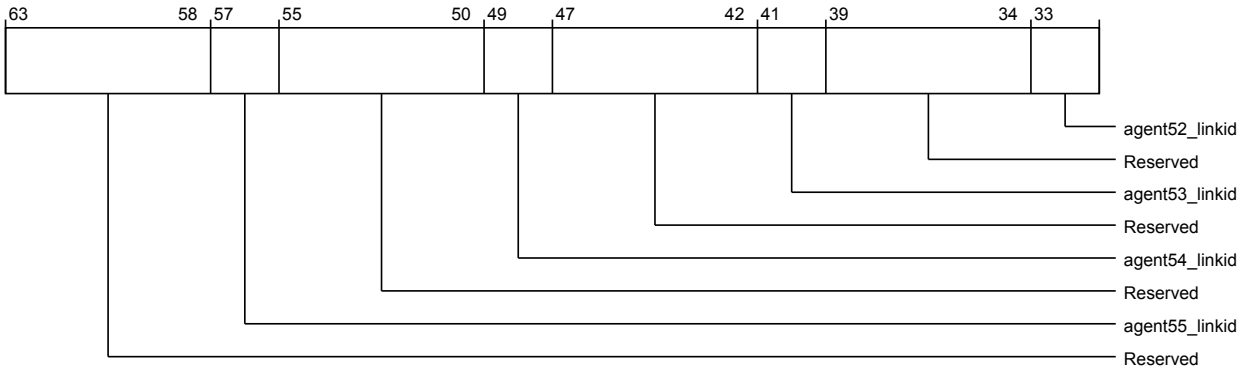

Figure 3-1094 por_cxg_ha_agentid_to_linkid_reg6 (high)

The following table shows the por_cxg_ha_agentid_to_linkid_reg6 higher register bit assignments.

Table 3-1108 por_cxg_ha_agentid_to_linkid_reg6 (high)

Bits	Field name	Description	Type	Reset
63:58	Reserved	Reserved	RO	-
57:56	agent55_linkid	Specifies Link ID 55	RW	2'h0
55:50	Reserved	Reserved	RO	-
49:48	agent54_linkid	Specifies Link ID 54	RW	2'h0
47:42	Reserved	Reserved	RO	-
41:40	agent53_linkid	Specifies Link ID 53	RW	2'h0
39:34	Reserved	Reserved	RO	-
33:32	agent52_linkid	Specifies Link ID 52	RW	2'h0

The following image shows the lower register bit assignments.

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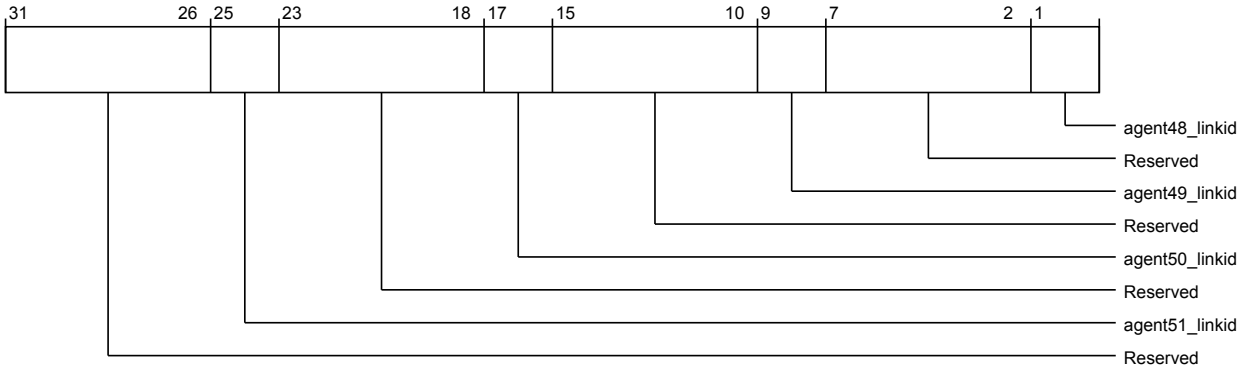

Figure 3-1095 por_cxg_ha_agentid_to_linkid_reg6 (low)

The following table shows the por_cxg_ha_agentid_to_linkid_reg6 lower register bit assignments.

Table 3-1109 por_cxg_ha_agentid_to_linkid_reg6 (low)

Bits	Field name	Description	Type	Reset
31:26	Reserved	Reserved	RO	-
25:24	agent51_linkid	Specifies Link ID 51	RW	2'h0
23:18	Reserved	Reserved	RO	-
17:16	agent50_linkid	Specifies Link ID 50	RW	2'h0
15:10	Reserved	Reserved	RO	-
9:8	agent49_linkid	Specifies Link ID 49	RW	2'h0
7:2	Reserved	Reserved	RO	-
1:0	agent48_linkid	Specifies Link ID 48	RW	2'h0

por_cxg_ha_agentid_to_linkid_reg7

Specifies the mapping of Agent ID to Link ID for Agent IDs 56 to 63.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC78

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ha_secure_register_groups_override.linkid_ctl

The following image shows the higher register bit assignments.

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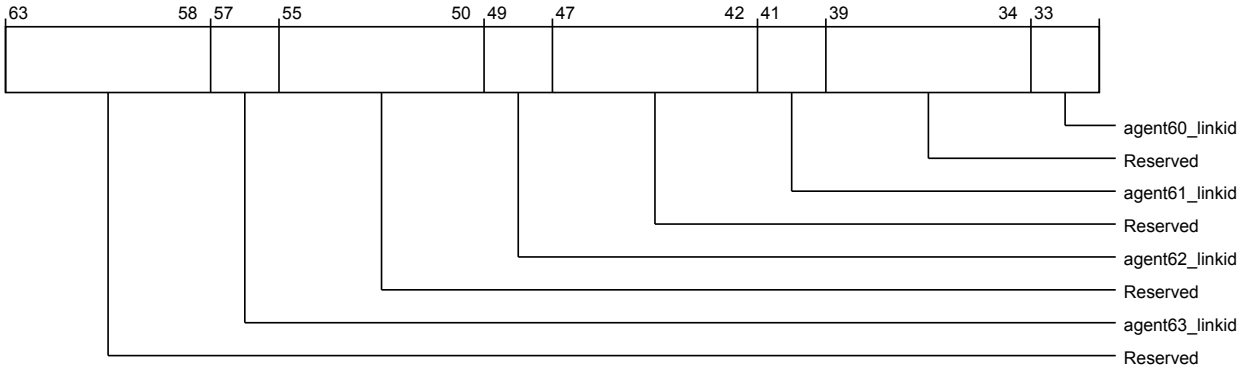

Figure 3-1096 por_cxg_ha_agentid_to_linkid_reg7 (high)

The following table shows the por_cxg_ha_agentid_to_linkid_reg7 higher register bit assignments.

Table 3-1110 por_cxg_ha_agentid_to_linkid_reg7 (high)

Bits	Field name	Description	Type	Reset
63:58	Reserved	Reserved	RO	-
57:56	agent63_linkid	Specifies Link ID 63	RW	2'h0
55:50	Reserved	Reserved	RO	-
49:48	agent62_linkid	Specifies Link ID 62	RW	2'h0
47:42	Reserved	Reserved	RO	-
41:40	agent61_linkid	Specifies Link ID 61	RW	2'h0
39:34	Reserved	Reserved	RO	-
33:32	agent60_linkid	Specifies Link ID 60	RW	2'h0

The following image shows the lower register bit assignments.

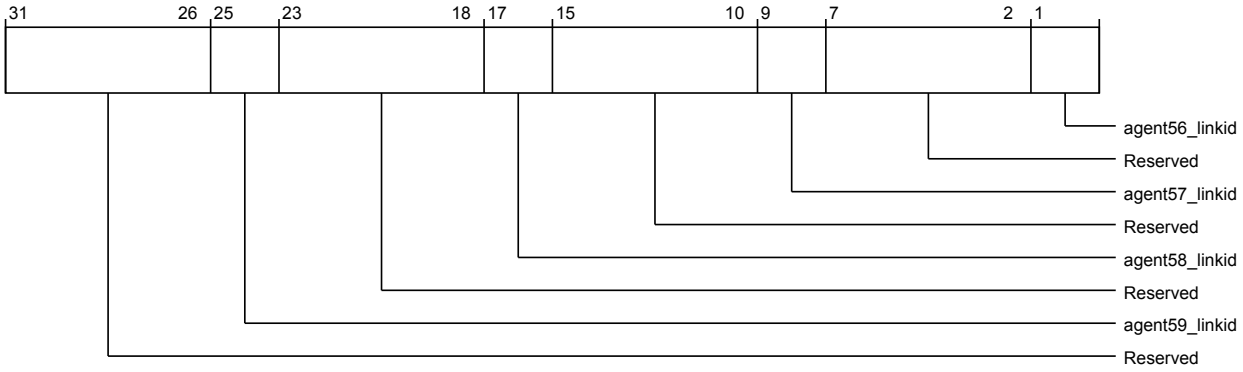

Figure 3-1097 por_cxg_ha_agentid_to_linkid_reg7 (low)

The following table shows the por_cxg_ha_agentid_to_linkid_reg7 lower register bit assignments.

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Table 3-1111 por_cxg_ha_agentid_to_linkid_reg7 (low)

Bits	Field name	Description	Type	Reset
31:26	Reserved	Reserved	RO	-
25:24	agent59_linkid	Specifies Link ID 59	RW	2'h0
23:18	Reserved	Reserved	RO	-
17:16	agent58_linkid	Specifies Link ID 58	RW	2'h0
15:10	Reserved	Reserved	RO	-
9:8	agent57_linkid	Specifies Link ID 57	RW	2'h0
7:2	Reserved	Reserved	RO	-
1:0	agent56_linkid	Specifies Link ID 56	RW	2'h0

por_cxg_ha_agentid_to_linkid_val

Specifies which Agent ID to Link ID mappings are valid.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD00

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ha_secure_register_groups_override.linkid_ctl

The following image shows the higher register bit assignments.

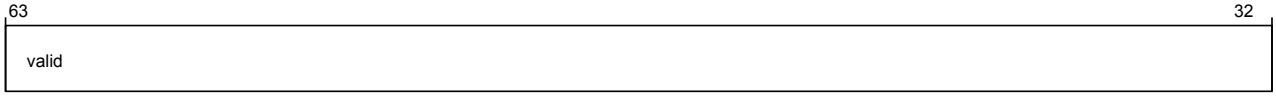

Figure 3-1098 por_cxg_ha_agentid_to_linkid_val (high)

The following table shows the por_cxg_ha_agentid_to_linkid_val higher register bit assignments.

Table 3-1112 por_cxg_ha_agentid_to_linkid_val (high)

Bits	Field name	Description	Type	Reset
63:32	valid	Specifies whether the Link ID is valid; bit number corresponds to logical Agent ID number (from 0 to 63)	RW	63'h0

The following image shows the lower register bit assignments.

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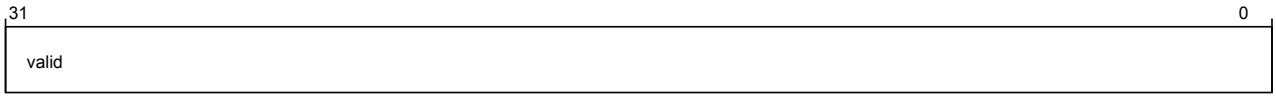

Figure 3-1099 por_cxg_ha_agentid_to_linkid_val (low)

The following table shows the por_cxg_ha_agentid_to_linkid_val lower register bit assignments.

Table 3-1113 por_cxg_ha_agentid_to_linkid_val (low)

Bits	Field name	Description	Type	Reset
31:0	valid	Specifies whether the Link ID is valid; bit number corresponds to logical Agent ID number (from 0 to 63)	RW	63'h0

por_cxg_ha_rnf_raid_to_ldid_val

Specifies which RAID to RN-F LDID mappings are valid.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD08

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ha_secure_register_groups_override.ldid_ctl

The following image shows the higher register bit assignments.

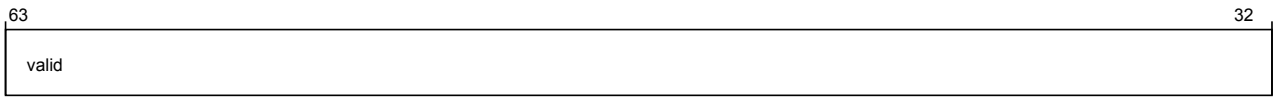

Figure 3-1100 por_cxg_ha_rnf_raid_to_ldid_val (high)

The following table shows the por_cxg_ha_rnf_raid_to_ldid_val higher register bit assignments.

Table 3-1114 por_cxg_ha_rnf_raid_to_ldid_val (high)

Bits	Field name	Description	Type	Reset
63:32	valid	Specifies whether the LDID is valid; bit number corresponds to logical RN-F LDID number (from 0 to 63)	RW	63'h0

The following image shows the lower register bit assignments.

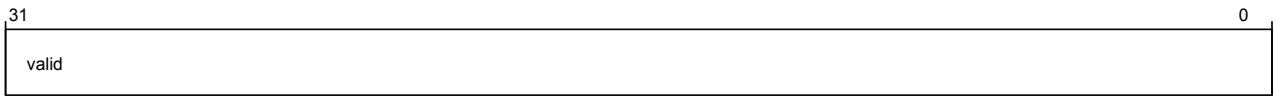

Figure 3-1101 por_cxg_ha_rnf_raid_to_ldid_val (low)

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The following table shows the por_cxg_ha_rnf_raid_to_ldid_val lower register bit assignments.

Table 3-1115 por_cxg_ha_rnf_raid_to_ldid_val (low)

Bits	Field name	Description	Type	Reset
31:0	valid	Specifies whether the LDID is valid; bit number corresponds to logical RN-F LDID number (from 0 to 63)	RW	63'h0

por_cxg_ha_pmu_event_sel

Specifies the PMU event to be counted as a 6-bit ID with the following encodings:

- 6'b000000: CXHA_PMU_EVENT_NULL
- 6'b100001: CXHA_PMU_EVENT_RDDATBYP
- 6'b100010: CXHA_PMU_EVENT_CHIRSP_UP_STALL
- 6'b100011: CXHA_PMU_EVENT_CHIDAT_UP_STALL
- 6'b100100: CXHA_PMU_EVENT_SNPPCRD_LNK0_STALL
- 6'b100101: CXHA_PMU_EVENT_SNPPCRD_LNK1_STALL
- 6'b100110: CXHA_PMU_EVENT_SNPPCRD_LNK2_STALL
- 6'b100111: CXHA_PMU_EVENT_REQTRK_OCC
- 6'b101000: CXHA_PMU_EVENT_RDB_OCC
- 6'b101001: CXHA_PMU_EVENT_RDBBYP_OCC
- 6'b101010: CXHA_PMU_EVENT_WDB_OCC
- 6'b101011: CXHA_PMU_EVENT_SNPTRK_OCC
- 6'b101100: CXHA_PMU_EVENT_SDB_OCC
- 6'b101101: CXHA_PMU_EVENT_SNPHAZ_OCC

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h2000

Register reset 64'b0

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

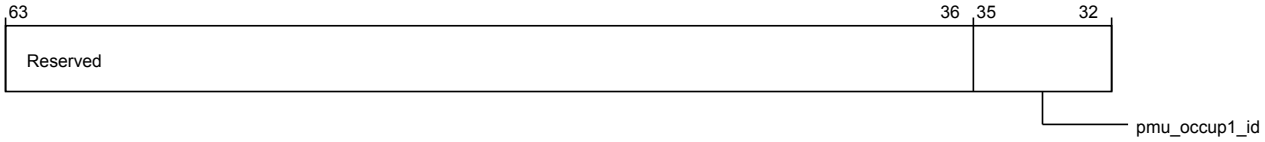

Figure 3-1102 por_cxg_ha_pmu_event_sel (high)

The following table shows the por_cxg_ha_pmu_event_sel higher register bit assignments.

Table 3-1116 por_cxg_ha_pmu_event_sel (high)

Bits	Field name	Description	Type	Reset
63:36	Reserved	Reserved	RO	-
35:32	pmu_occup1_id	CXHA PMU occupancy event selector ID	RW	4'b0

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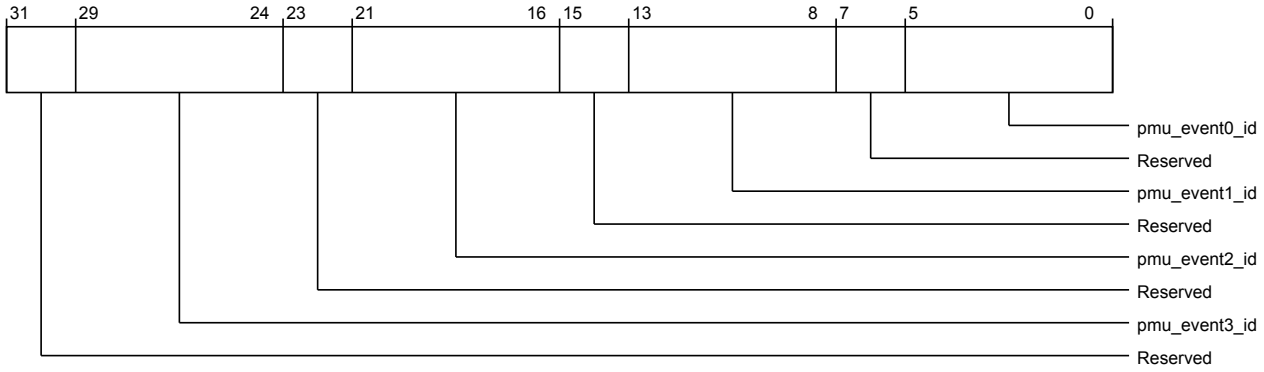

Figure 3-1103 por_cxg_ha_pmu_event_sel (low)

The following table shows the por_cxg_ha_pmu_event_sel lower register bit assignments.

Table 3-1117 por_cxg_ha_pmu_event_sel (low)

Bits	Field name	Description	Type	Reset
31:30	Reserved	Reserved	RO	-
29:24	pmu_event3_id	CXHA PMU Event 3 ID	RW	6'b0
23:22	Reserved	Reserved	RO	-
21:16	pmu_event2_id	CXHA PMU Event 2 ID	RW	6'b0
15:14	Reserved	Reserved	RO	-
13:8	pmu_event1_id	CXHA PMU Event 1 ID	RW	6'b0
7:6	Reserved	Reserved	RO	-
5:0	pmu_event0_id	CXHA PMU Event 0 ID	RW	6'b0

por_cxg_ha_cxprtcl_link0_ctl

Functions as the CXHA CCIX Protocol Link 0 control register. Works with por_cxg_ha_cxprtcl_link0_status.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h1000

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

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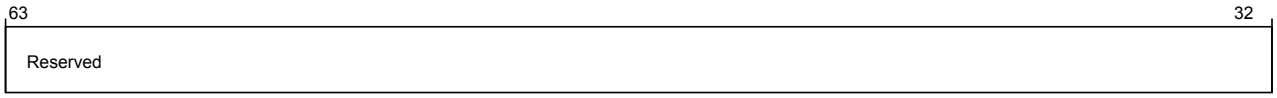

Figure 3-1104 por_cxg_ha_cxprtcl_link0_ctl (high)

The following table shows the por_cxg_ha_cxprtcl_link0_ctl higher register bit assignments.

Table 3-1118 por_cxg_ha_cxprtcl_link0_ctl (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

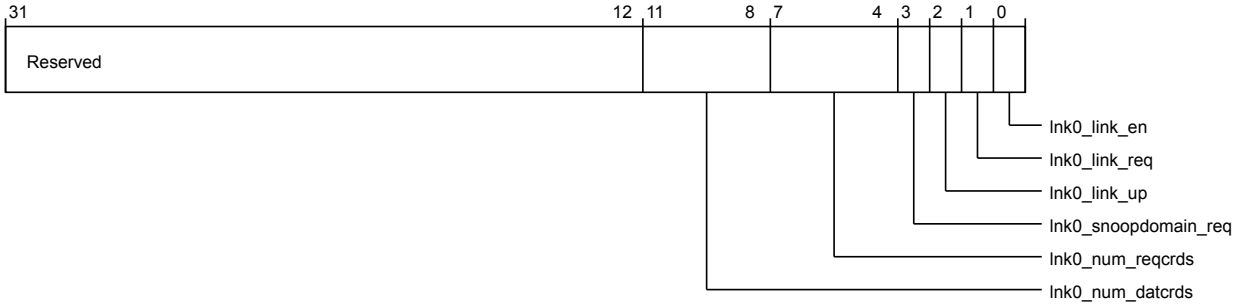

Figure 3-1105 por_cxg_ha_cxprtcl_link0_ctl (low)

The following table shows the por_cxg_ha_cxprtcl_link0_ctl lower register bit assignments.

Table 3-1119 por_cxg_ha_cxprtcl_link0_ctl (low)

Bits	Field name	Description	Type	Reset
31:12	Reserved	Reserved	RO	-
11:8	lnk0_num_datcrds	Controls the number of CCIX data credits assigned to Link 0 4'h0: Total credits are equally divided across all links 4'h1: 25% of credits assigned 4'h2: 50% of credits assigned 4'h3: 75% of credits assigned 4'h4: 100% of credits assigned 4'hF: 0% of credits assigned	RW	4'b0

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Table 3-1119 por_cxg_ha_cxprtcl_link0_ctl (low) (continued)

Bits	Field name	Description	Type	Reset
7:4	lnk0_num_reqcrds	Controls the number of CCIX request credits assigned to Link 0 4'h0: Total credits are equally divided across all links 4'h1: 25% of credits assigned 4'h2: 50% of credits assigned 4'h3: 75% of credits assigned 4'h4: 100% of credits assigned 4'hF: 0% of credits assigned	RW	4'b0
3	lnk0_snoopdomain_req	Controls Snoop domain enable (SYSCOREQ) for CCIX Link 0	RW	1'b0
2	lnk0_link_up	Link Up status. Software writes this register bit to indicate Link status after polling Link_ACK and Link_DN status in the remote agent 1'b0: Link is not Up. Software clears Link_UP when Link_ACK status is clear and Link_DN status is set in both local and remote agents. The local agent stops responding to any protocol activity from remote agent, including acceptance of protocol credits, when Link_UP is clear 1'b1: Link is Up. Software sets Link_UP when Link_ACK status is set and Link_DN status is clear in both local and remote agents; the local agent starts sending local protocol credits to remote agent	RW	1'b0
1	lnk0_link_req	Link Up/Down request; software writes this register bit to request a Link Up or Link Down in the local agent 1'b0: Link Down request **Note** The local agent does not return remote protocol credits yet since remote agent may still be in Link_UP state. 1'b1: Link Up request	RW	1'b0
0	lnk0_link_en	Enables CCIX Link 0 when set 1'b0: Link is disabled 1'b1: Link is enabled	RW	1'b0

por_cxg_ha_cxprtcl_link0_status

Functions as the CXHA CCIX Protocol Link 0 status register. Works with por_cxg_ha_cxprtcl_link0_ctl.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h1008
Register reset 64'b010
Usage constraints Only accessible by secure accesses.

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The following image shows the higher register bit assignments.

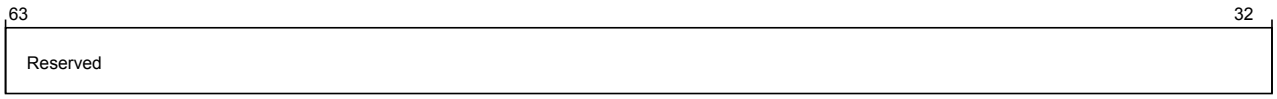

Figure 3-1106 por_cxg_ha_cxprtcl_link0_status (high)

The following table shows the por_cxg_ha_cxprtcl_link0_status higher register bit assignments.

Table 3-1120 por_cxg_ha_cxprtcl_link0_status (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

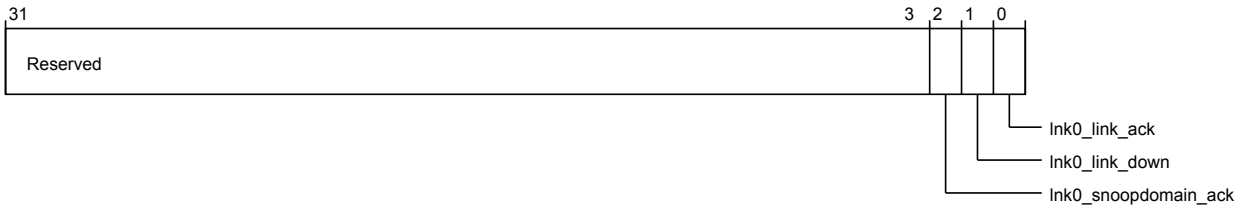

Figure 3-1107 por_cxg_ha_cxprtcl_link0_status (low)

The following table shows the por_cxg_ha_cxprtcl_link0_status lower register bit assignments.

Table 3-1121 por_cxg_ha_cxprtcl_link0_status (low)

Bits	Field name	Description	Type	Reset
31:3	Reserved	Reserved	RO	-
2	lnk0_snoopdomain_ack	Provides Snoop domain status (SYSCOACK) for CCIX Link 0	RO	1'b0

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Table 3-1121 por_cxg_ha_cxprtcl_link0_status (low) (continued)

Bits	Field name	Description	Type	Reset
1	lnk0_link_down	Link Down status; hardware updates this register bit to indicate Link Down status 1'b0: Link is not Down; hardware clears Link_DN when it receives a Link Up request 1'b1: Link is Down; hardware sets Link_DN after the local agent has received all local protocol credits. The local agent must continue to respond to any remote protocol activity, including accepting and returning remote protocol credits until Link Up is clear	RO	1'b1
0	lnk0_link_ack	Link Up/Down acknowledge; hardware updates this register bit to acknowledge the software link request 1'b0: Link Down acknowledge; hardware clears Link_ACK on receiving a Link Down request; the local agent stops sending protocol credits to the remote agent when Link_ACK is clear 1'b1: Link Up acknowledge; hardware sets Link_ACK when the local agent is ready to start accepting protocol credits from the remote agent **Note** The local agent must clear Link_DN before setting Link_ACK.	RO	1'b0

por_cxg_ha_cxprtcl_link1_ctl

Functions as the CXHA CCIX Protocol Link 1 control register. Works with por_cxg_ha_cxprtcl_link1_status.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h1010
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

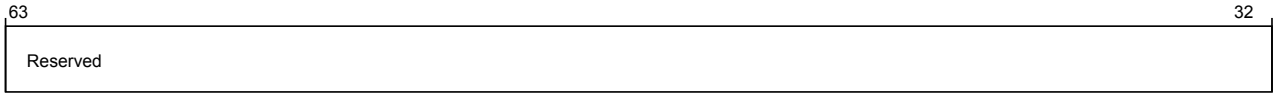

Figure 3-1108 por_cxg_ha_cxprtcl_link1_ctl (high)

The following table shows the por_cxg_ha_cxprtcl_link1_ctl higher register bit assignments.

Table 3-1122 por_cxg_ha_cxprtcl_link1_ctl (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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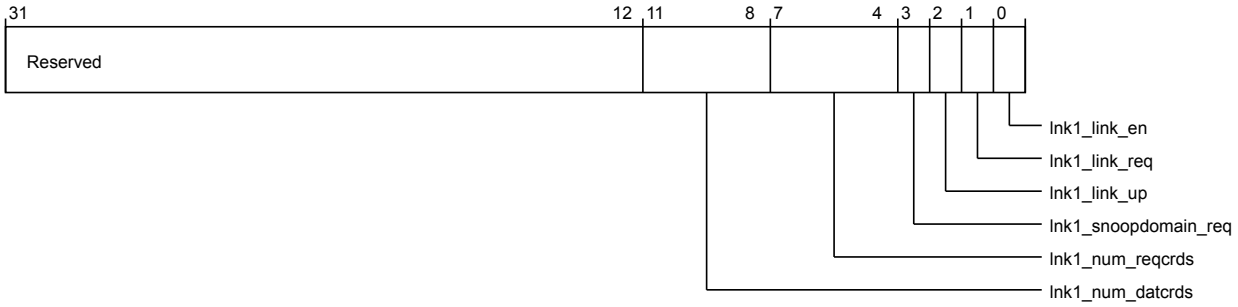

Figure 3-1109 por_cxg_ha_cxprtcl_link1_ctl (low)

The following table shows the por_cxg_ha_cxprtcl_link1_ctl lower register bit assignments.

Table 3-1123 por_cxg_ha_cxprtcl_link1_ctl (low)

Bits	Field name	Description	Type	Reset
31:12	Reserved	Reserved	RO	-
11:8	lnk1_num_datcrds	Controls the number of CCIX data credits assigned to Link 1 4'h0: Total credits equally divided across all links 4'h1: 25% of credits assigned 4'h2: 50% of credits assigned 4'h3: 75% of credits assigned 4'h4: 100% of credits assigned 4'hF: 0% of credits assigned	RW	4'b0
7:4	lnk1_num_reqcrds	Controls the number of CCIX request credits assigned to Link 1 4'h0: Total credits are equally divided across all links 4'h1: 25% of credits assigned 4'h2: 50% of credits assigned 4'h3: 75% of credits assigned 4'h4: 100% of credits assigned 4'hF: 0% of credits assigned	RW	4'b0
3	lnk1_snoopdomain_req	Controls Snoop domain enable (SYSCOREQ) for CCIX Link 1	RW	1'b0
2	lnk1_link_up	Link Up status. Software writes this register bit to indicate Link status after polling Link_ACK and Link_DN status in the remote agent 1'b0: Link is not Up. Software clears Link_UP when Link_ACK status is clear and Link_DN status is set in both local and remote agents. The local agent stops responding to any protocol activity from remote agent, including acceptance of protocol credits, when Link_UP is clear 1'b1: Link is Up. Software sets Link_UP when Link_ACK status is set and Link_DN status is clear in both local and remote agents; the local agent starts sending local protocol credits to remote agent	RW	1'b0

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Table 3-1123 por_cxg_ha_cxprtcl_link1_ctl (low) (continued)

Bits	Field name	Description	Type	Reset
1	lnk1_link_req	Link Up/Down request; software writes this register bit to request a Link Up or Link Down in the local agent 1'b0: Link Down request **Note** The local agent does not return remote protocol credits yet since remote agent may still be in Link_UP state. 1'b1: Link Up request	RW	1'b0
0	lnk1_link_en	Enables CCIX Link 1 when set 1'b0: Link is disabled 1'b1: Link is enabled	RW	1'b0

por_cxg_ha_cxprtcl_link1_status

Functions as the CXHA CCIX Protocol Link 1 status register. Works with por_cxg_ha_cxprtcl_link1_ctl.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h1018
Register reset 64'b010
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

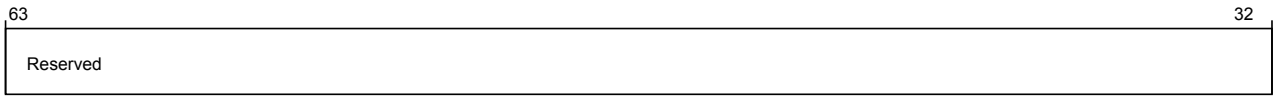

Figure 3-1110 por_cxg_ha_cxprtcl_link1_status (high)

The following table shows the por_cxg_ha_cxprtcl_link1_status higher register bit assignments.

Table 3-1124 por_cxg_ha_cxprtcl_link1_status (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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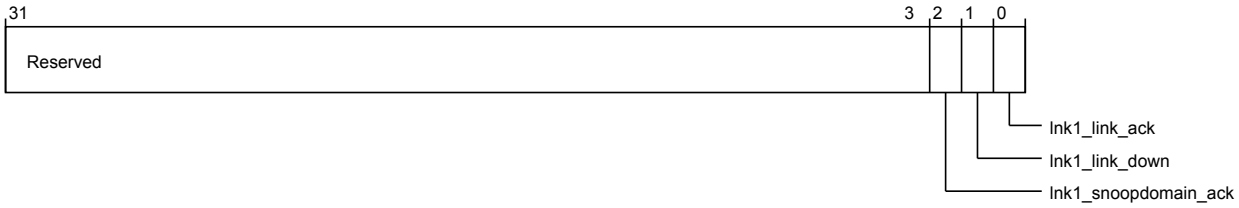

Figure 3-1111 por_cxg_ha_cxprtcl_link1_status (low)

The following table shows the por_cxg_ha_cxprtcl_link1_status lower register bit assignments.

Table 3-1125 por_cxg_ha_cxprtcl_link1_status (low)

Bits	Field name	Description	Type	Reset
31:3	Reserved	Reserved	RO	-
2	lnk1_snoopdomain_ack	Provides Snoop domain status (SYSCOACK) for CCIX Link 1	RO	1'b0
1	lnk1_link_down	Link Down status; hardware updates this register bit to indicate Link Down status 1'b0: Link is not Down; hardware clears Link_DN when it receives a Link Up request 1'b1: Link is Down; hardware sets Link_DN after the local agent has received all local protocol credits. The local agent must continue to respond to any remote protocol activity, including accepting and returning remote protocol credits until Link Up is clear	RO	1'b1
0	lnk1_link_ack	Link Up/Down Acknowledge; hardware updates this register bit to acknowledge the software link request 1'b0: Link Down acknowledge; hardware clears Link_ACK on receiving a Link Down request; the local agent stops sending protocol credits to the remote agent when Link_ACK is clear 1'b1: Link Up acknowledge; hardware sets Link_ACK when the local agent is ready to start accepting protocol credits from the remote agent ——— **Note** ——— The local agent must clear Link_DN before setting Link_ACK. ———	RO	1'b0

por_cxg_ha_cxprtcl_link2_ctl

Functions as the CXHA CCIX Protocol Link 2 control register. Works with por_cxg_ha_cxprtcl_link2_status.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h1020
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

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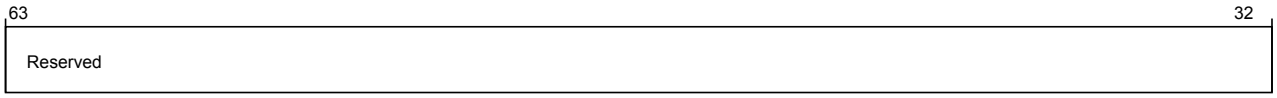

Figure 3-1112 por_cxg_ha_cxprtcl_link2_ctl (high)

The following table shows the por_cxg_ha_cxprtcl_link2_ctl higher register bit assignments.

Table 3-1126 por_cxg_ha_cxprtcl_link2_ctl (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

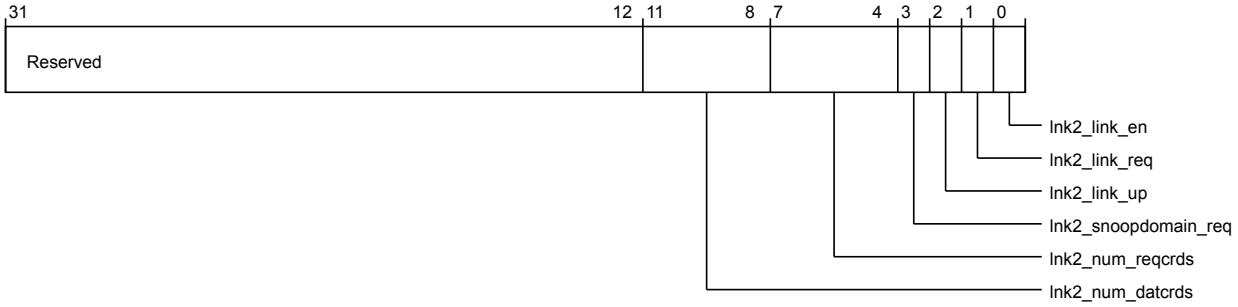

Figure 3-1113 por_cxg_ha_cxprtcl_link2_ctl (low)

The following table shows the por_cxg_ha_cxprtcl_link2_ctl lower register bit assignments.

Table 3-1127 por_cxg_ha_cxprtcl_link2_ctl (low)

Bits	Field name	Description	Type	Reset
31:12	Reserved	Reserved	RO	-
11:8	lnk2_num_datcrds	Controls the number of CCIX data credits assigned to Link 2 4'h0: Total credits are equally divided across all links 4'h1: 25% of credits assigned 4'h2: 50% of credits assigned 4'h3: 75% of credits assigned 4'h4: 100% of credits assigned 4'hF: 0% of credits assigned	RW	4'b0

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Table 3-1127 por_cxg_ha_cxprtcl_link2_ctl (low) (continued)

Bits	Field name	Description	Type	Reset
7:4	lnk2_num_reqcrds	Controls the number of CCIX request credits assigned to Link 2 4'h0: Total credits are equally divided across all links 4'h1: 25% of credits assigned 4'h2: 50% of credits assigned 4'h3: 75% of credits assigned 4'h4: 100% of credits assigned 4'hF: 0% of credits assigned	RW	4'b0
3	lnk2_snoopdomain_req	Controls Snoop domain enable (SYSCOREQ) for CCIX Link 2	RW	1'b0
2	lnk2_link_up	Link Up status. Software writes this register bit to indicate Link status after polling Link_ACK and Link_DN status in the remote agent 1'b0: Link is not Up. Software clears Link_UP when Link_ACK status is clear and Link_DN status is set in both local and remote agents. The local agent stops responding to any protocol activity from remote agent, including acceptance of protocol credits, when Link_UP is clear 1'b1: Link is Up. Software sets Link_UP when Link_ACK status is set and Link_DN status is clear in both local and remote agents; the local agent starts sending local protocol credits to remote agent	RW	1'b0
1	lnk2_link_req	Link Up/Down request; software writes this register bit to request a Link Up or Link Down in the local agent 1'b0: Link Down request **Note** The local agent does not return remote protocol credits yet since remote agent may still be in Link_UP state. 1'b1: Link Up request	RW	1'b0
0	lnk2_link_en	Enables CCIX Link 2 when set 1'b0: Link is disabled 1'b1: Link is enabled	RW	1'b0

por_cxg_ha_cxprtcl_link2_status

Functions as the CXHA CCIX Protocol Link 2 status register. Works with por_cxg_ha_cxprtcl_link2_ctl.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h1028
Register reset 64'b010
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

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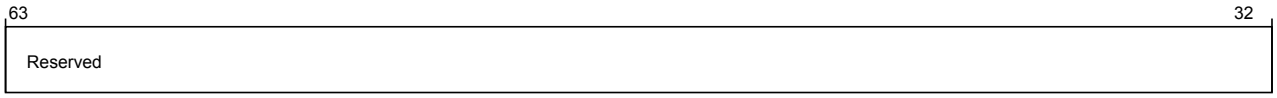

Figure 3-1114 por_cxg_ha_cxprtcl_link2_status (high)

The following table shows the por_cxg_ha_cxprtcl_link2_status higher register bit assignments.

Table 3-1128 por_cxg_ha_cxprtcl_link2_status (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

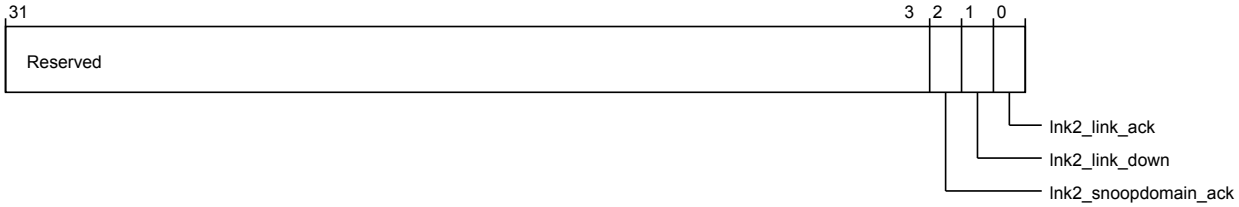

Figure 3-1115 por_cxg_ha_cxprtcl_link2_status (low)

The following table shows the por_cxg_ha_cxprtcl_link2_status lower register bit assignments.

Table 3-1129 por_cxg_ha_cxprtcl_link2_status (low)

Bits	Field name	Description	Type	Reset
31:3	Reserved	Reserved	RO	-
2	lnk2_snoopdomain_ack	Provides Snoop domain status (SYSCOACK) for CCIX Link 2	RO	1'b0

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Table 3-1129 por_cxg_ha_cxprtcl_link2_status (low) (continued)

Bits	Field name	Description	Type	Reset
1	lnk2_link_down	Link Down status; hardware updates this register bit to indicate Link Down status 1'b0: Link is not Down; hardware clears Link_DN when it receives a Link Up request 1'b1: Link is Down; hardware sets Link_DN after the local agent has received all local protocol credits. The local agent must continue to respond to any remote protocol activity, including accepting and returning remote protocol credits until Link Up is clear	RO	1'b1
0	lnk2_link_ack	Link Up/Down acknowledge; hardware updates this register bit to acknowledge the software link request 1'b0: Link Down acknowledge; hardware clears Link_ACK on receiving a Link Down request; the local agent stops sending protocol credits to the remote agent when Link_ACK is clear 1'b1: Link Up acknowledge; hardware sets Link_ACK when the local agent is ready to start accepting protocol credits from the remote agent **Note** The local agent must clear Link_DN before setting Link_ACK.	RO	1'b0

por_cxg_ha_errfr

Functions as the error feature register.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h3000
Register reset 64'b0000010100101
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

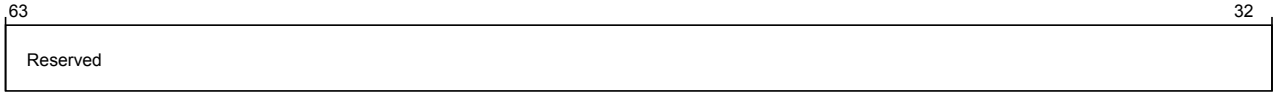

Figure 3-1116 por_cxg_ha_errfr (high)

The following table shows the por_cxg_ha_errfr higher register bit assignments.

Table 3-1130 por_cxg_ha_errfr (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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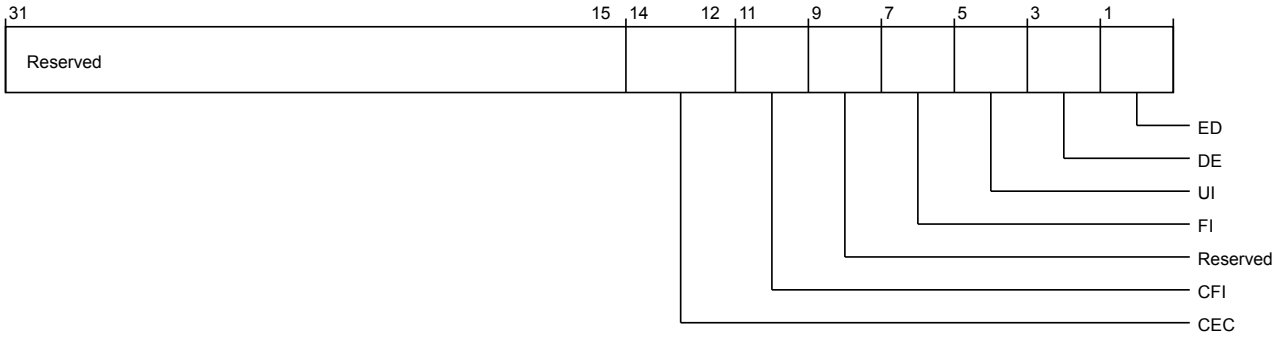

Figure 3-1117 por_cxg_ha_errfr (low)

The following table shows the por_cxg_ha_errfr lower register bit assignments.

Table 3-1131 por_cxg_ha_errfr (low)

Bits	Field name	Description	Type	Reset
31:15	Reserved	Reserved	RO	-
14:12	CEC	Standard corrected error count mechanism 3'b000: Does not implement standardized error counter model 3'b010: Implements 8-bit error counter in por_cxg_ha_errmisc[39:32] 3'b100: Implements 16-bit error counter in por_cxg_ha_errmisc[47:32]	RO	3'b000
11:10	CFI	Corrected error interrupt	RO	2'b00
9:8	Reserved	Reserved	RO	-
7:6	FI	Fault handling interrupt	RO	2'b10
5:4	UI	Uncorrected error interrupt	RO	2'b10
3:2	DE	Deferred errors for data poison	RO	2'b01
1:0	ED	Error detection	RO	2'b01

por_cxg_ha_errctlr

Functions as the error control register. Controls whether specific error-handling interrupts and error detection/deferment are enabled.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h3008
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

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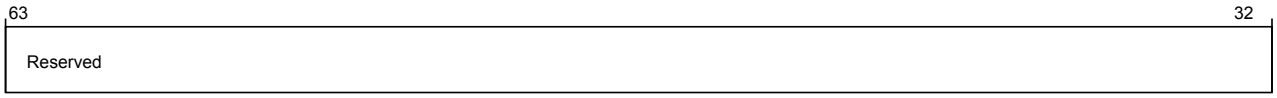

Figure 3-1118 por_cxg_ha_errctlr (high)

The following table shows the por_cxg_ha_errctlr higher register bit assignments.

Table 3-1132 por_cxg_ha_errctlr (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

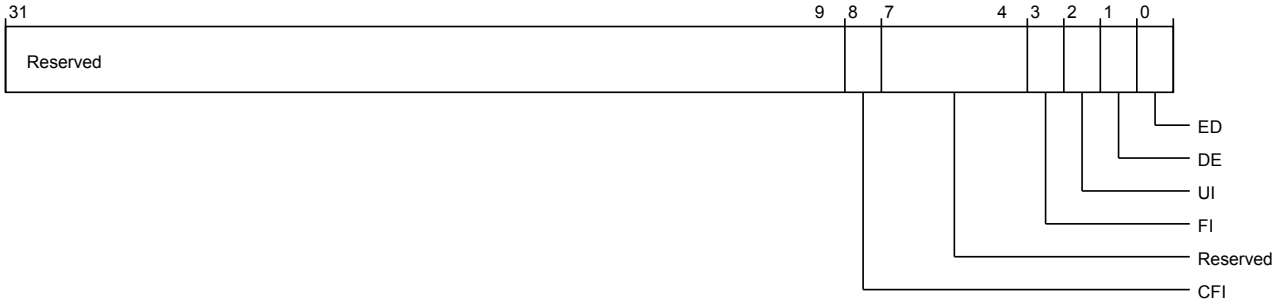

Figure 3-1119 por_cxg_ha_errctlr (low)

The following table shows the por_cxg_ha_errctlr lower register bit assignments.

Table 3-1133 por_cxg_ha_errctlr (low)

Bits	Field name	Description	Type	Reset
31:9	Reserved	Reserved	RO	-
8	CFI	Enables corrected error interrupt as specified in por_cxg_ha_errfr.CFI	RW	1'b0
7:4	Reserved	Reserved	RO	-
3	FI	Enables fault handling interrupt for all detected deferred errors as specified in por_cxg_ha_errfr.FI	RW	1'b0
2	UI	Enables uncorrected error interrupt as specified in por_cxg_ha_errfr.UI	RW	1'b0
1	DE	Enables error deferment as specified in por_cxg_ha_errfr.DE	RW	1'b0
0	ED	Enables error detection as specified in por_cxg_ha_errfr.ED	RW	1'b0

por_cxg_ha_errstatus

Functions as the error status register. AV and MV bits must be cleared in the same cycle, otherwise the error record does not have a consistent view.

Its characteristics are:

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Type W1C
Register width (Bits) 64
Address offset 14'h3010
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

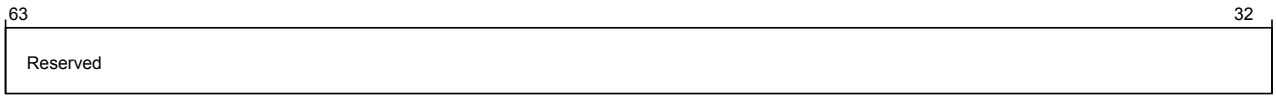

Figure 3-1120 por_cxg_ha_errstatus (high)

The following table shows the por_cxg_ha_errstatus higher register bit assignments.

Table 3-1134 por_cxg_ha_errstatus (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

Figure 3-1121 por_cxg_ha_errstatus (low)

The following table shows the por_cxg_ha_errstatus lower register bit assignments.

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Table 3-1135 por_cxg_ha_errstatus (low)

Bits	Field name	Description	Type	Reset
31	AV	Address register valid; writes to this bit are ignored if any of the UE, DE, or CE bits are set to 1, and the highest priority are not cleared to 0 in the same write; write a 1 to clear 1'b1: Address is valid; por_cxg_ha_erraddr contains a physical address for that recorded error 1'b0: Address is not valid	W1C	1'b0
30	V	Register valid; writes to this bit are ignored if any of the UE, DE, or CE bits are set to 1, and are not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one error recorded; register is valid 1'b0: No errors recorded	W1C	1'b0
29	UE	Uncorrected errors; writes to this bit are ignored if the OF bit is set to 1, and is not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one error detected that is not corrected and is not deferred to a slave 1'b0: No uncorrected errors detected	W1C	1'b0
28	Reserved	Reserved	RO	-
27	OF	Overflow; asserted when multiple errors of the highest priority type are detected; write a 1 to clear 1'b1: More than one error detected 1'b0: Only one error of the highest priority type detected as described by UE/DE/CE fields	W1C	1'b0
26	MV	por_cxg_ha_errmisc valid; writes to this bit are ignored if any of the UE, DE, or CE bits are set to 1, and the highest priority are not cleared to 0 in the same write; write a 1 to clear 1'b1: Miscellaneous registers are valid 1'b0: Miscellaneous registers are not valid	W1C	1'b0
25	Reserved	Reserved	RO	-
24	CE	Corrected errors; writes to this bit are ignored if the OF bit is set to 1, and is not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one transient corrected error recorded 1'b0: No corrected errors recorded	W1C	1'b0
23	DE	Deferred errors; writes to this bit are ignored if the OF bit is set to 1, and is not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one error is not corrected and is deferred 1'b0: No errors deferred	W1C	1'b0
22:0	Reserved	Reserved	RO	-

por_cxg_ha_erraddr

Contains the error record address.

Its characteristics are:

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Type RW
Register width (Bits) 64
Address offset 14'h3018
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

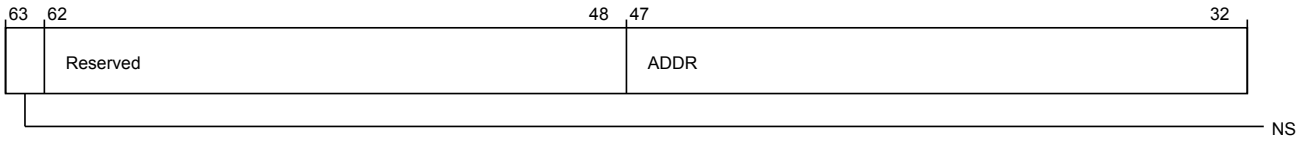

Figure 3-1122 por_cxg_ha_erraddr (high)

The following table shows the por_cxg_ha_erraddr higher register bit assignments.

Table 3-1136 por_cxg_ha_erraddr (high)

Bits	Field name	Description	Type	Reset
63	NS	Security status of transaction 1'b1: Non-secure transaction 1'b0: Secure transaction CONSTRAINT: por_cxg_ha_erraddr.NS is redundant. Since it is writable, it cannot be used for logic qualification.	RW	1'b0
62:48	Reserved	Reserved	RO	-
47:32	ADDR	Transaction address	RW	48'b0

The following image shows the lower register bit assignments.

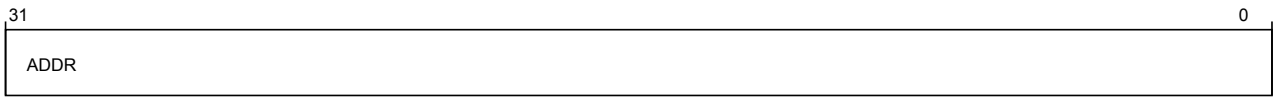

Figure 3-1123 por_cxg_ha_erraddr (low)

The following table shows the por_cxg_ha_erraddr lower register bit assignments.

Table 3-1137 por_cxg_ha_erraddr (low)

Bits	Field name	Description	Type	Reset
31:0	ADDR	Transaction address	RW	48'b0

por_cxg_ha_errmisc

Functions as the miscellaneous error register. Contains miscellaneous information about deferred/ uncorrected errors.

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Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h3020
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

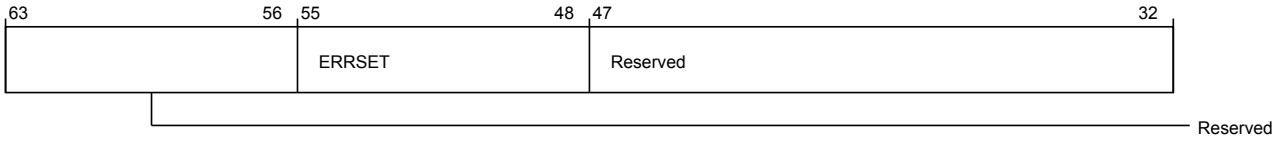

Figure 3-1124 por_cxg_ha_errmisc (high)

The following table shows the por_cxg_ha_errmisc higher register bit assignments.

Table 3-1138 por_cxg_ha_errmisc (high)

Bits	Field name	Description	Type	Reset
63:56	Reserved	Reserved	RO	-
55:48	ERRSET	RAM entry set address for parity error	RW	8'b0
47:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

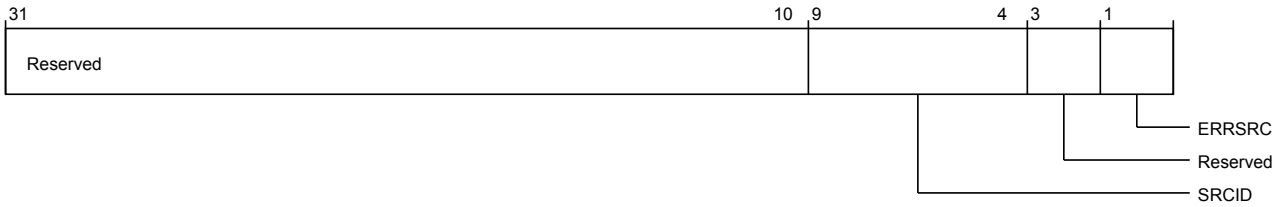

Figure 3-1125 por_cxg_ha_errmisc (low)

The following table shows the por_cxg_ha_errmisc lower register bit assignments.

Table 3-1139 por_cxg_ha_errmisc (low)

Bits	Field name	Description	Type	Reset
31:10	Reserved	Reserved	RO	-
9:4	SRCID	CCIX RAID of the requestor or the snoop target	RW	6'b0

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Table 3-1139 por_cxg_ha_errmisc (low) (continued)

Bits	Field name	Description	Type	Reset
3:2	Reserved	Reserved	RO	-
1:0	ERRSRC	Source of the parity error 2'b00: Read data buffer 0 2'b01: Read data buffer 1 2'b10: Write data buffer 0 2'b11: Write data buffer 1	RW	2'b00

por_cxg_ha_errfr_NS

Functions as the non-secure error feature register.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h3100
Register reset 64'b0000010100101
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

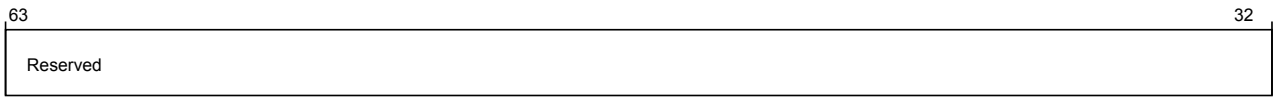

Figure 3-1126 por_cxg_ha_errfr_ns (high)

The following table shows the por_cxg_ha_errfr_NS higher register bit assignments.

Table 3-1140 por_cxg_ha_errfr_ns (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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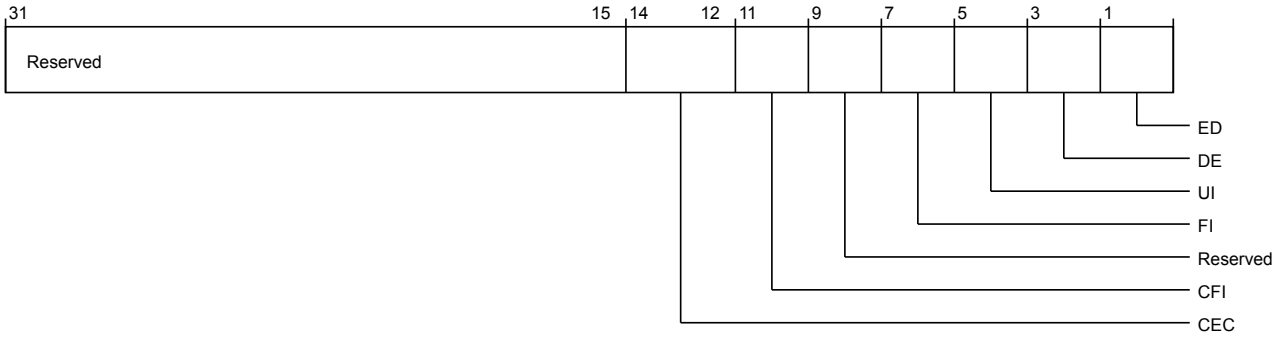

Figure 3-1127 por_cxg_ha_errfr_ns (low)

The following table shows the por_cxg_ha_errfr_NS lower register bit assignments.

Table 3-1141 por_cxg_ha_errfr_ns (low)

Bits	Field name	Description	Type	Reset
31:15	Reserved	Reserved	RO	-
14:12	CEC	Standard corrected error count mechanism 3'b000: Does not implement standardized error counter model 3'b010: Implements 8-bit error counter in por_cxg_ha_errmisc[39:32] 3'b100: Implements 16-bit error counter in por_cxg_ha_errmisc[47:32]	RO	3'b000
11:10	CFI	Corrected error interrupt	RO	2'b00
9:8	Reserved	Reserved	RO	-
7:6	FI	Fault handling interrupt	RO	2'b10
5:4	UI	Uncorrected error interrupt	RO	2'b10
3:2	DE	Deferred errors for data poison	RO	2'b01
1:0	ED	Error detection	RO	2'b01

por_cxg_ha_errctlr_NS

Functions as the non-secure error control register. Controls whether specific error-handling interrupts and error detection/deferment are enabled.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h3108
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

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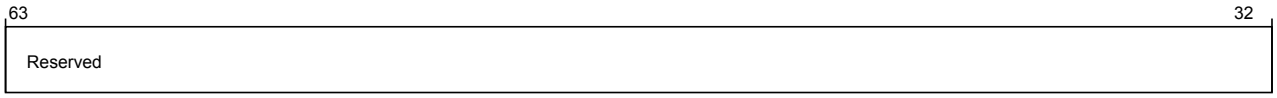

Figure 3-1128 por_cxg_ha_errctlr_ns (high)

The following table shows the por_cxg_ha_errctlr_NS higher register bit assignments.

Table 3-1142 por_cxg_ha_errctlr_ns (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

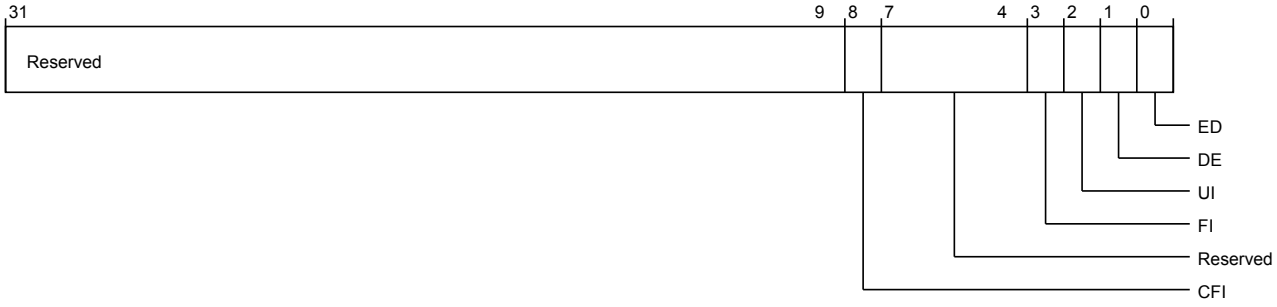

Figure 3-1129 por_cxg_ha_errctlr_ns (low)

The following table shows the por_cxg_ha_errctlr_NS lower register bit assignments.

Table 3-1143 por_cxg_ha_errctlr_ns (low)

Bits	Field name	Description	Type	Reset
31:9	Reserved	Reserved	RO	-
8	CFI	Enables corrected error interrupt as specified in por_cxg_ha_errfr.CFI	RW	1'b0
7:4	Reserved	Reserved	RO	-
3	FI	Enables fault handling interrupt for all detected deferred errors as specified in por_cxg_ha_errfr.FI	RW	1'b0
2	UI	Enables uncorrected error interrupt as specified in por_cxg_ha_errfr.UI	RW	1'b0
1	DE	Enables error deferment as specified in por_cxg_ha_errfr.DE	RW	1'b0
0	ED	Enables error detection as specified in por_cxg_ha_errfr.ED	RW	1'b0

por_cxg_ha_errstatus_NS

Functions as the non-secure error status register. AV and MV bits must be cleared in the same cycle, otherwise the error record does not have a consistent view.

Its characteristics are:

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Type W1C
Register width (Bits) 64
Address offset 14'h3110
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

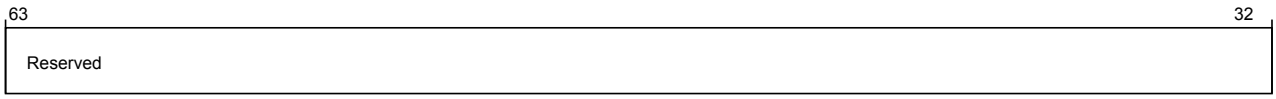

Figure 3-1130 por_cxg_ha_errstatus_ns (high)

The following table shows the por_cxg_ha_errstatus_NS higher register bit assignments.

Table 3-1144 por_cxg_ha_errstatus_ns (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

Figure 3-1131 por_cxg_ha_errstatus_ns (low)

The following table shows the por_cxg_ha_errstatus_NS lower register bit assignments.

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Table 3-1145 por_cxg_ha_errstatus_ns (low)

Bits	Field name	Description	Type	Reset
31	AV	Address register valid; writes to this bit are ignored if any of the UE, DE, or CE bits are set to 1, and the highest priority are not cleared to 0 in the same write; write a 1 to clear 1'b1: Address is valid; por_cxg_ha_erraddr contains a physical address for that recorded error 1'b0: Address is not valid	W1C	1'b0
30	V	Register valid; writes to this bit are ignored if any of the UE, DE, or CE bits are set to 1, and are not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one error recorded; register is valid 1'b0: No errors recorded	W1C	1'b0
29	UE	Uncorrected errors; writes to this bit are ignored if the OF bit is set to 1, and is not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one error detected that is not corrected and is not deferred to a slave 1'b0: No uncorrected errors detected	W1C	1'b0
28	Reserved	Reserved	RO	-
27	OF	Overflow; asserted when multiple errors of the highest priority type are detected; write a 1 to clear 1'b1: More than one error detected 1'b0: Only one error of the highest priority type detected as described by UE/DE/CE fields	W1C	1'b0
26	MV	por_cxg_ha_errmisc valid; writes to this bit are ignored if any of the UE, DE, or CE bits are set to 1, and the highest priority are not cleared to 0 in the same write; write a 1 to clear 1'b1: Miscellaneous registers are valid 1'b0: Miscellaneous registers are not valid	W1C	1'b0
25	Reserved	Reserved	RO	-
24	CE	Corrected errors; writes to this bit are ignored if the OF bit is set to 1, and is not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one transient corrected error recorded 1'b0: No corrected errors recorded	W1C	1'b0
23	DE	Deferred errors; writes to this bit are ignored if the OF bit is set to 1, and is not cleared to 0 in the same write; write a 1 to clear 1'b1: At least one error is not corrected and is deferred 1'b0: No errors deferred	W1C	1'b0
22:0	Reserved	Reserved	RO	-

por_cxg_ha_erraddr_NS

Contains the non-secure error record address.

Its characteristics are:

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Type RW
Register width (Bits) 64
Address offset 14'h3118
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

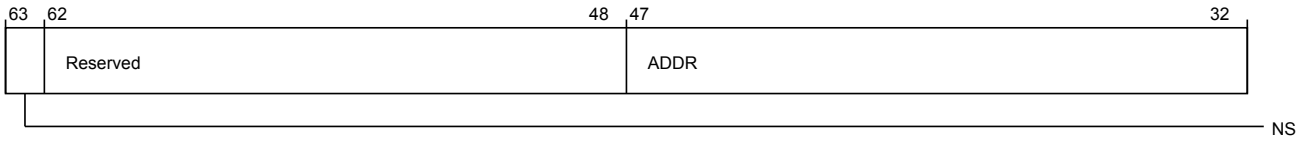

Figure 3-1132 por_cxg_ha_erraddr_ns (high)

The following table shows the por_cxg_ha_erraddr_NS higher register bit assignments.

Table 3-1146 por_cxg_ha_erraddr_ns (high)

Bits	Field name	Description	Type	Reset
63	NS	Security status of transaction 1'b1: Non-secure transaction 1'b0: Secure transaction CONSTRAINT: por_cxg_ha_erraddr.NS is redundant. Since it is writable, it cannot be used for logic qualification.	RW	1'b0
62:48	Reserved	Reserved	RO	-
47:32	ADDR	Transaction address	RW	48'b0

The following image shows the lower register bit assignments.

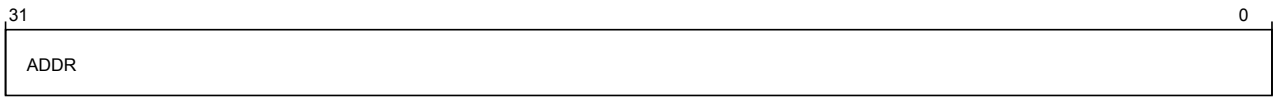

Figure 3-1133 por_cxg_ha_erraddr_ns (low)

The following table shows the por_cxg_ha_erraddr_NS lower register bit assignments.

Table 3-1147 por_cxg_ha_erraddr_ns (low)

Bits	Field name	Description	Type	Reset
31:0	ADDR	Transaction address	RW	48'b0

por_cxg_ha_errmisc_NS

Functions as the non-secure miscellaneous error register. Contains miscellaneous information about deferred/uncorrected errors.

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Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'h3120

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

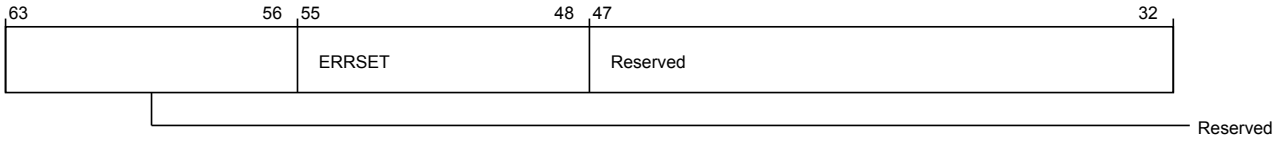

Figure 3-1134 por_cxg_ha_errmisc_ns (high)

The following table shows the por_cxg_ha_errmisc_NS higher register bit assignments.

Table 3-1148 por_cxg_ha_errmisc_ns (high)

Bits	Field name	Description	Type	Reset
63:56	Reserved	Reserved	RO	-
55:48	ERRSET	RAM entry set address for parity error	RW	8'b0
47:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

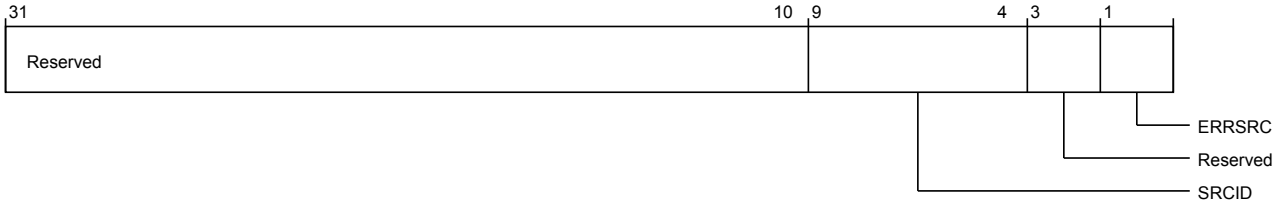

Figure 3-1135 por_cxg_ha_errmisc_ns (low)

The following table shows the por_cxg_ha_errmisc_NS lower register bit assignments.

Table 3-1149 por_cxg_ha_errmisc_ns (low)

Bits	Field name	Description	Type	Reset
31:10	Reserved	Reserved	RO	-
9:4	SRCID	CCIX RAID of the requestor or the snoop target	RW	6'b0

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Table 3-1149 por_cxg_ha_errmisc_ns (low) (continued)

Bits	Field name	Description	Type	Reset
3:2	Reserved	Reserved	RO	-
1:0	ERRSRC	Source of the parity error 2'b00: Read data buffer 0 2'b01: Read data buffer 1 2'b10: Write data buffer 0 2'b11: Write data buffer 1	RW	2'b00

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3.3.12 CXRA configuration registers

This section lists the CXRA configuration registers.

por_cxg_ra_node_info

Provides component identification information.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h0
Register reset Configuration dependent
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

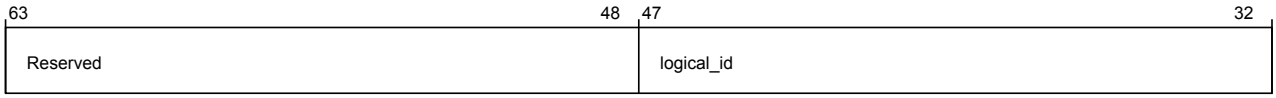

Figure 3-1136 por_cxg_ra_node_info (high)

The following table shows the por_cxg_ra_node_info higher register bit assignments.

Table 3-1150 por_cxg_ra_node_info (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	logical_id	Component logical ID	RO	Configuration dependent

The following image shows the lower register bit assignments.

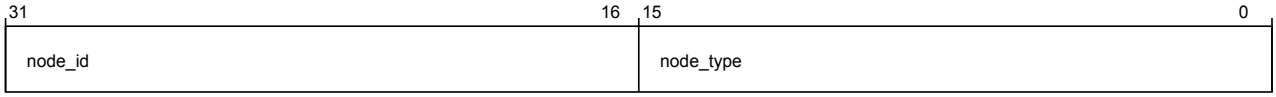

Figure 3-1137 por_cxg_ra_node_info (low)

The following table shows the por_cxg_ra_node_info lower register bit assignments.

Table 3-1151 por_cxg_ra_node_info (low)

Bits	Field name	Description	Type	Reset
31:16	node_id	Component CHI node ID	RO	Configuration dependent
15:0	node_type	CMN-600 node type identifier	RO	16'h0100

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por_cxg_ra_child_info

Provides component child identification information.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h80
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

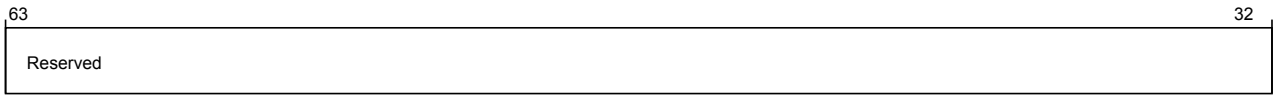

Figure 3-1138 por_cxg_ra_child_info (high)

The following table shows the por_cxg_ra_child_info higher register bit assignments.

Table 3-1152 por_cxg_ra_child_info (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

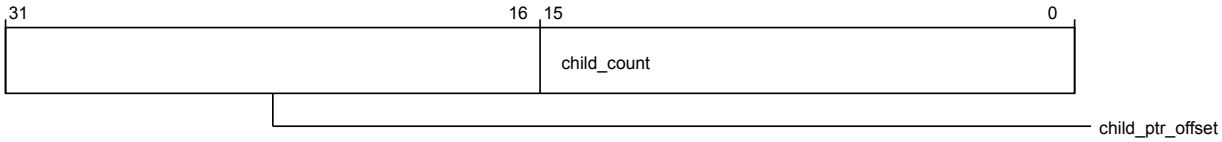

Figure 3-1139 por_cxg_ra_child_info (low)

The following table shows the por_cxg_ra_child_info lower register bit assignments.

Table 3-1153 por_cxg_ra_child_info (low)

Bits	Field name	Description	Type	Reset
31:16	child_ptr_offset	Starting register offset which contains pointers to the child nodes	RO	16'h0
15:0	child_count	Number of child nodes; used in discovery process	RO	16'h0

por_cxg_ra_secure_register_groups_override

Allows non-secure access to predefined groups of secure registers.

Its characteristics are:

Type RW
Register width (Bits) 64

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Address offset 14'h980

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

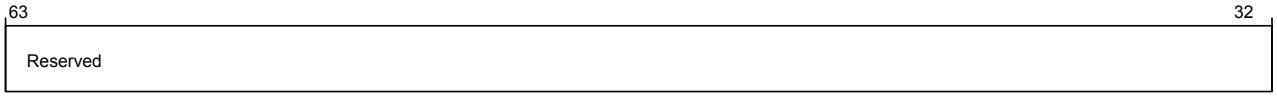

Figure 3-1140 por_cxg_ra_secure_register_groups_override (high)

The following table shows the por_cxg_ra_secure_register_groups_override higher register bit assignments.

Table 3-1154 por_cxg_ra_secure_register_groups_override (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

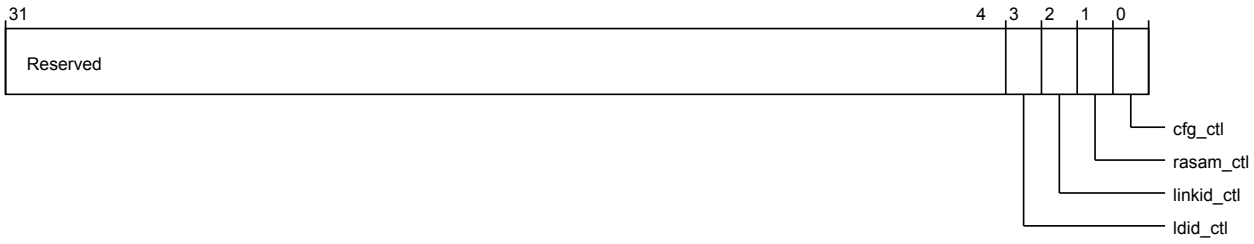

Figure 3-1141 por_cxg_ra_secure_register_groups_override (low)

The following table shows the por_cxg_ra_secure_register_groups_override lower register bit assignments.

Table 3-1155 por_cxg_ra_secure_register_groups_override (low)

Bits	Field name	Description	Type	Reset
31:4	Reserved	Reserved	RO	-
3	ldid_ctl	Allows non-secure access to secure RA LDID registers	RW	1'b0
2	linkid_ctl	Allows non-secure access to secure RA Link ID registers	RW	1'b0
1	rasam_ctl	Allows non-secure access to secure RA SAM control registers	RW	1'b0
0	cfg_ctl	Allows non-secure access to secure configuration control register	RW	1'b0

por_cxg_ra_unit_info

Provides component identification information for CXRA.

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Its characteristics are:

Type RO

Register width (Bits) 64

Address offset 14'h900

Register reset Configuration dependent

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

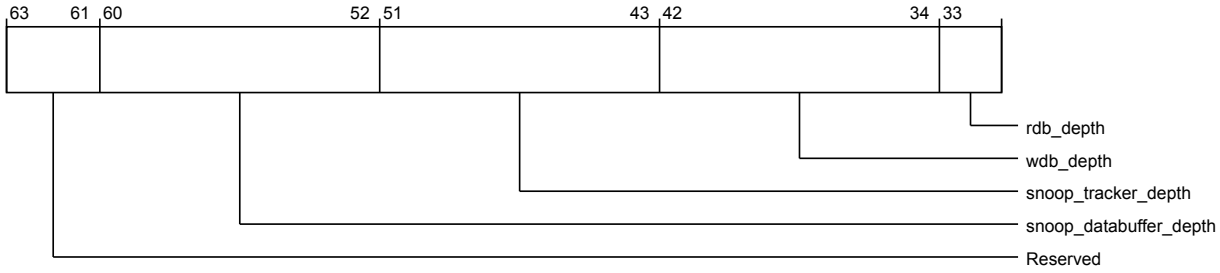

Figure 3-1142 por_cxg_ra_unit_info (high)

The following table shows the por_cxg_ra_unit_info higher register bit assignments.

Table 3-1156 por_cxg_ra_unit_info (high)

Bits	Field name	Description	Type	Reset
63:61	Reserved	Reserved	RO	-
60:52	snoop_databuffer_depth	Depth of Snoop Data Buffer - number of outstanding SNP requests on CHI	RO	Configuration dependent
51:43	snoop_tracker_depth	Depth of Snoop Tracker - number of outstanding SNP requests on CCIX	RO	Configuration dependent
42:34	wdb_depth	Depth of Write Data Buffer	RO	Configuration dependent
33:32	rdb_depth	Depth of Read Data Buffer	RO	Configuration dependent

The following image shows the lower register bit assignments.

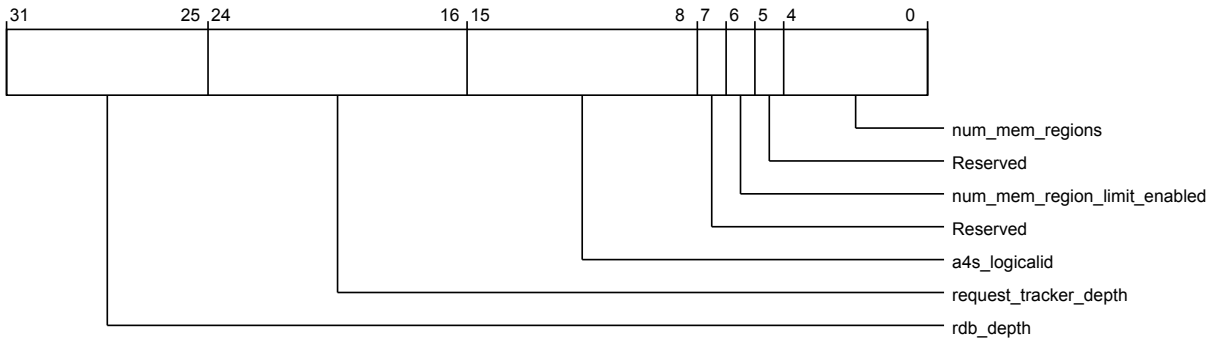

Figure 3-1143 por_cxg_ra_unit_info (low)

The following table shows the por_cxg_ra_unit_info lower register bit assignments.

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Table 3-1157 por_cxg_ra_unit_info (low)

Bits	Field name	Description	Type	Reset
31:25	rdb_depth	Depth of Read Data Buffer	RO	Configuration dependent
24:16	request_tracker_depth	Depth of Request Tracker - number of outstanding Memory requests on CCIX	RO	Configuration dependent
15:8	a4s_logicalid	AXI4Stream interfaces logical ID	RO	Configuration dependent
7	Reserved	Reserved	RO	-
6	num_mem_region_limit_enabled	Memory region limiting enabled	RO	Configuration dependent
5	Reserved	Reserved	RO	-
4:0	num_mem_regions	Number of memory regions supported	RO	Configuration dependent

por_cxg_ra_cfg_ctl

Functions as the configuration control register. Specifies the current mode.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hA00

Register reset 10'h2

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

Secure group override por_cxg_ra_secure_register_groups_override.cfg_ctl

The following image shows the higher register bit assignments.

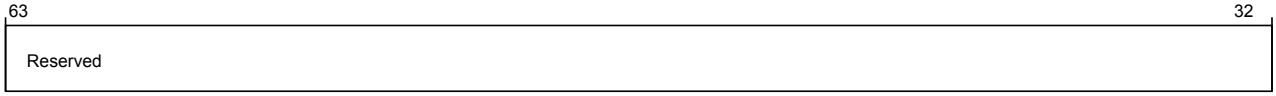

Figure 3-1144 por_cxg_ra_cfg_ctl (high)

The following table shows the por_cxg_ra_cfg_ctl higher register bit assignments.

Table 3-1158 por_cxg_ra_cfg_ctl (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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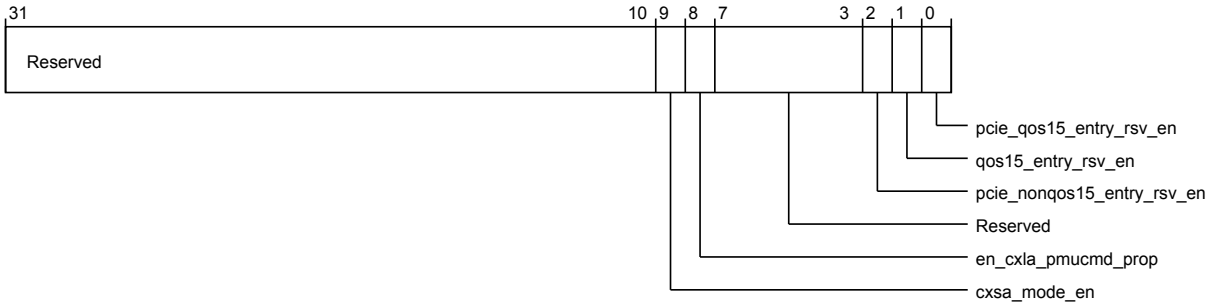

Figure 3-1145 por_cxg_ra_cfg_ctl (low)

The following table shows the por_cxg_ra_cfg_ctl lower register bit assignments.

Table 3-1159 por_cxg_ra_cfg_ctl (low)

Bits	Field name	Description	Type	Reset
31:10	Reserved	Reserved	RO	-
9	cxsa_mode_en	When set, enables the CCIX Slave Agent mode.In this mode RA functions as a CCIX Slave Agent 1'b1: CCIX Slave Agent 1'b0: CCIX Requesting Agent	RW	1'b0
8	en_cxla_pmucmd_prop	When set, enables the propagation of PMU commands to CXLA ——— **Note** ——— By default, CXLA PMU command propagation is disabled. ———	RW	1'b0
7:3	Reserved	Reserved	RO	-
2	pcie_nonqos15_entry_rsv_en	Enables entry reservation for non QoS15 traffic from PCIe RN-I/RN-D 1'b1: Reserves tracker entry for non QoS15 requests from PCIe RN-I/RN-D 1'b0: Does not reserve tracker entry for non QoS15 requests from PCIe RN-I/RN-D	RW	1'b0
1	qos15_entry_rsv_en	Enables entry reservation for QoS15 traffic 1'b1: Reserves tracker entry for QoS15 requests 1'b0: Does not reserve tracker entry for QoS15 requests	RW	1'b1
0	pcie_qos15_entry_rsv_en	Enables entry reservation for QoS15 traffic from PCIe RN-I/RN-D 1'b1: Reserves tracker entry for QoS15 requests from PCIe RN-I/RN-D 1'b0: Does not reserve tracker entry for QoS15 requests from PCIe RN-I/RN-D	RW	1'b0

por_cxg_ra_aux_ctl

Functions as the auxiliary control register for CXRA.

Its characteristics are:

Type RW

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Register width (Bits) 64

Address offset 14'hA08

Register reset 17'h6

Usage constraints Only accessible by secure accesses. This register can be modified only with prior written permission from Arm.

The following image shows the higher register bit assignments.

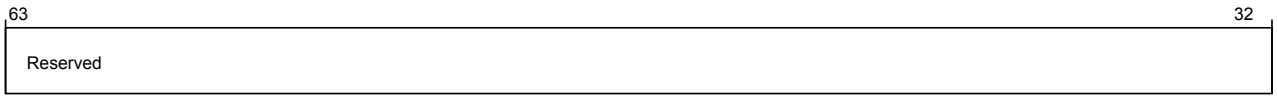

Figure 3-1146 por_cxg_ra_aux_ctl (high)

The following table shows the por_cxg_ra_aux_ctl higher register bit assignments.

Table 3-1160 por_cxg_ra_aux_ctl (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

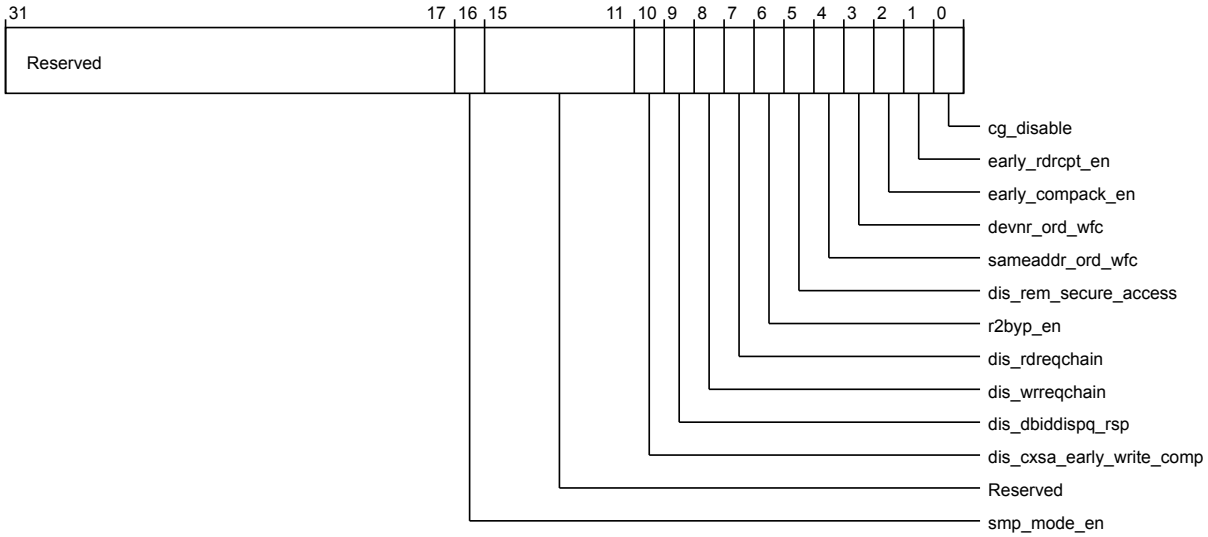

Figure 3-1147 por_cxg_ra_aux_ctl (low)

The following table shows the por_cxg_ra_aux_ctl lower register bit assignments.

Table 3-1161 por_cxg_ra_aux_ctl (low)

Bits	Field name	Description	Type	Reset
31:17	Reserved	Reserved	RO	-
16	smp_mode_en	When set, enables Symmetric Multiprocessor Mode (SMP) Mode.	RW	1'b0

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Table 3-1161 por_cxg_ra_aux_ctl (low) (continued)

Bits	Field name	Description	Type	Reset
15:11	Reserved	Reserved	RO	-
10	dis_cxsa_early_write_comp	When set, disables early write completions in CCIX Slave Agent mode.	RW	1'b0
9	dis_dbiddispq_rsp	When set, disables the dispatch of DBID responses from a separate DispatchQ.	RW	1'b0
8	dis_wrreqchain	When set, disables chaining of write requests.	RW	1'b0
7	dis_rdreqchain	When set, disables chaining of read and dataless requests.	RW	1'b0
6	r2byp_en	When set, enables request bypass. Applies to read and dataless requests only. Note: When set will affect the capability to chain a request on the TX side	RW	1'b0
5	dis_rem_secure_access	When set, treats all the incoming snoops as non-secure and forces the NS bit to 1	RW	1'b0
4	sameaddr_ord_wfc	When set, enables waiting for completion (COMP) before dispatching next same Addr dependent transaction (TXN)	RW	1'b0
3	devnr_ord_wfc	When set, enables waiting for completion (COMP) before dispatching next Device-nR dependent transaction (TXN)	RW	1'b0
2	early_compack_en	Early CompAck enable; enables sending early CompAck on CCIX for requests that require CompAck	RW	1'b1
1	early_rdrcpt_en	Early ReadReceipt enable; enables sending early ReadReceipt for ordered read requests	RW	1'b1
0	cg_disable	Disables clock gating when set	RW	1'b0

por_cxg_ra_sam_addr_region_reg0

Configures Address Region 0 for RA SAM.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hDA8

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.rasam_ctl

The following image shows the higher register bit assignments.

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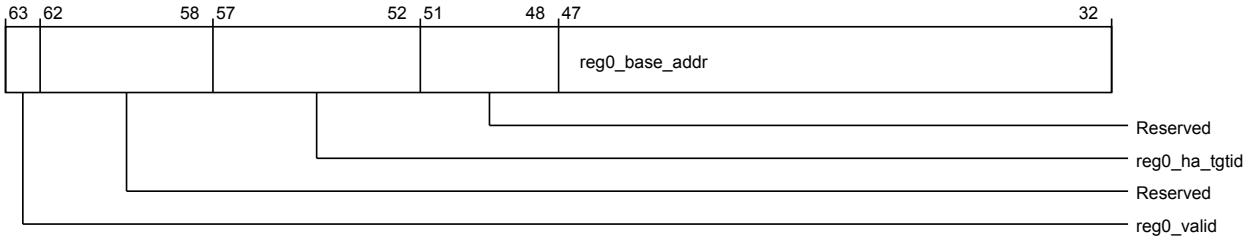

Figure 3-1148 por_cxg_ra_sam_addr_region_reg0 (high)

The following table shows the por_cxg_ra_sam_addr_region_reg0 higher register bit assignments.

Table 3-1162 por_cxg_ra_sam_addr_region_reg0 (high)

Bits	Field name	Description	Type	Reset
63	reg0_valid	Specifies if the memory region is valid	RW	1'b0
62:58	Reserved	Reserved	RO	-
57:52	reg0_ha_tgtid	Specifies the target HAID	RW	6'b0
51:48	Reserved	Reserved	RO	-
47:32	reg0_base_addr	Specifies the 2^n-aligned base address for the memory region	RW	32'h0

The following image shows the lower register bit assignments.

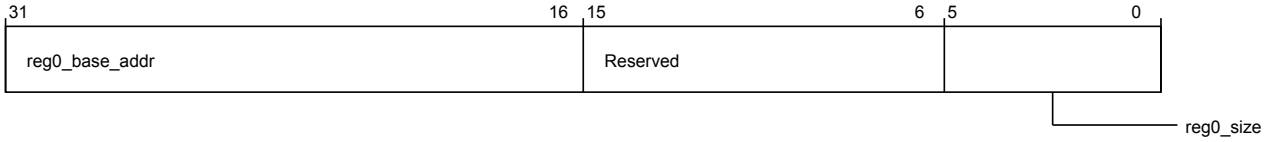

Figure 3-1149 por_cxg_ra_sam_addr_region_reg0 (low)

The following table shows the por_cxg_ra_sam_addr_region_reg0 lower register bit assignments.

Table 3-1163 por_cxg_ra_sam_addr_region_reg0 (low)

Bits	Field name	Description	Type	Reset
31:16	reg0_base_addr	Specifies the 2^n-aligned base address for the memory region	RW	32'h0
15:6	Reserved	Reserved	RO	-
5:0	reg0_size	Specifies the size of the memory region	RW	1'b0

por_cxg_ra_sam_addr_region_reg1

Configures Address Region 1 for RA SAM.

Its characteristics are:

Type RW

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Register width (Bits) 64

Address offset 14'hDB0

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.rasam_ctl

The following image shows the higher register bit assignments.

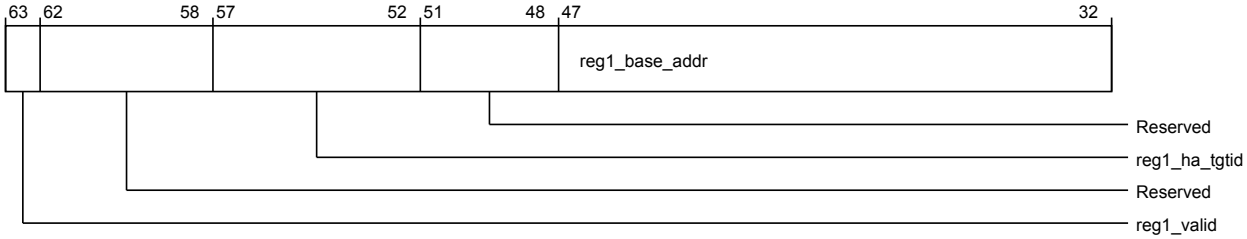

Figure 3-1150 por_cxg_ra_sam_addr_region_reg1 (high)

The following table shows the por_cxg_ra_sam_addr_region_reg1 higher register bit assignments.

Table 3-1164 por_cxg_ra_sam_addr_region_reg1 (high)

Bits	Field name	Description	Type	Reset
63	reg1_valid	Specifies if the memory region is valid	RW	1'b0
62:58	Reserved	Reserved	RO	-
57:52	reg1_ha_tgtid	Specifies the target HAID	RW	6'b0
51:48	Reserved	Reserved	RO	-
47:32	reg1_base_addr	Specifies the 2^n-aligned base address for the memory region	RW	32'h0

The following image shows the lower register bit assignments.

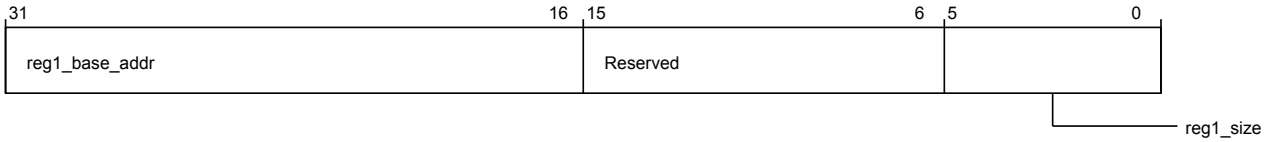

Figure 3-1151 por_cxg_ra_sam_addr_region_reg1 (low)

The following table shows the por_cxg_ra_sam_addr_region_reg1 lower register bit assignments.

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Table 3-1165 por_cxg_ra_sam_addr_region_reg1 (low)

Bits	Field name	Description	Type	Reset
31:16	reg1_base_addr	Specifies the 2^n-aligned base address for the memory region	RW	32'h0
15:6	Reserved	Reserved	RO	-
5:0	reg1_size	Specifies the size of the memory region	RW	1'b0

por_cxg_ra_sam_addr_region_reg2

Configures Address Region 2 for RA SAM.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hDB8

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.rasam_ctl

The following image shows the higher register bit assignments.

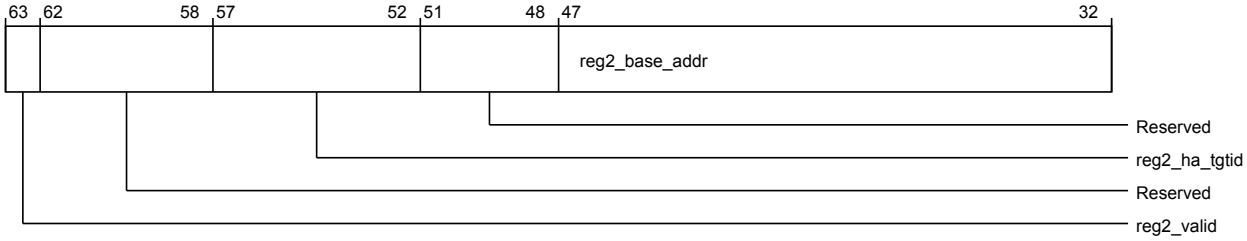

Figure 3-1152 por_cxg_ra_sam_addr_region_reg2 (high)

The following table shows the por_cxg_ra_sam_addr_region_reg2 higher register bit assignments.

Table 3-1166 por_cxg_ra_sam_addr_region_reg2 (high)

Bits	Field name	Description	Type	Reset
63	reg2_valid	Specifies if the memory region is valid	RW	1'b0
62:58	Reserved	Reserved	RO	-
57:52	reg2_ha_tgtid	Specifies the target HAID	RW	6'b0
51:48	Reserved	Reserved	RO	-
47:32	reg2_base_addr	Specifies the 2^n-aligned base address for the memory region	RW	32'h0

The following image shows the lower register bit assignments.

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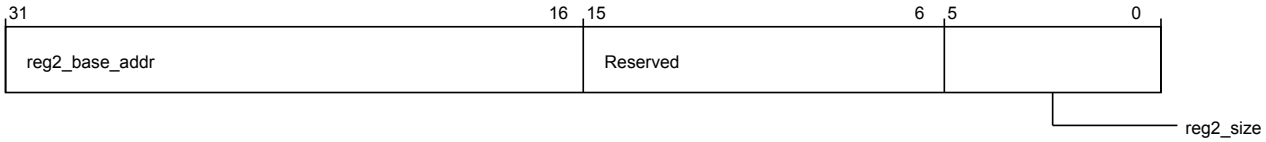

Figure 3-1153 por_cxg_ra_sam_addr_region_reg2 (low)

The following table shows the por_cxg_ra_sam_addr_region_reg2 lower register bit assignments.

Table 3-1167 por_cxg_ra_sam_addr_region_reg2 (low)

Bits	Field name	Description	Type	Reset
31:16	reg2_base_addr	Specifies the 2^n-aligned base address for the memory region	RW	32'h0
15:6	Reserved	Reserved	RO	-
5:0	reg2_size	Specifies the size of the memory region	RW	1'b0

por_cxg_ra_sam_addr_region_reg3

Configures Address Region 3 for RA SAM.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hDC0

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.rasam_ctl

The following image shows the higher register bit assignments.

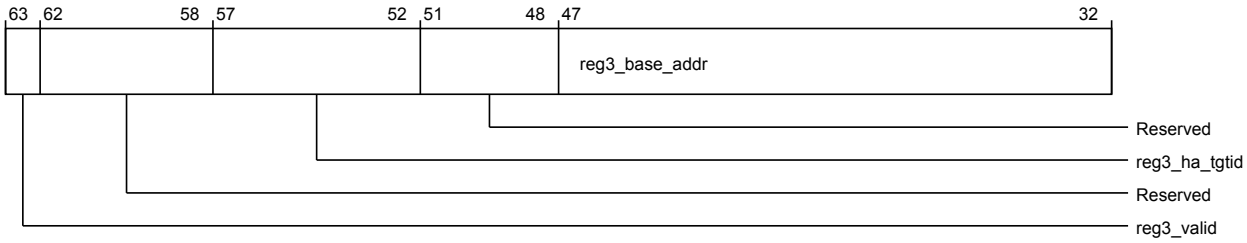

Figure 3-1154 por_cxg_ra_sam_addr_region_reg3 (high)

The following table shows the por_cxg_ra_sam_addr_region_reg3 higher register bit assignments.

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Table 3-1168 por_cxg_ra_sam_addr_region_reg3 (high)

Bits	Field name	Description	Type	Reset
63	reg3_valid	Specifies if the memory region is valid	RW	1'b0
62:58	Reserved	Reserved	RO	-
57:52	reg3_ha_tgtid	Specifies the target HAID	RW	6'b0
51:48	Reserved	Reserved	RO	-
47:32	reg3_base_addr	Specifies the 2^n-aligned base address for the memory region	RW	32'h0

The following image shows the lower register bit assignments.

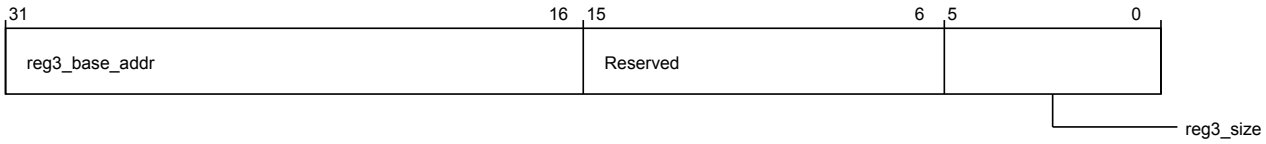

Figure 3-1155 por_cxg_ra_sam_addr_region_reg3 (low)

The following table shows the por_cxg_ra_sam_addr_region_reg3 lower register bit assignments.

Table 3-1169 por_cxg_ra_sam_addr_region_reg3 (low)

Bits	Field name	Description	Type	Reset
31:16	reg3_base_addr	Specifies the 2^n-aligned base address for the memory region	RW	32'h0
15:6	Reserved	Reserved	RO	-
5:0	reg3_size	Specifies the size of the memory region	RW	1'b0

por_cxg_ra_sam_addr_region_reg4

Configures Address Region 4 for RA SAM.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hDC8

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.rasam_ctl

The following image shows the higher register bit assignments.

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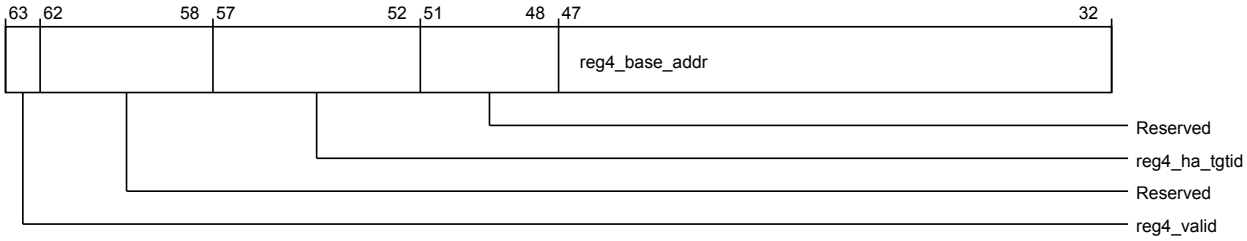

Figure 3-1156 por_cxg_ra_sam_addr_region_reg4 (high)

The following table shows the por_cxg_ra_sam_addr_region_reg4 higher register bit assignments.

Table 3-1170 por_cxg_ra_sam_addr_region_reg4 (high)

Bits	Field name	Description	Type	Reset
63	reg4_valid	Specifies if the memory region is valid	RW	1'b0
62:58	Reserved	Reserved	RO	-
57:52	reg4_ha_tgtid	Specifies the target HAID	RW	6'b0
51:48	Reserved	Reserved	RO	-
47:32	reg4_base_addr	Specifies the 2^n-aligned base address for the memory region	RW	32'h0

The following image shows the lower register bit assignments.

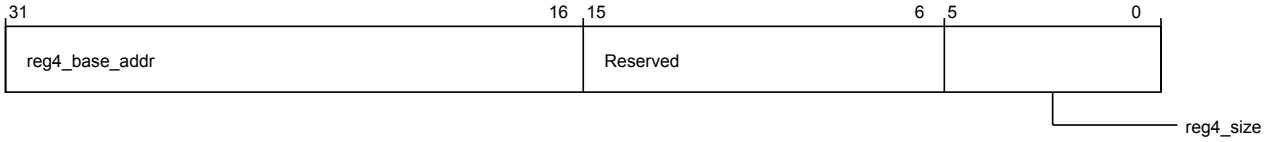

Figure 3-1157 por_cxg_ra_sam_addr_region_reg4 (low)

The following table shows the por_cxg_ra_sam_addr_region_reg4 lower register bit assignments.

Table 3-1171 por_cxg_ra_sam_addr_region_reg4 (low)

Bits	Field name	Description	Type	Reset
31:16	reg4_base_addr	Specifies the 2^n-aligned base address for the memory region	RW	32'h0
15:6	Reserved	Reserved	RO	-
5:0	reg4_size	Specifies the size of the memory region	RW	1'b0

por_cxg_ra_sam_addr_region_reg5

Configures Address Region 5 for RA SAM.

Its characteristics are:

Type RW

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Register width (Bits) 64

Address offset 14'hDD0

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.rasam_ctl

The following image shows the higher register bit assignments.

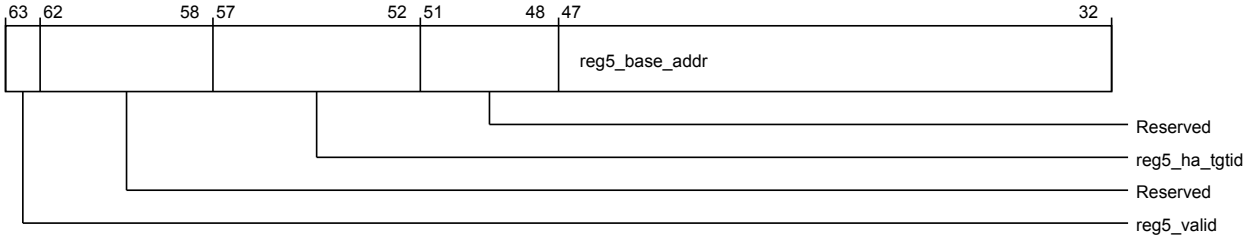

Figure 3-1158 por_cxg_ra_sam_addr_region_reg5 (high)

The following table shows the por_cxg_ra_sam_addr_region_reg5 higher register bit assignments.

Table 3-1172 por_cxg_ra_sam_addr_region_reg5 (high)

Bits	Field name	Description	Type	Reset
63	reg5_valid	Specifies if the memory region is valid	RW	1'b0
62:58	Reserved	Reserved	RO	-
57:52	reg5_ha_tgtid	Specifies the target HAID	RW	6'b0
51:48	Reserved	Reserved	RO	-
47:32	reg5_base_addr	Specifies the 2^n-aligned base address for the memory region	RW	32'h0

The following image shows the lower register bit assignments.

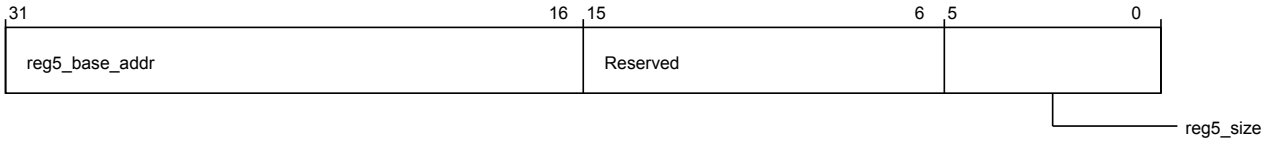

Figure 3-1159 por_cxg_ra_sam_addr_region_reg5 (low)

The following table shows the por_cxg_ra_sam_addr_region_reg5 lower register bit assignments.

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Table 3-1173 por_cxg_ra_sam_addr_region_reg5 (low)

Bits	Field name	Description	Type	Reset
31:16	reg5_base_addr	Specifies the 2^n-aligned base address for the memory region	RW	32'h0
15:6	Reserved	Reserved	RO	-
5:0	reg5_size	Specifies the size of the memory region	RW	1'b0

por_cxg_ra_sam_addr_region_reg6

Configures Address Region 6 for RA SAM.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hDD8

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.rasam_ctl

The following image shows the higher register bit assignments.

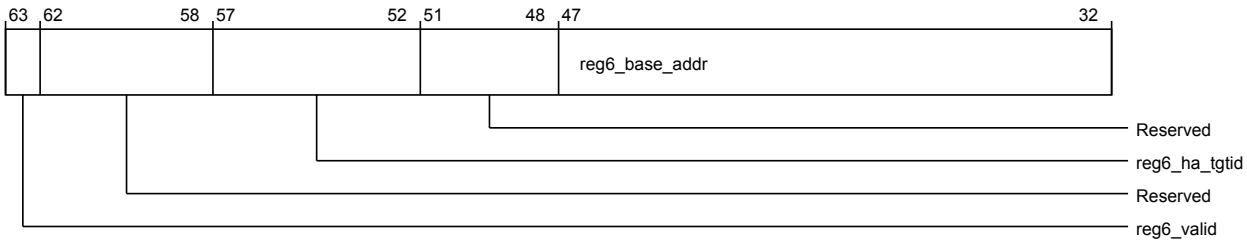

Figure 3-1160 por_cxg_ra_sam_addr_region_reg6 (high)

The following table shows the por_cxg_ra_sam_addr_region_reg6 higher register bit assignments.

Table 3-1174 por_cxg_ra_sam_addr_region_reg6 (high)

Bits	Field name	Description	Type	Reset
63	reg6_valid	Specifies if the memory region is valid	RW	1'b0
62:58	Reserved	Reserved	RO	-
57:52	reg6_ha_tgtid	Specifies the target HAID	RW	6'b0
51:48	Reserved	Reserved	RO	-
47:32	reg6_base_addr	Specifies the 2^n-aligned base address for the memory region	RW	32'h0

The following image shows the lower register bit assignments.

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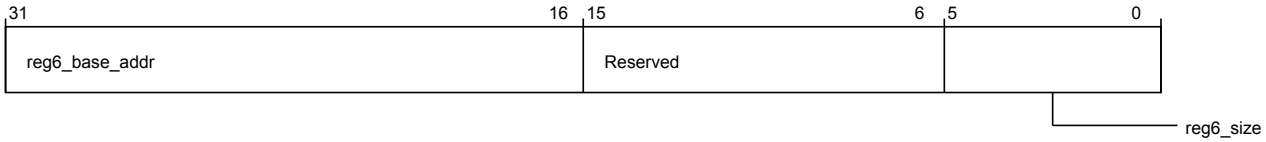

Figure 3-1161 por_cxg_ra_sam_addr_region_reg6 (low)

The following table shows the por_cxg_ra_sam_addr_region_reg6 lower register bit assignments.

Table 3-1175 por_cxg_ra_sam_addr_region_reg6 (low)

Bits	Field name	Description	Type	Reset
31:16	reg6_base_addr	Specifies the 2^n-aligned base address for the memory region	RW	32'h0
15:6	Reserved	Reserved	RO	-
5:0	reg6_size	Specifies the size of the memory region	RW	1'b0

por_cxg_ra_sam_addr_region_reg7

Configures Address Region 7 for RA SAM.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hDE0

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.rasam_ctl

The following image shows the higher register bit assignments.

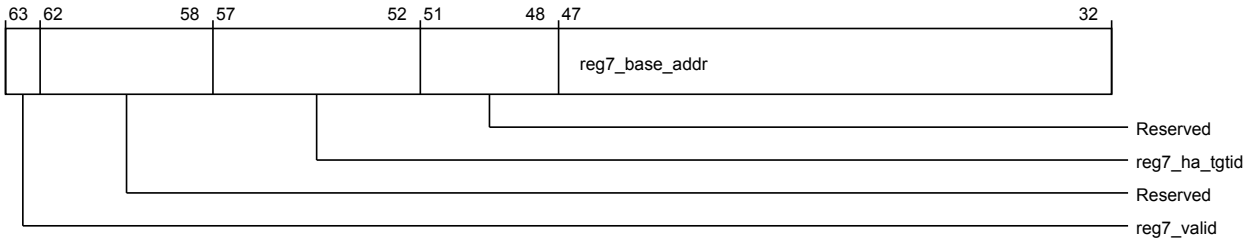

Figure 3-1162 por_cxg_ra_sam_addr_region_reg7 (high)

The following table shows the por_cxg_ra_sam_addr_region_reg7 higher register bit assignments.

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Table 3-1176 por_cxg_ra_sam_addr_region_reg7 (high)

Bits	Field name	Description	Type	Reset
63	reg7_valid	Specifies if the memory region is valid	RW	1'b0
62:58	Reserved	Reserved	RO	-
57:52	reg7_ha_tgtid	Specifies the target HAID	RW	6'b0
51:48	Reserved	Reserved	RO	-
47:32	reg7_base_addr	Specifies the 2^n-aligned base address for the memory region	RW	32'h0

The following image shows the lower register bit assignments.

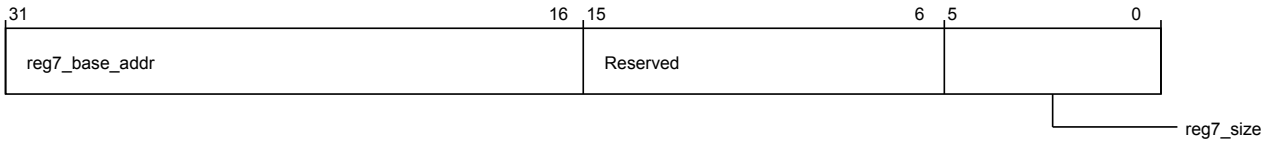

Figure 3-1163 por_cxg_ra_sam_addr_region_reg7 (low)

The following table shows the por_cxg_ra_sam_addr_region_reg7 lower register bit assignments.

Table 3-1177 por_cxg_ra_sam_addr_region_reg7 (low)

Bits	Field name	Description	Type	Reset
31:16	reg7_base_addr	Specifies the 2^n-aligned base address for the memory region	RW	32'h0
15:6	Reserved	Reserved	RO	-
5:0	reg7_size	Specifies the size of the memory region	RW	1'b0

por_cxg_ra_agentid_to_linkid_reg0

Specifies the mapping of Agent ID to Link ID for Agent IDs 0 to 7.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hE60

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.linkid_ctl

The following image shows the higher register bit assignments.

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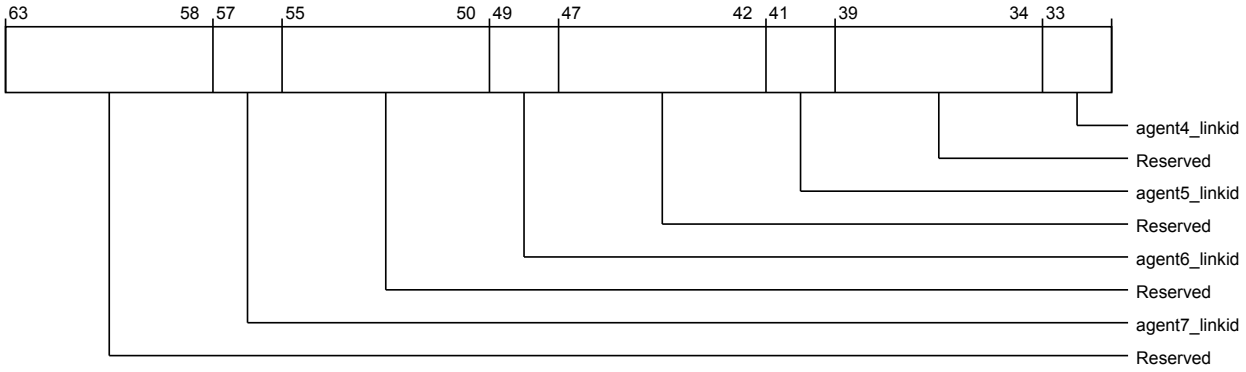

Figure 3-1164 por_cxg_ra_agentid_to_linkid_reg0 (high)

The following table shows the por_cxg_ra_agentid_to_linkid_reg0 higher register bit assignments.

Table 3-1178 por_cxg_ra_agentid_to_linkid_reg0 (high)

Bits	Field name	Description	Type	Reset
63:58	Reserved	Reserved	RO	-
57:56	agent7_linkid	Specifies the Link ID for Agent ID 7	RW	2'h0
55:50	Reserved	Reserved	RO	-
49:48	agent6_linkid	Specifies the Link ID for Agent ID 6	RW	2'h0
47:42	Reserved	Reserved	RO	-
41:40	agent5_linkid	Specifies the Link ID for Agent ID 5	RW	2'h0
39:34	Reserved	Reserved	RO	-
33:32	agent4_linkid	Specifies the Link ID for Agent ID 4	RW	2'h0

The following image shows the lower register bit assignments.

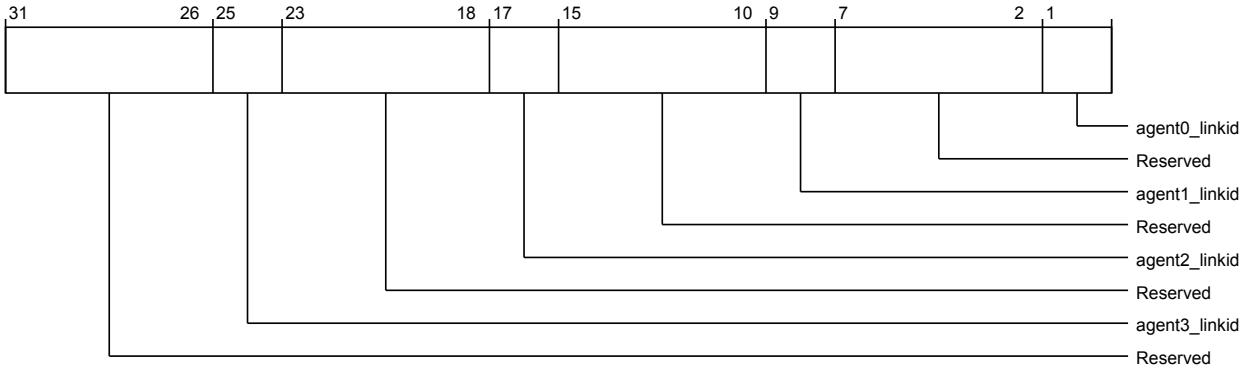

Figure 3-1165 por_cxg_ra_agentid_to_linkid_reg0 (low)

The following table shows the por_cxg_ra_agentid_to_linkid_reg0 lower register bit assignments.

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Table 3-1179 por_cxg_ra_agentid_to_linkid_reg0 (low)

Bits	Field name	Description	Type	Reset
31:26	Reserved	Reserved	RO	-
25:24	agent3_linkid	Specifies the Link ID for Agent ID 3	RW	2'h0
23:18	Reserved	Reserved	RO	-
17:16	agent2_linkid	Specifies the Link ID for Agent ID 2	RW	2'h0
15:10	Reserved	Reserved	RO	-
9:8	agent1_linkid	Specifies the Link ID for Agent ID 1	RW	2'h0
7:2	Reserved	Reserved	RO	-
1:0	agent0_linkid	Specifies the Link ID for Agent ID 0	RW	2'h0

por_cxg_ra_agentid_to_linkid_reg1

Specifies the mapping of Agent ID to Link ID for Agent IDs 8 to 15.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hE68

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.linkid_ctl

The following image shows the higher register bit assignments.

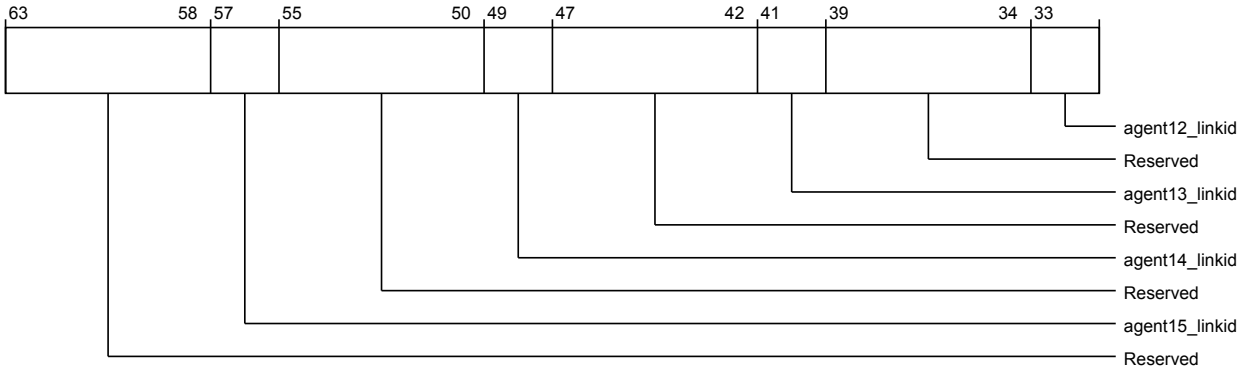

Figure 3-1166 por_cxg_ra_agentid_to_linkid_reg1 (high)

The following table shows the por_cxg_ra_agentid_to_linkid_reg1 higher register bit assignments.

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Table 3-1180 por_cxg_ra_agentid_to_linkid_reg1 (high)

Bits	Field name	Description	Type	Reset
63:58	Reserved	Reserved	RO	-
57:56	agent15_linkid	Specifies the Link ID for Agent ID 15	RW	2'h0
55:50	Reserved	Reserved	RO	-
49:48	agent14_linkid	Specifies the Link ID for Agent ID 14	RW	2'h0
47:42	Reserved	Reserved	RO	-
41:40	agent13_linkid	Specifies the Link ID for Agent ID 13	RW	2'h0
39:34	Reserved	Reserved	RO	-
33:32	agent12_linkid	Specifies the Link ID for Agent ID 12	RW	2'h0

The following image shows the lower register bit assignments.

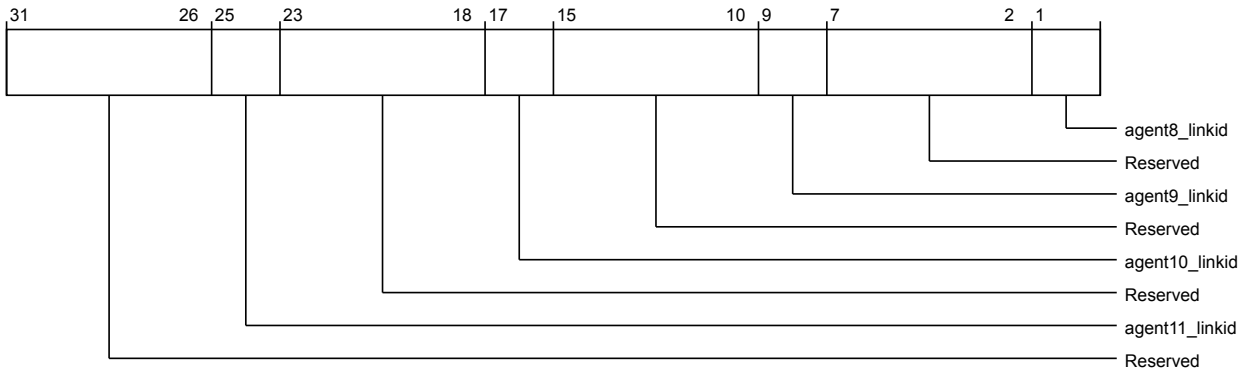

Figure 3-1167 por_cxg_ra_agentid_to_linkid_reg1 (low)

The following table shows the por_cxg_ra_agentid_to_linkid_reg1 lower register bit assignments.

Table 3-1181 por_cxg_ra_agentid_to_linkid_reg1 (low)

Bits	Field name	Description	Type	Reset
31:26	Reserved	Reserved	RO	-
25:24	agent11_linkid	Specifies the Link ID for Agent ID 11	RW	2'h0
23:18	Reserved	Reserved	RO	-
17:16	agent10_linkid	Specifies the Link ID for Agent ID 10	RW	2'h0
15:10	Reserved	Reserved	RO	-
9:8	agent9_linkid	Specifies the Link ID for Agent ID 9	RW	2'h0
7:2	Reserved	Reserved	RO	-
1:0	agent8_linkid	Specifies the Link ID for Agent ID 8	RW	2'h0

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por_cxg_ra_agentid_to_linkid_reg2

Specifies the mapping of Agent ID to Link ID for Agent IDs 16 to 23.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hE70

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.linkid_ctl

The following image shows the higher register bit assignments.

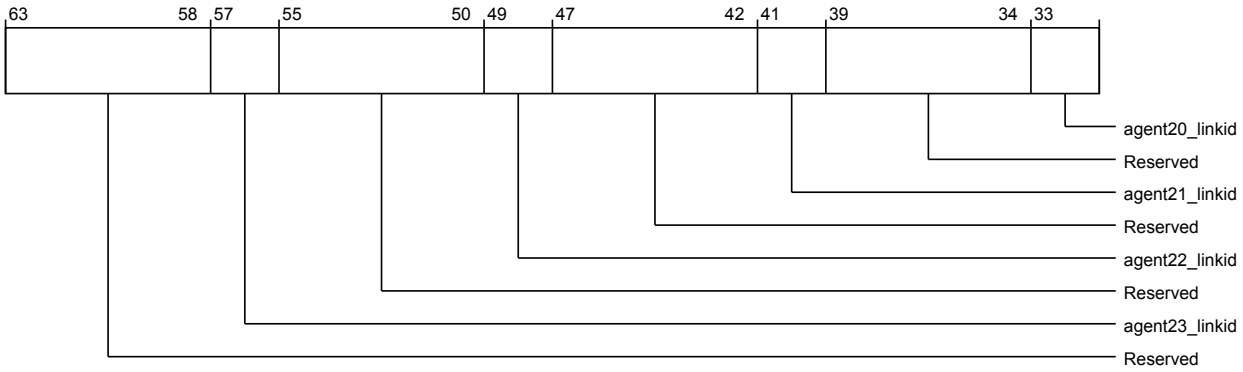

Figure 3-1168 por_cxg_ra_agentid_to_linkid_reg2 (high)

The following table shows the por_cxg_ra_agentid_to_linkid_reg2 higher register bit assignments.

Table 3-1182 por_cxg_ra_agentid_to_linkid_reg2 (high)

Bits	Field name	Description	Type	Reset
63:58	Reserved	Reserved	RO	-
57:56	agent23_linkid	Specifies the Link ID for Agent ID 23	RW	2'h0
55:50	Reserved	Reserved	RO	-
49:48	agent22_linkid	Specifies the Link ID for Agent ID 22	RW	2'h0
47:42	Reserved	Reserved	RO	-
41:40	agent21_linkid	Specifies the Link ID for Agent ID 21	RW	2'h0
39:34	Reserved	Reserved	RO	-
33:32	agent20_linkid	Specifies the Link ID for Agent ID 20	RW	2'h0

The following image shows the lower register bit assignments.

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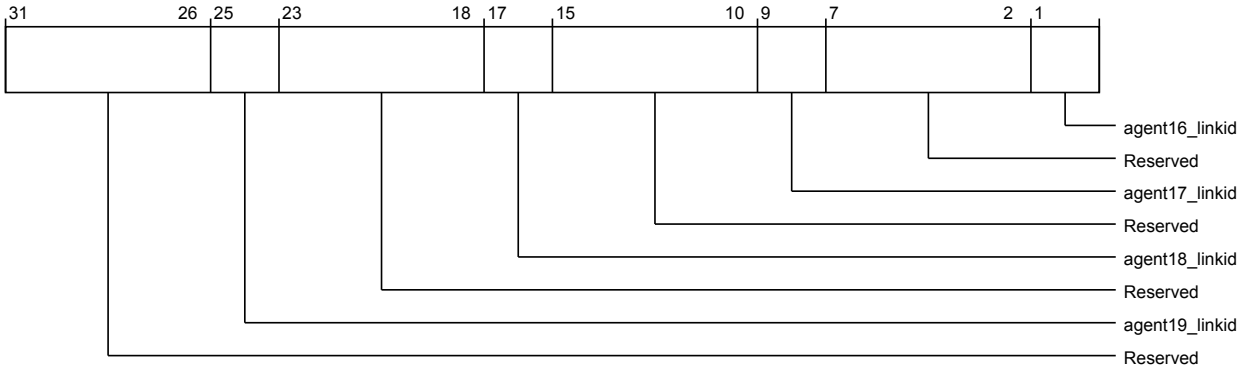

Figure 3-1169 por_cxg_ra_agentid_to_linkid_reg2 (low)

The following table shows the por_cxg_ra_agentid_to_linkid_reg2 lower register bit assignments.

Table 3-1183 por_cxg_ra_agentid_to_linkid_reg2 (low)

Bits	Field name	Description	Type	Reset
31:26	Reserved	Reserved	RO	-
25:24	agent19_linkid	Specifies the Link ID for Agent ID 19	RW	2'h0
23:18	Reserved	Reserved	RO	-
17:16	agent18_linkid	Specifies the Link ID for Agent ID 18	RW	2'h0
15:10	Reserved	Reserved	RO	-
9:8	agent17_linkid	Specifies the Link ID for Agent ID 17	RW	2'h0
7:2	Reserved	Reserved	RO	-
1:0	agent16_linkid	Specifies the Link ID for Agent ID 16	RW	2'h0

por_cxg_ra_agentid_to_linkid_reg3

Specifies the mapping of Agent ID to Link ID for Agent IDs 24 to 31.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hE78

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.linkid_ctl

The following image shows the higher register bit assignments.

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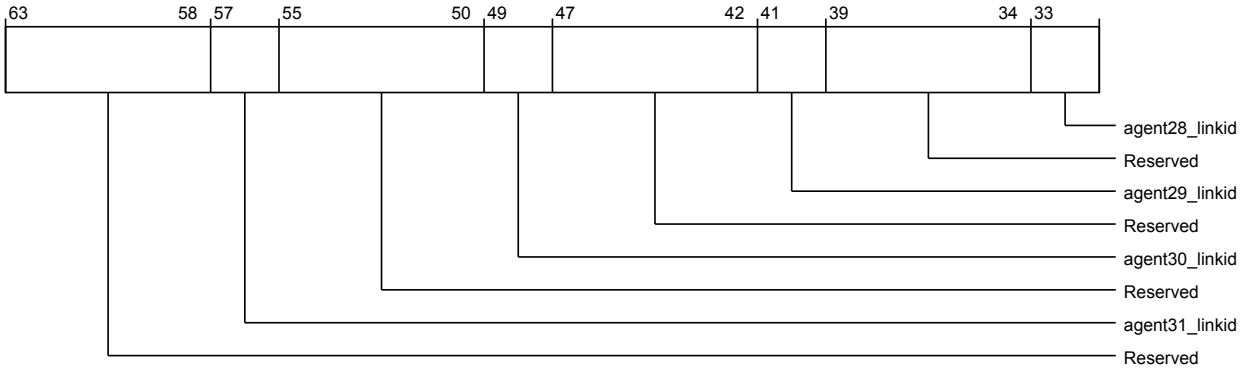

Figure 3-1170 por_cxg_ra_agentid_to_linkid_reg3 (high)

The following table shows the por_cxg_ra_agentid_to_linkid_reg3 higher register bit assignments.

Table 3-1184 por_cxg_ra_agentid_to_linkid_reg3 (high)

Bits	Field name	Description	Type	Reset
63:58	Reserved	Reserved	RO	-
57:56	agent31_linkid	Specifies the Link ID for Agent ID 31	RW	2'h0
55:50	Reserved	Reserved	RO	-
49:48	agent30_linkid	Specifies the Link ID for Agent ID 30	RW	2'h0
47:42	Reserved	Reserved	RO	-
41:40	agent29_linkid	Specifies the Link ID for Agent ID 29	RW	2'h0
39:34	Reserved	Reserved	RO	-
33:32	agent28_linkid	Specifies the Link ID for Agent ID 28	RW	2'h0

The following image shows the lower register bit assignments.

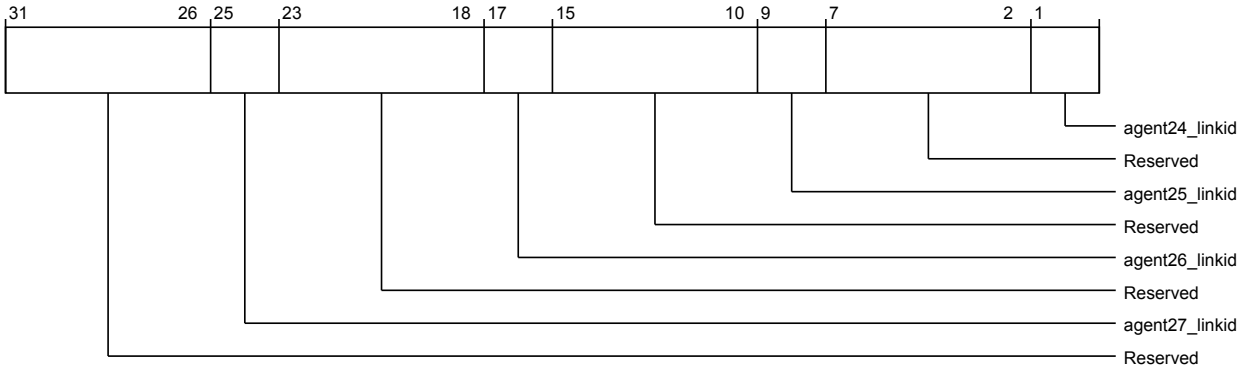

Figure 3-1171 por_cxg_ra_agentid_to_linkid_reg3 (low)

The following table shows the por_cxg_ra_agentid_to_linkid_reg3 lower register bit assignments.

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Table 3-1185 por_cxg_ra_agentid_to_linkid_reg3 (low)

Bits	Field name	Description	Type	Reset
31:26	Reserved	Reserved	RO	-
25:24	agent27_linkid	Specifies the Link ID for Agent ID 27	RW	2'h0
23:18	Reserved	Reserved	RO	-
17:16	agent26_linkid	Specifies the Link ID for Agent ID 26	RW	2'h0
15:10	Reserved	Reserved	RO	-
9:8	agent25_linkid	Specifies the Link ID for Agent ID 25	RW	2'h0
7:2	Reserved	Reserved	RO	-
1:0	agent24_linkid	Specifies the Link ID for Agent ID 24	RW	2'h0

por_cxg_ra_agentid_to_linkid_reg4

Specifies the mapping of Agent ID to Link ID for Agent IDs 32 to 39.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hE80

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.linkid_ctl

The following image shows the higher register bit assignments.

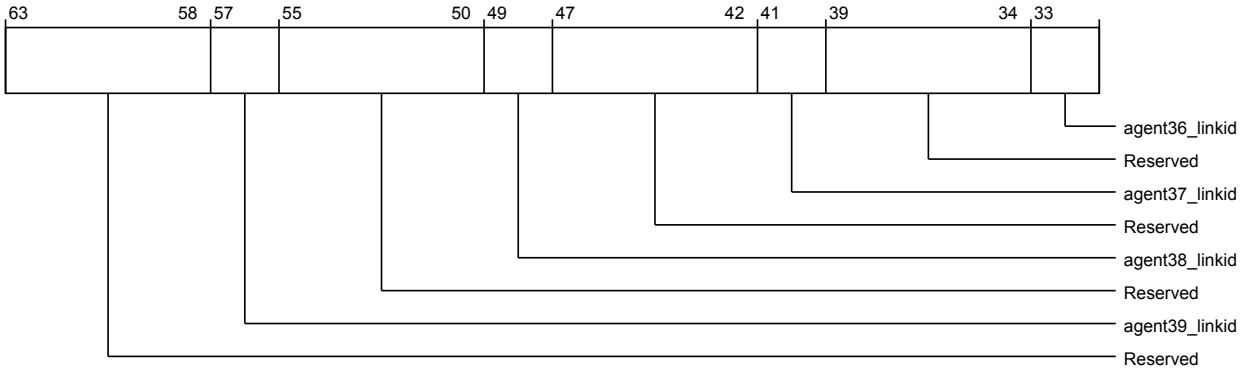

Figure 3-1172 por_cxg_ra_agentid_to_linkid_reg4 (high)

The following table shows the por_cxg_ra_agentid_to_linkid_reg4 higher register bit assignments.

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Table 3-1186 por_cxg_ra_agentid_to_linkid_reg4 (high)

Bits	Field name	Description	Type	Reset
63:58	Reserved	Reserved	RO	-
57:56	agent39_linkid	Specifies the Link ID for Agent ID 39	RW	2'h0
55:50	Reserved	Reserved	RO	-
49:48	agent38_linkid	Specifies the Link ID for Agent ID 38	RW	2'h0
47:42	Reserved	Reserved	RO	-
41:40	agent37_linkid	Specifies the Link ID for Agent ID 37	RW	2'h0
39:34	Reserved	Reserved	RO	-
33:32	agent36_linkid	Specifies the Link ID for Agent ID 36	RW	2'h0

The following image shows the lower register bit assignments.

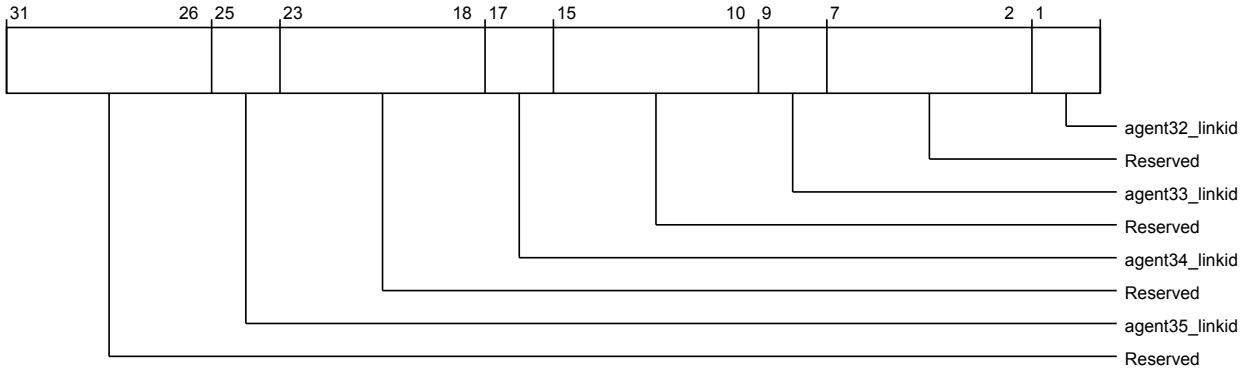

Figure 3-1173 por_cxg_ra_agentid_to_linkid_reg4 (low)

The following table shows the por_cxg_ra_agentid_to_linkid_reg4 lower register bit assignments.

Table 3-1187 por_cxg_ra_agentid_to_linkid_reg4 (low)

Bits	Field name	Description	Type	Reset
31:26	Reserved	Reserved	RO	-
25:24	agent35_linkid	Specifies the Link ID for Agent ID 35	RW	2'h0
23:18	Reserved	Reserved	RO	-
17:16	agent34_linkid	Specifies the Link ID for Agent ID 34	RW	2'h0
15:10	Reserved	Reserved	RO	-
9:8	agent33_linkid	Specifies the Link ID for Agent ID 33	RW	2'h0
7:2	Reserved	Reserved	RO	-
1:0	agent32_linkid	Specifies the Link ID for Agent ID 32	RW	2'h0

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por_cxg_ra_agentid_to_linkid_reg5

Specifies the mapping of Agent ID to Link ID for Agent IDs 40 to 47.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hE88

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.linkid_ctl

The following image shows the higher register bit assignments.

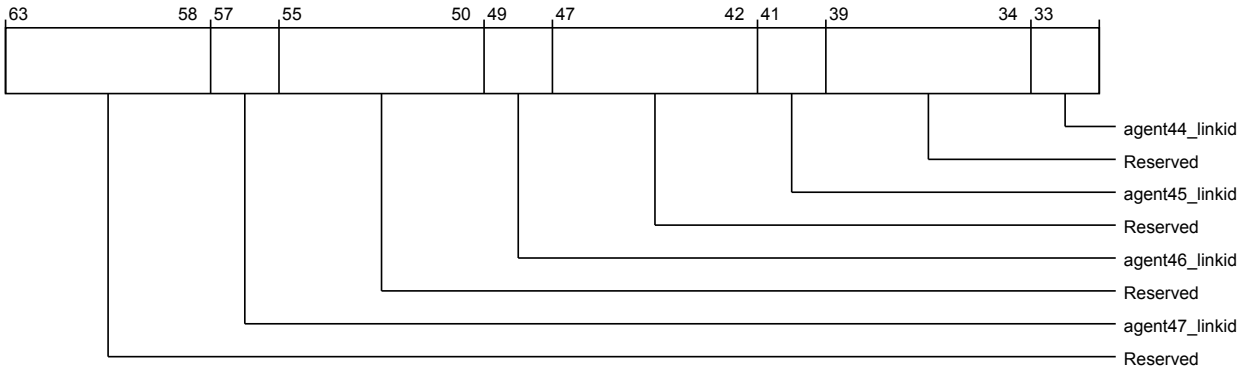

Figure 3-1174 por_cxg_ra_agentid_to_linkid_reg5 (high)

The following table shows the por_cxg_ra_agentid_to_linkid_reg5 higher register bit assignments.

Table 3-1188 por_cxg_ra_agentid_to_linkid_reg5 (high)

Bits	Field name	Description	Type	Reset
63:58	Reserved	Reserved	RO	-
57:56	agent47_linkid	Specifies the Link ID for Agent ID 47	RW	2'h0
55:50	Reserved	Reserved	RO	-
49:48	agent46_linkid	Specifies the Link ID for Agent ID 46	RW	2'h0
47:42	Reserved	Reserved	RO	-
41:40	agent45_linkid	Specifies the Link ID for Agent ID 45	RW	2'h0
39:34	Reserved	Reserved	RO	-
33:32	agent44_linkid	Specifies the Link ID for Agent ID 44	RW	2'h0

The following image shows the lower register bit assignments.

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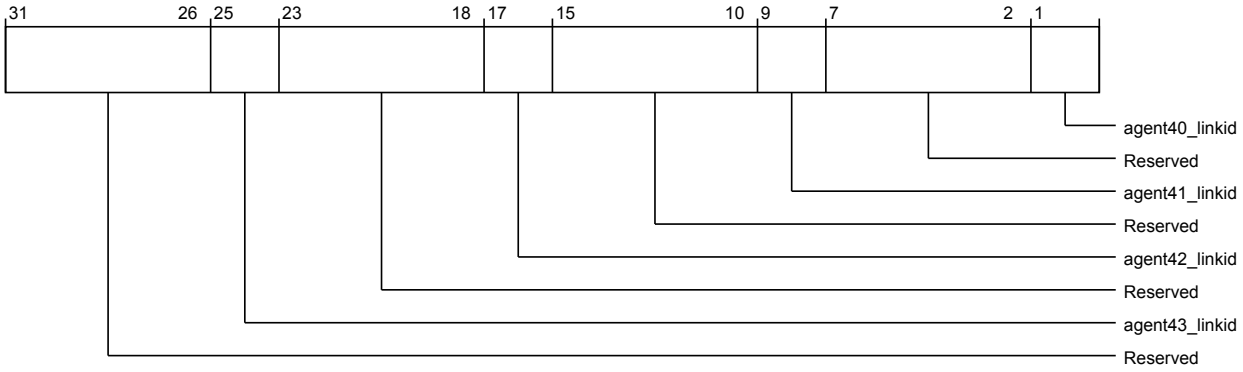

Figure 3-1175 por_cxg_ra_agentid_to_linkid_reg5 (low)

The following table shows the por_cxg_ra_agentid_to_linkid_reg5 lower register bit assignments.

Table 3-1189 por_cxg_ra_agentid_to_linkid_reg5 (low)

Bits	Field name	Description	Type	Reset
31:26	Reserved	Reserved	RO	-
25:24	agent43_linkid	Specifies the Link ID for Agent ID 43	RW	2'h0
23:18	Reserved	Reserved	RO	-
17:16	agent42_linkid	Specifies the Link ID for Agent ID 42	RW	2'h0
15:10	Reserved	Reserved	RO	-
9:8	agent41_linkid	Specifies the Link ID for Agent ID 41	RW	2'h0
7:2	Reserved	Reserved	RO	-
1:0	agent40_linkid	Specifies the Link ID for Agent ID 40	RW	2'h0

por_cxg_ra_agentid_to_linkid_reg6

Specifies the mapping of Agent ID to Link ID for Agent IDs 48 to 55.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hE90

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.linkid_ctl

The following image shows the higher register bit assignments.

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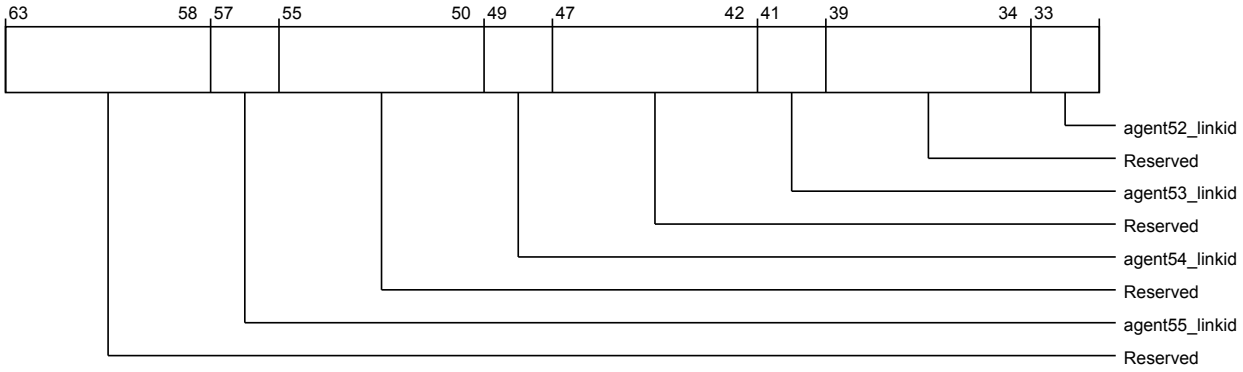

Figure 3-1176 por_cxg_ra_agentid_to_linkid_reg6 (high)

The following table shows the por_cxg_ra_agentid_to_linkid_reg6 higher register bit assignments.

Table 3-1190 por_cxg_ra_agentid_to_linkid_reg6 (high)

Bits	Field name	Description	Type	Reset
63:58	Reserved	Reserved	RO	-
57:56	agent55_linkid	Specifies the Link ID for Agent ID 55	RW	2'h0
55:50	Reserved	Reserved	RO	-
49:48	agent54_linkid	Specifies the Link ID for Agent ID 54	RW	2'h0
47:42	Reserved	Reserved	RO	-
41:40	agent53_linkid	Specifies the Link ID for Agent ID 53	RW	2'h0
39:34	Reserved	Reserved	RO	-
33:32	agent52_linkid	Specifies the Link ID for Agent ID 52	RW	2'h0

The following image shows the lower register bit assignments.

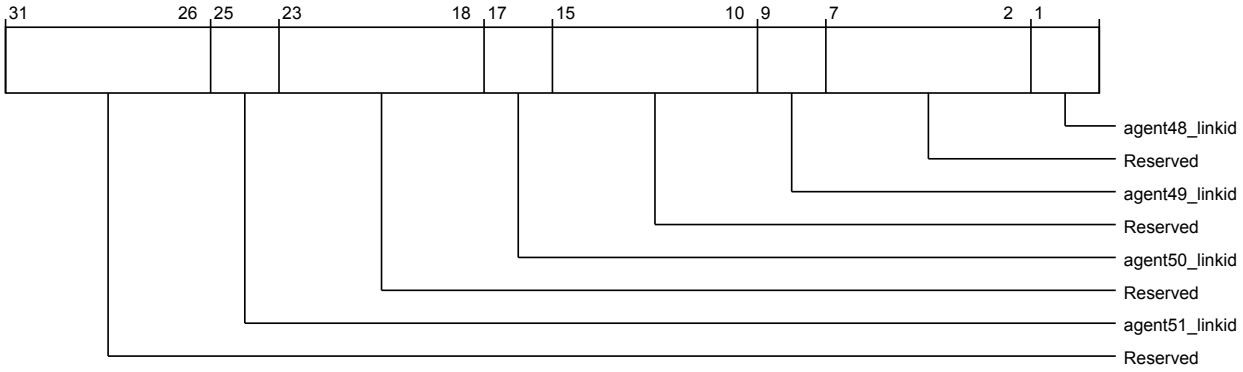

Figure 3-1177 por_cxg_ra_agentid_to_linkid_reg6 (low)

The following table shows the por_cxg_ra_agentid_to_linkid_reg6 lower register bit assignments.

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Table 3-1191 por_cxg_ra_agentid_to_linkid_reg6 (low)

Bits	Field name	Description	Type	Reset
31:26	Reserved	Reserved	RO	-
25:24	agent51_linkid	Specifies the Link ID for Agent ID 51	RW	2'h0
23:18	Reserved	Reserved	RO	-
17:16	agent50_linkid	Specifies the Link ID for Agent ID 50	RW	2'h0
15:10	Reserved	Reserved	RO	-
9:8	agent49_linkid	Specifies the Link ID for Agent ID 49	RW	2'h0
7:2	Reserved	Reserved	RO	-
1:0	agent48_linkid	Specifies the Link ID for Agent ID 48	RW	2'h0

por_cxg_ra_agentid_to_linkid_reg7

Specifies the mapping of Agent ID to Link ID for Agent IDs 56 to 63.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hE98

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.linkid_ctl

The following image shows the higher register bit assignments.

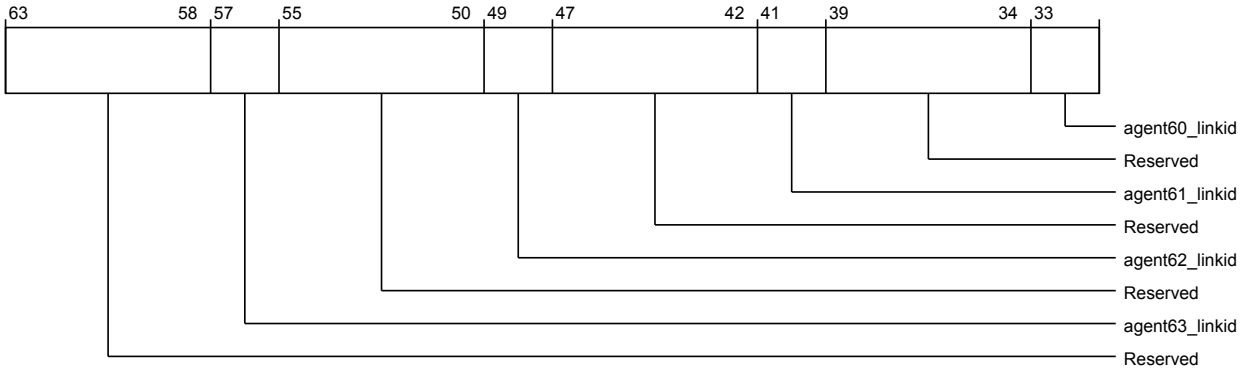

Figure 3-1178 por_cxg_ra_agentid_to_linkid_reg7 (high)

The following table shows the por_cxg_ra_agentid_to_linkid_reg7 higher register bit assignments.

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Table 3-1192 por_cxg_ra_agentid_to_linkid_reg7 (high)

Bits	Field name	Description	Type	Reset
63:58	Reserved	Reserved	RO	-
57:56	agent63_linkid	Specifies the Link ID for Agent ID 63	RW	2'h0
55:50	Reserved	Reserved	RO	-
49:48	agent62_linkid	Specifies the Link ID for Agent ID 62	RW	2'h0
47:42	Reserved	Reserved	RO	-
41:40	agent61_linkid	Specifies the Link ID for Agent ID 61	RW	2'h0
39:34	Reserved	Reserved	RO	-
33:32	agent60_linkid	Specifies the Link ID for Agent ID 60	RW	2'h0

The following image shows the lower register bit assignments.

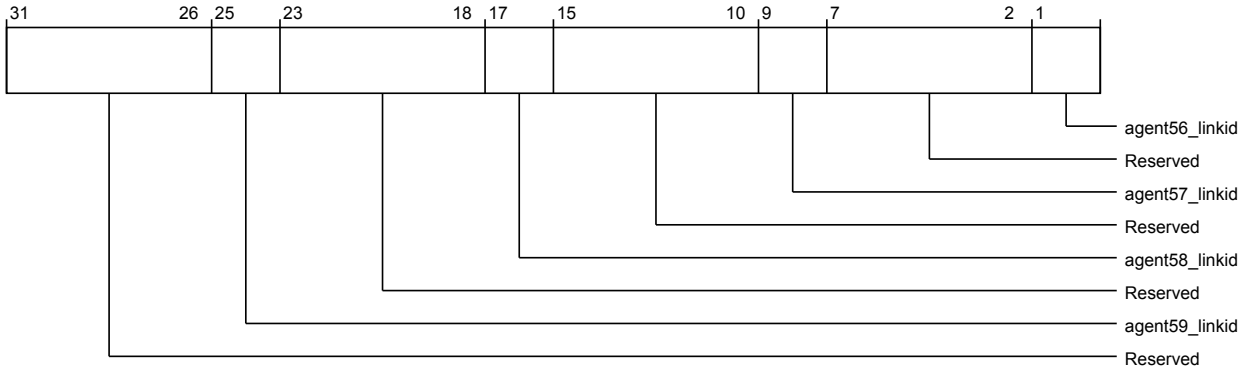

Figure 3-1179 por_cxg_ra_agentid_to_linkid_reg7 (low)

The following table shows the por_cxg_ra_agentid_to_linkid_reg7 lower register bit assignments.

Table 3-1193 por_cxg_ra_agentid_to_linkid_reg7 (low)

Bits	Field name	Description	Type	Reset
31:26	Reserved	Reserved	RO	-
25:24	agent59_linkid	Specifies the Link ID for Agent ID 59	RW	2'h0
23:18	Reserved	Reserved	RO	-
17:16	agent58_linkid	Specifies the Link ID for Agent ID 58	RW	2'h0
15:10	Reserved	Reserved	RO	-
9:8	agent57_linkid	Specifies the Link ID for Agent ID 57	RW	2'h0
7:2	Reserved	Reserved	RO	-
1:0	agent56_linkid	Specifies the Link ID for Agent ID 56	RW	2'h0

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por_cxg_ra_rnf_ldid_to_raid_reg0

Specifies the mapping of RN-F LDID to RAID for LDIDs 0 to 7.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hEA0

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.ldid_ctl

The following image shows the higher register bit assignments.

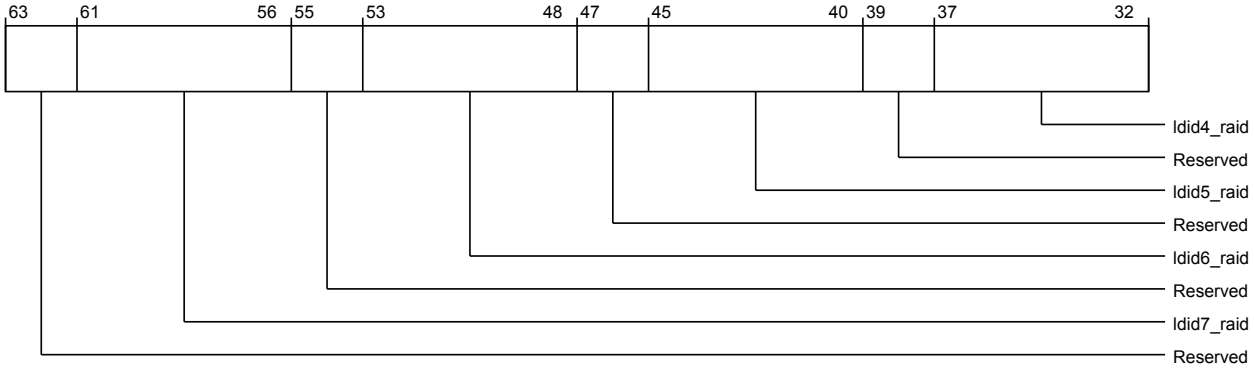

Figure 3-1180 por_cxg_ra_rnf_ldid_to_raid_reg0 (high)

The following table shows the por_cxg_ra_rnf_ldid_to_raid_reg0 higher register bit assignments.

Table 3-1194 por_cxg_ra_rnf_ldid_to_raid_reg0 (high)

Bits	Field name	Description	Type	Reset
63:62	Reserved	Reserved	RO	-
61:56	ldid7_raid	Specifies the RAID for LDID 7	RW	6'h0
55:54	Reserved	Reserved	RO	-
53:48	ldid6_raid	Specifies the RAID for LDID 6	RW	6'h0
47:46	Reserved	Reserved	RO	-
45:40	ldid5_raid	Specifies the RAID for LDID 5	RW	6'h0
39:38	Reserved	Reserved	RO	-
37:32	ldid4_raid	Specifies the RAID for LDID 4	RW	6'h0

The following image shows the lower register bit assignments.

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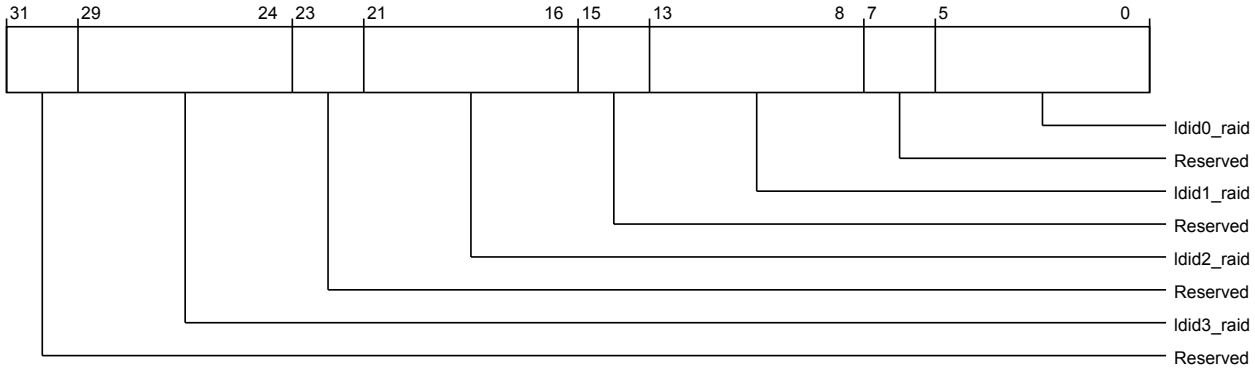

Figure 3-1181 por_cxg_ra_rnf_ldid_to_raid_reg0 (low)

The following table shows the por_cxg_ra_rnf_ldid_to_raid_reg0 lower register bit assignments.

Table 3-1195 por_cxg_ra_rnf_ldid_to_raid_reg0 (low)

Bits	Field name	Description	Type	Reset
31:30	Reserved	Reserved	RO	-
29:24	ldid3_raid	Specifies the RAID for LDID 3	RW	6'h0
23:22	Reserved	Reserved	RO	-
21:16	ldid2_raid	Specifies the RAID for LDID 2	RW	6'h0
15:14	Reserved	Reserved	RO	-
13:8	ldid1_raid	Specifies the RAID for LDID 1	RW	6'h0
7:6	Reserved	Reserved	RO	-
5:0	ldid0_raid	Specifies the RAID for LDID 0	RW	6'h0

por_cxg_ra_rnf_ldid_to_raid_reg1

Specifies the mapping of RN-F LDID to RAID for LDIDs 8 to 15.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hEA8

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.ldid_ctl

The following image shows the higher register bit assignments.

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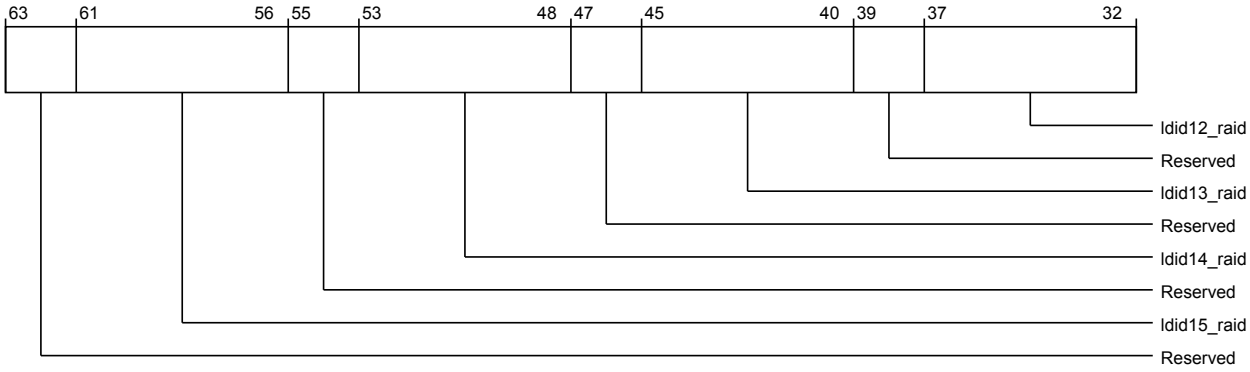

Figure 3-1182 por_cxg_ra_rnf_ldid_to_raid_reg1 (high)

The following table shows the por_cxg_ra_rnf_ldid_to_raid_reg1 higher register bit assignments.

Table 3-1196 por_cxg_ra_rnf_ldid_to_raid_reg1 (high)

Bits	Field name	Description	Type	Reset
63:62	Reserved	Reserved	RO	-
61:56	ldid15_raid	Specifies the RAID for LDID 15	RW	6'h0
55:54	Reserved	Reserved	RO	-
53:48	ldid14_raid	Specifies the RAID for LDID 14	RW	6'h0
47:46	Reserved	Reserved	RO	-
45:40	ldid13_raid	Specifies the RAID for LDID 13	RW	6'h0
39:38	Reserved	Reserved	RO	-
37:32	ldid12_raid	Specifies the RAID for LDID 12	RW	6'h0

The following image shows the lower register bit assignments.

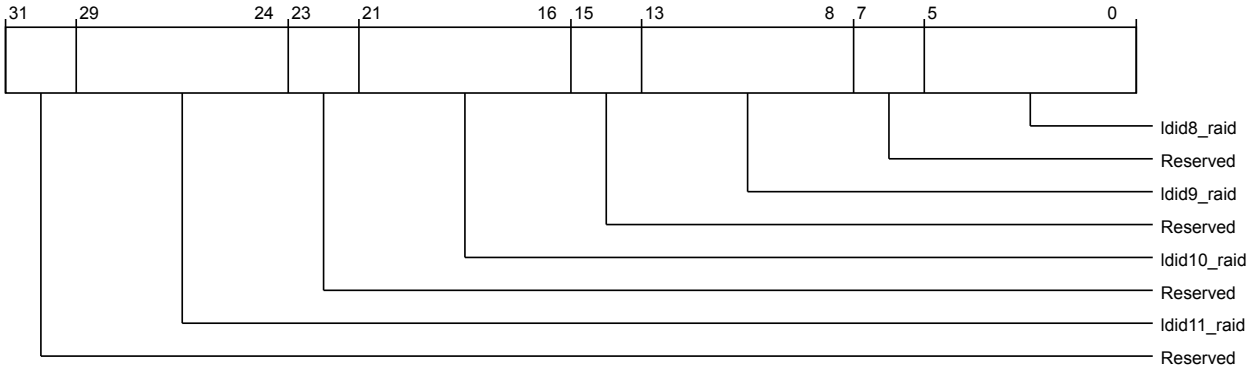

Figure 3-1183 por_cxg_ra_rnf_ldid_to_raid_reg1 (low)

The following table shows the por_cxg_ra_rnf_ldid_to_raid_reg1 lower register bit assignments.

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Table 3-1197 por_cxg_ra_rnf_ldid_to_raid_reg1 (low)

Bits	Field name	Description	Type	Reset
31:30	Reserved	Reserved	RO	-
29:24	ldid11_raid	Specifies the RAID for LDID 11	RW	6'h0
23:22	Reserved	Reserved	RO	-
21:16	ldid10_raid	Specifies the RAID for LDID 10	RW	6'h0
15:14	Reserved	Reserved	RO	-
13:8	ldid9_raid	Specifies the RAID for LDID 9	RW	6'h0
7:6	Reserved	Reserved	RO	-
5:0	ldid8_raid	Specifies the RAID for LDID 8	RW	6'h0

por_cxg_ra_rnf_ldid_to_raid_reg2

Specifies the mapping of RN-F LDID to RAID for LDIDs 16 to 23.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hEB0

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.ldid_ctl

The following image shows the higher register bit assignments.

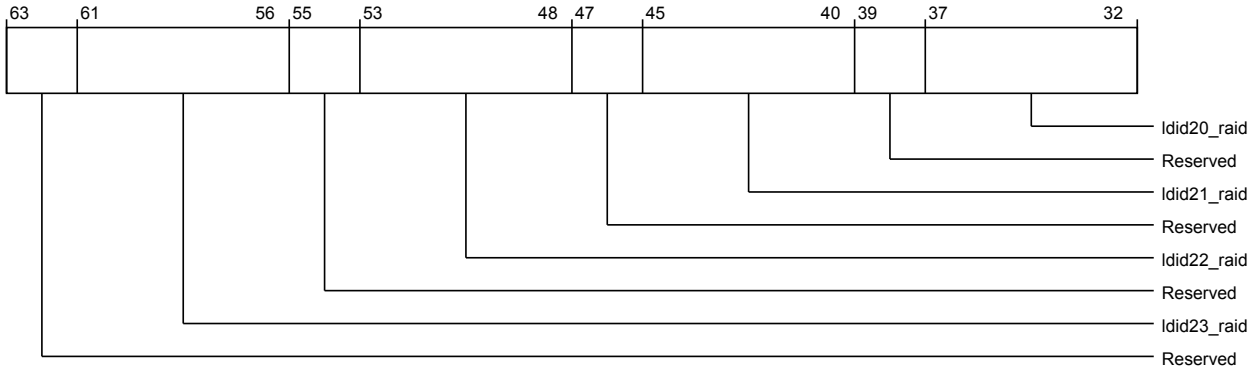

Figure 3-1184 por_cxg_ra_rnf_ldid_to_raid_reg2 (high)

The following table shows the por_cxg_ra_rnf_ldid_to_raid_reg2 higher register bit assignments.

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Table 3-1198 por_cxg_ra_rnf_ldid_to_raid_reg2 (high)

Bits	Field name	Description	Type	Reset
63:62	Reserved	Reserved	RO	-
61:56	ldid23_raid	Specifies the RAID for LDID 23	RW	6'h0
55:54	Reserved	Reserved	RO	-
53:48	ldid22_raid	Specifies the RAID for LDID 22	RW	6'h0
47:46	Reserved	Reserved	RO	-
45:40	ldid21_raid	Specifies the RAID for LDID 21	RW	6'h0
39:38	Reserved	Reserved	RO	-
37:32	ldid20_raid	Specifies the RAID for LDID 20	RW	6'h0

The following image shows the lower register bit assignments.

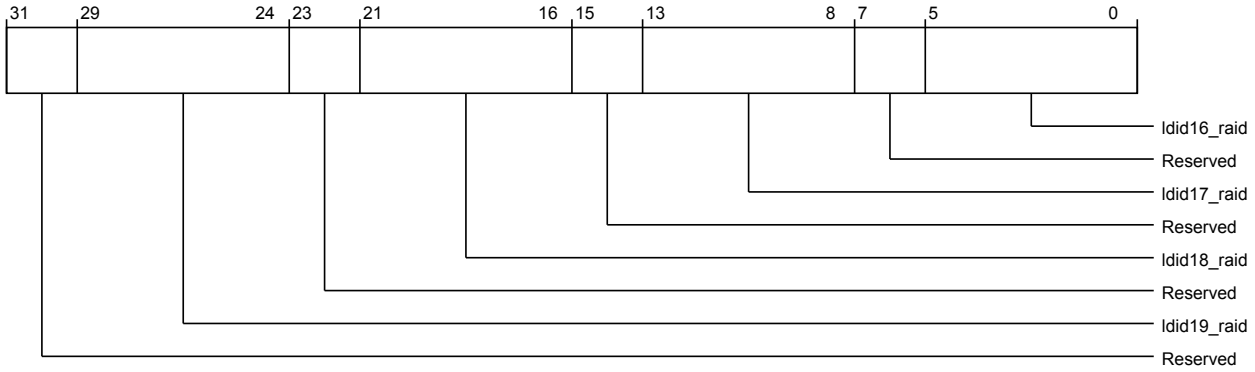

Figure 3-1185 por_cxg_ra_rnf_ldid_to_raid_reg2 (low)

The following table shows the por_cxg_ra_rnf_ldid_to_raid_reg2 lower register bit assignments.

Table 3-1199 por_cxg_ra_rnf_ldid_to_raid_reg2 (low)

Bits	Field name	Description	Type	Reset
31:30	Reserved	Reserved	RO	-
29:24	ldid19_raid	Specifies the RAID for LDID 19	RW	6'h0
23:22	Reserved	Reserved	RO	-
21:16	ldid18_raid	Specifies the RAID for LDID 18	RW	6'h0
15:14	Reserved	Reserved	RO	-
13:8	ldid17_raid	Specifies the RAID for LDID 17	RW	6'h0
7:6	Reserved	Reserved	RO	-
5:0	ldid16_raid	Specifies the RAID for LDID 16	RW	6'h0

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por_cxg_ra_rnf_ldid_to_raid_reg3

Specifies the mapping of RN-F LDID to RAID for LDIDs 24 to 31.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hEB8

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.ldid_ctl

The following image shows the higher register bit assignments.

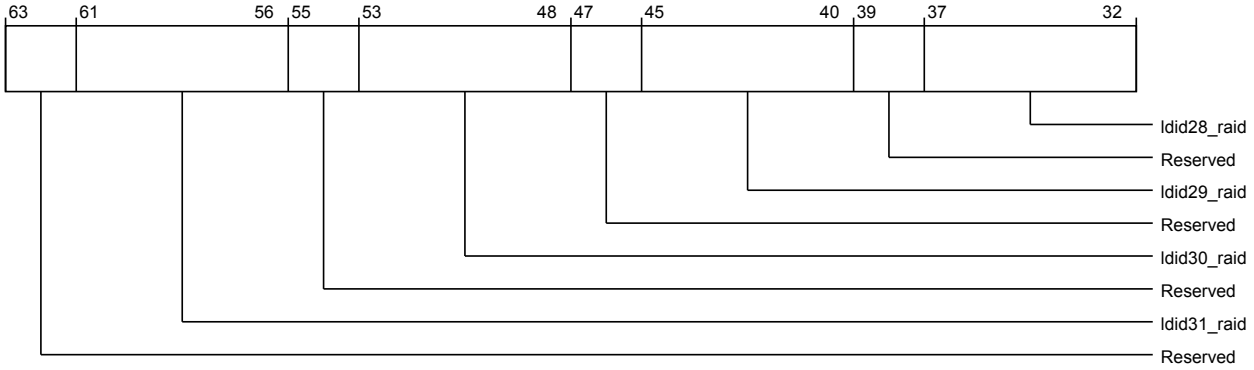

Figure 3-1186 por_cxg_ra_rnf_ldid_to_raid_reg3 (high)

The following table shows the por_cxg_ra_rnf_ldid_to_raid_reg3 higher register bit assignments.

Table 3-1200 por_cxg_ra_rnf_ldid_to_raid_reg3 (high)

Bits	Field name	Description	Type	Reset
63:62	Reserved	Reserved	RO	-
61:56	ldid31_raid	Specifies the RAID for LDID 31	RW	6'h0
55:54	Reserved	Reserved	RO	-
53:48	ldid30_raid	Specifies the RAID for LDID 30	RW	6'h0
47:46	Reserved	Reserved	RO	-
45:40	ldid29_raid	Specifies the RAID for LDID 29	RW	6'h0
39:38	Reserved	Reserved	RO	-
37:32	ldid28_raid	Specifies the RAID for LDID 28	RW	6'h0

The following image shows the lower register bit assignments.

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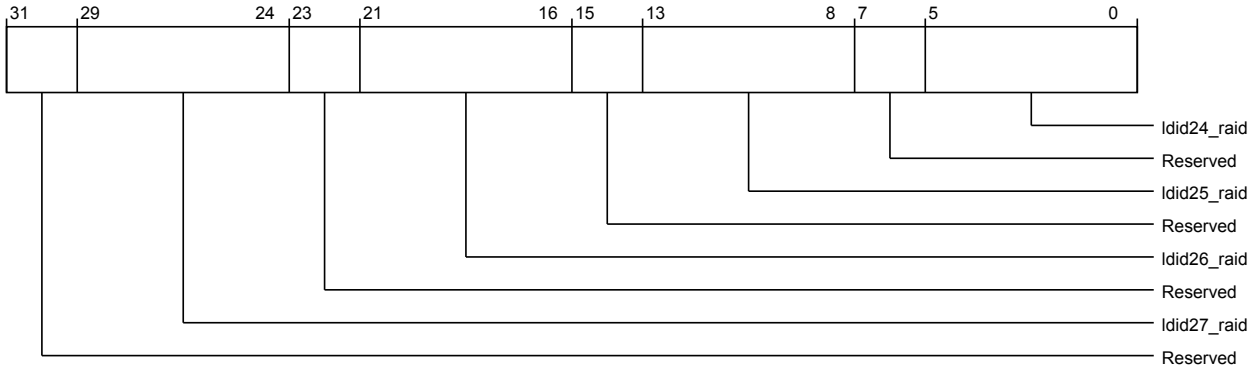

Figure 3-1187 por_cxg_ra_rnf_ldid_to_raid_reg3 (low)

The following table shows the por_cxg_ra_rnf_ldid_to_raid_reg3 lower register bit assignments.

Table 3-1201 por_cxg_ra_rnf_ldid_to_raid_reg3 (low)

Bits	Field name	Description	Type	Reset
31:30	Reserved	Reserved	RO	-
29:24	ldid27_raid	Specifies the RAID for LDID 27	RW	6'h0
23:22	Reserved	Reserved	RO	-
21:16	ldid26_raid	Specifies the RAID for LDID 26	RW	6'h0
15:14	Reserved	Reserved	RO	-
13:8	ldid25_raid	Specifies the RAID for LDID 25	RW	6'h0
7:6	Reserved	Reserved	RO	-
5:0	ldid24_raid	Specifies the RAID for LDID 24	RW	6'h0

por_cxg_ra_rnf_ldid_to_raid_reg4

Specifies the mapping of RN-F LDID to RAID for LDIDs 32 to 39.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hEC0

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.ldid_ctl

The following image shows the higher register bit assignments.

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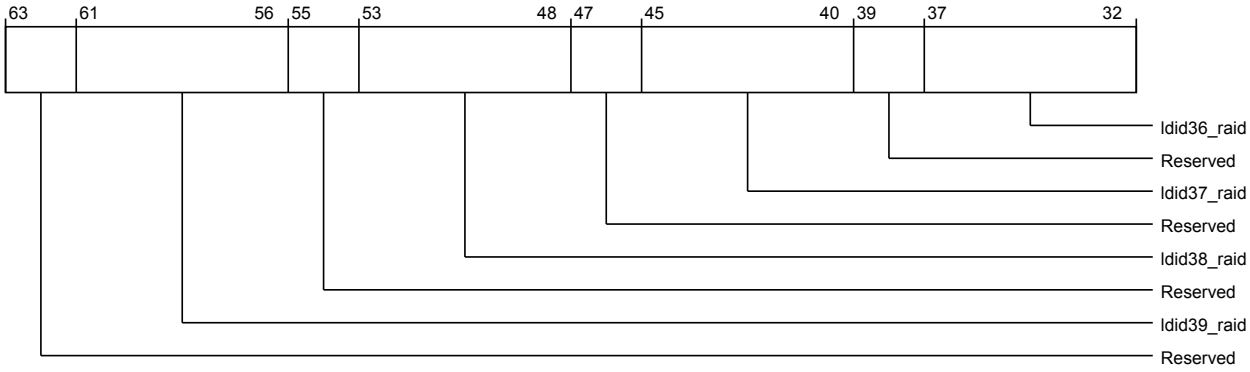

Figure 3-1188 por_cxg_ra_rnf_ldid_to_raid_reg4 (high)

The following table shows the por_cxg_ra_rnf_ldid_to_raid_reg4 higher register bit assignments.

Table 3-1202 por_cxg_ra_rnf_ldid_to_raid_reg4 (high)

Bits	Field name	Description	Type	Reset
63:62	Reserved	Reserved	RO	-
61:56	ldid39_raid	Specifies the RAID for LDID 39	RW	6'h0
55:54	Reserved	Reserved	RO	-
53:48	ldid38_raid	Specifies the RAID for LDID 38	RW	6'h0
47:46	Reserved	Reserved	RO	-
45:40	ldid37_raid	Specifies the RAID for LDID 37	RW	6'h0
39:38	Reserved	Reserved	RO	-
37:32	ldid36_raid	Specifies the RAID for LDID 36	RW	6'h0

The following image shows the lower register bit assignments.

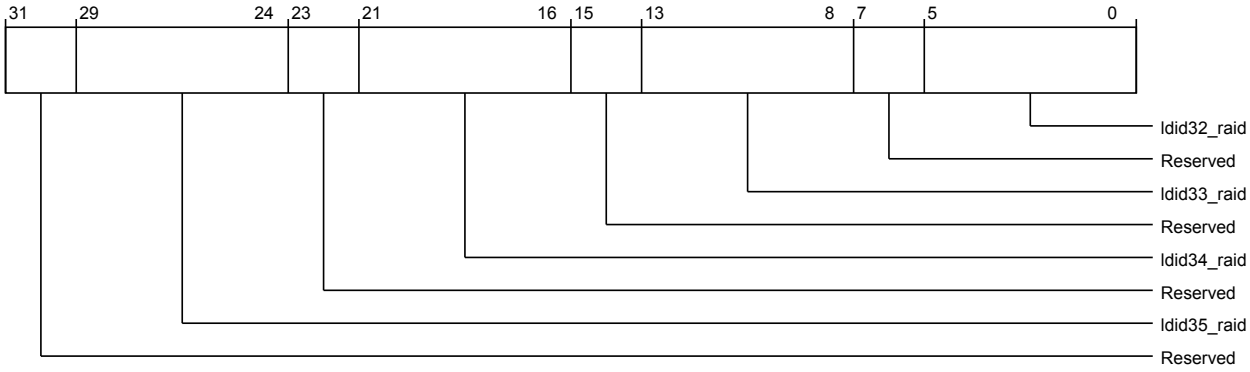

Figure 3-1189 por_cxg_ra_rnf_ldid_to_raid_reg4 (low)

The following table shows the por_cxg_ra_rnf_ldid_to_raid_reg4 lower register bit assignments.

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Table 3-1203 por_cxg_ra_rnf_ldid_to_raid_reg4 (low)

Bits	Field name	Description	Type	Reset
31:30	Reserved	Reserved	RO	-
29:24	ldid35_raid	Specifies the RAID for LDID 35	RW	6'h0
23:22	Reserved	Reserved	RO	-
21:16	ldid34_raid	Specifies the RAID for LDID 34	RW	6'h0
15:14	Reserved	Reserved	RO	-
13:8	ldid33_raid	Specifies the RAID for LDID 33	RW	6'h0
7:6	Reserved	Reserved	RO	-
5:0	ldid32_raid	Specifies the RAID for LDID 32	RW	6'h0

por_cxg_ra_rnf_ldid_to_raid_reg5

Specifies the mapping of RN-F LDID to RAID for LDIDs 40 to 47.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hEC8

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.ldid_ctl

The following image shows the higher register bit assignments.

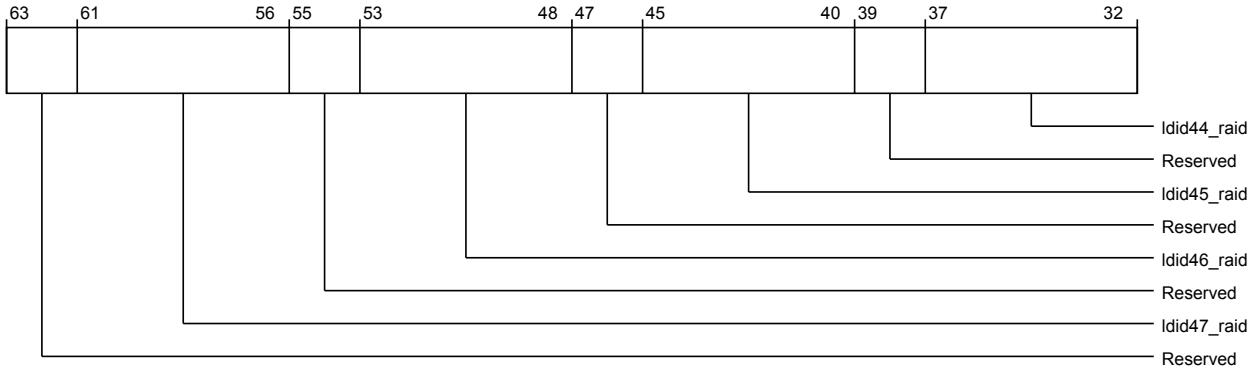

Figure 3-1190 por_cxg_ra_rnf_ldid_to_raid_reg5 (high)

The following table shows the por_cxg_ra_rnf_ldid_to_raid_reg5 higher register bit assignments.

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Table 3-1204 por_cxg_ra_rnf_ldid_to_raid_reg5 (high)

Bits	Field name	Description	Type	Reset
63:62	Reserved	Reserved	RO	-
61:56	ldid47_raid	Specifies the RAID for LDID 47	RW	6'h0
55:54	Reserved	Reserved	RO	-
53:48	ldid46_raid	Specifies the RAID for LDID 46	RW	6'h0
47:46	Reserved	Reserved	RO	-
45:40	ldid45_raid	Specifies the RAID for LDID 45	RW	6'h0
39:38	Reserved	Reserved	RO	-
37:32	ldid44_raid	Specifies the RAID for LDID 44	RW	6'h0

The following image shows the lower register bit assignments.

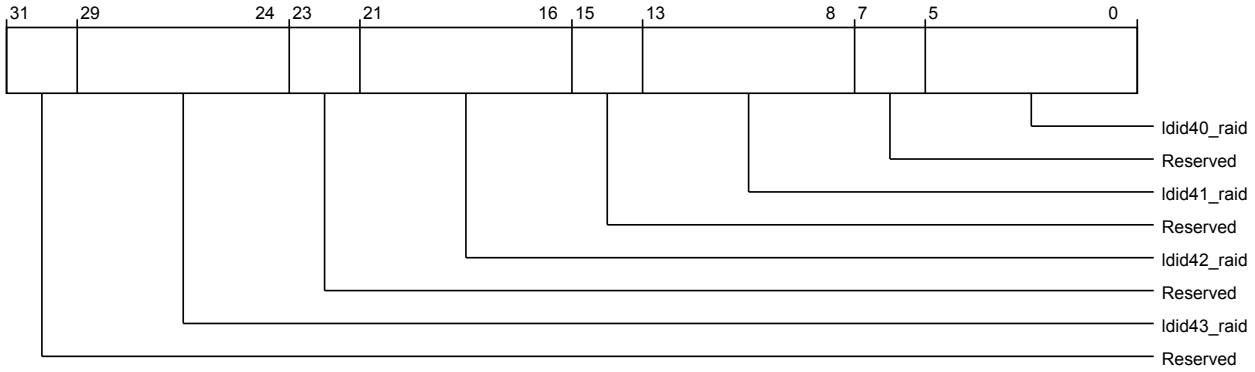

Figure 3-1191 por_cxg_ra_rnf_ldid_to_raid_reg5 (low)

The following table shows the por_cxg_ra_rnf_ldid_to_raid_reg5 lower register bit assignments.

Table 3-1205 por_cxg_ra_rnf_ldid_to_raid_reg5 (low)

Bits	Field name	Description	Type	Reset
31:30	Reserved	Reserved	RO	-
29:24	ldid43_raid	Specifies the RAID for LDID 43	RW	6'h0
23:22	Reserved	Reserved	RO	-
21:16	ldid42_raid	Specifies the RAID for LDID 42	RW	6'h0
15:14	Reserved	Reserved	RO	-
13:8	ldid41_raid	Specifies the RAID for LDID 41	RW	6'h0
7:6	Reserved	Reserved	RO	-
5:0	ldid40_raid	Specifies the RAID for LDID 40	RW	6'h0

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por_cxg_ra_rnf_ldid_to_raid_reg6

Specifies the mapping of RN-F LDID to RAID for LDIDs 48 to 55.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hED0

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.ldid_ctl

The following image shows the higher register bit assignments.

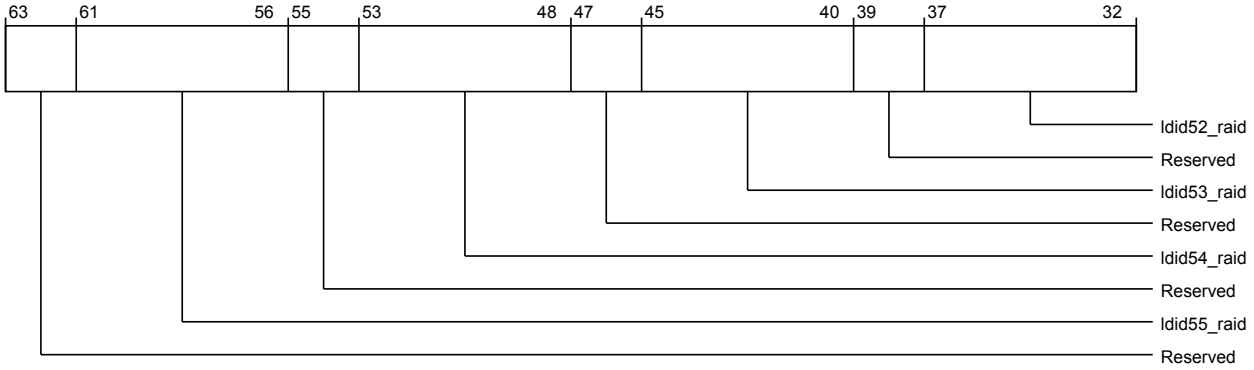

Figure 3-1192 por_cxg_ra_rnf_ldid_to_raid_reg6 (high)

The following table shows the por_cxg_ra_rnf_ldid_to_raid_reg6 higher register bit assignments.

Table 3-1206 por_cxg_ra_rnf_ldid_to_raid_reg6 (high)

Bits	Field name	Description	Type	Reset
63:62	Reserved	Reserved	RO	-
61:56	ldid55_raid	Specifies the RAID for LDID 55	RW	6'h0
55:54	Reserved	Reserved	RO	-
53:48	ldid54_raid	Specifies the RAID for LDID 54	RW	6'h0
47:46	Reserved	Reserved	RO	-
45:40	ldid53_raid	Specifies the RAID for LDID 53	RW	6'h0
39:38	Reserved	Reserved	RO	-
37:32	ldid52_raid	Specifies the RAID for LDID 52	RW	6'h0

The following image shows the lower register bit assignments.

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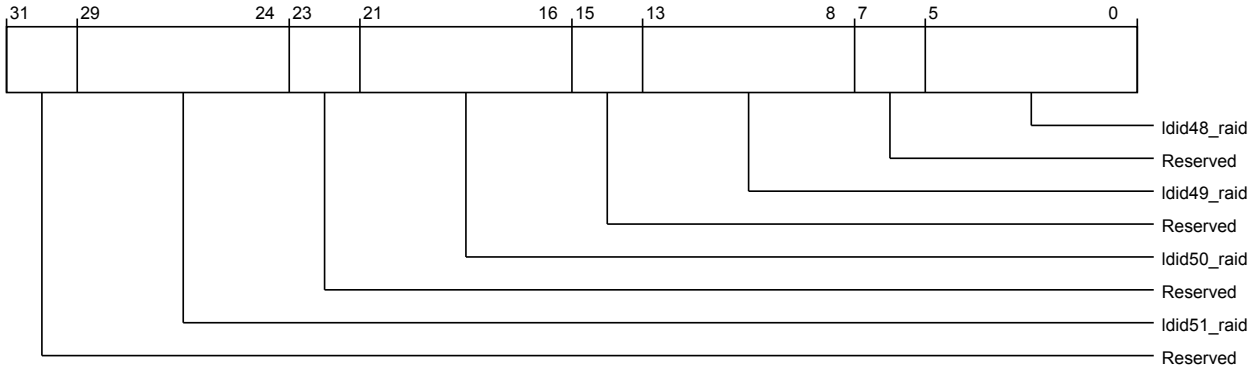

Figure 3-1193 por_cxg_ra_rnf_ldid_to_raid_reg6 (low)

The following table shows the por_cxg_ra_rnf_ldid_to_raid_reg6 lower register bit assignments.

Table 3-1207 por_cxg_ra_rnf_ldid_to_raid_reg6 (low)

Bits	Field name	Description	Type	Reset
31:30	Reserved	Reserved	RO	-
29:24	ldid51_raid	Specifies the RAID for LDID 51	RW	6'h0
23:22	Reserved	Reserved	RO	-
21:16	ldid50_raid	Specifies the RAID for LDID 50	RW	6'h0
15:14	Reserved	Reserved	RO	-
13:8	ldid49_raid	Specifies the RAID for LDID 49	RW	6'h0
7:6	Reserved	Reserved	RO	-
5:0	ldid48_raid	Specifies the RAID for LDID 48	RW	6'h0

por_cxg_ra_rnf_ldid_to_raid_reg7

Specifies the mapping of RN-F LDID to RAID for LDIDs 56 to 63.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hED8

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.ldid_ctl

The following image shows the higher register bit assignments.

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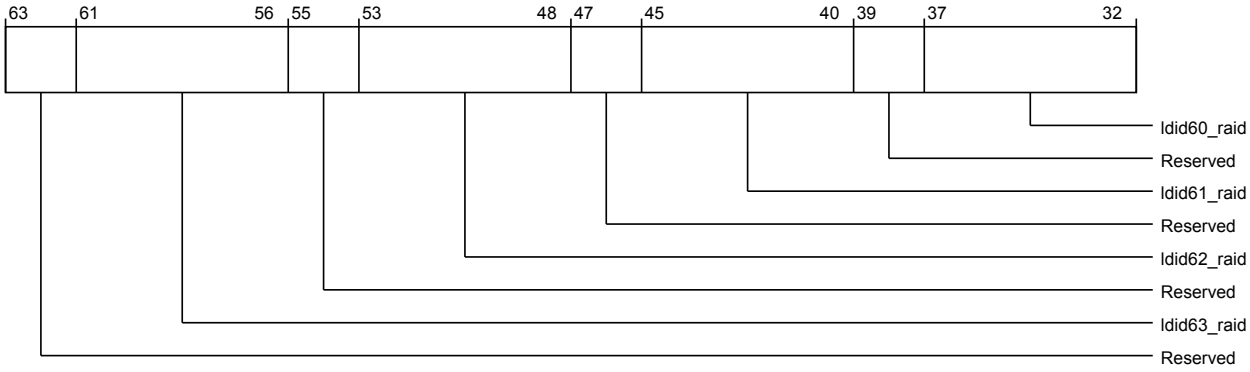

Figure 3-1194 por_cxg_ra_rnf_ldid_to_raid_reg7 (high)

The following table shows the por_cxg_ra_rnf_ldid_to_raid_reg7 higher register bit assignments.

Table 3-1208 por_cxg_ra_rnf_ldid_to_raid_reg7 (high)

Bits	Field name	Description	Type	Reset
63:62	Reserved	Reserved	RO	-
61:56	ldid63_raid	Specifies the RAID for LDID 63	RW	6'h0
55:54	Reserved	Reserved	RO	-
53:48	ldid62_raid	Specifies the RAID for LDID 62	RW	6'h0
47:46	Reserved	Reserved	RO	-
45:40	ldid61_raid	Specifies the RAID for LDID 61	RW	6'h0
39:38	Reserved	Reserved	RO	-
37:32	ldid60_raid	Specifies the RAID for LDID 60	RW	6'h0

The following image shows the lower register bit assignments.

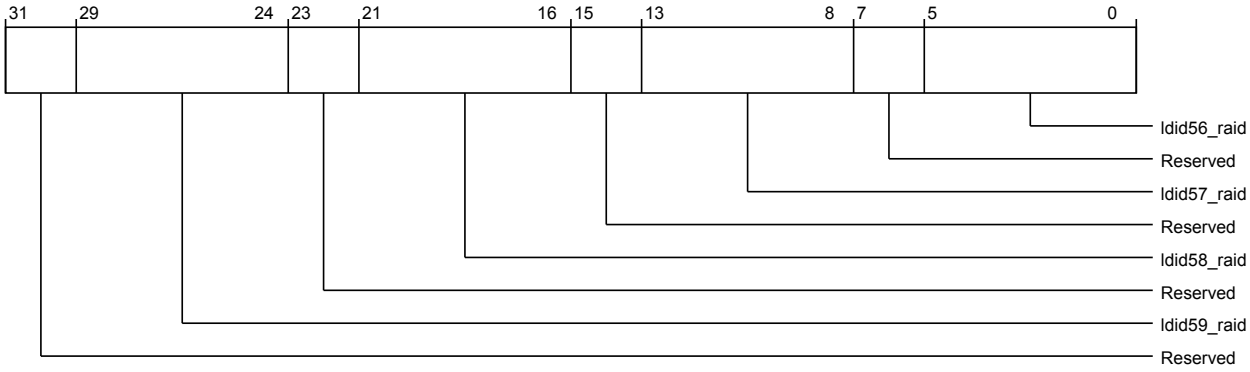

Figure 3-1195 por_cxg_ra_rnf_ldid_to_raid_reg7 (low)

The following table shows the por_cxg_ra_rnf_ldid_to_raid_reg7 lower register bit assignments.

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Table 3-1209 por_cxg_ra_rnf_ldid_to_raid_reg7 (low)

Bits	Field name	Description	Type	Reset
31:30	Reserved	Reserved	RO	-
29:24	ldid59_raid	Specifies the RAID for LDID 59	RW	6'h0
23:22	Reserved	Reserved	RO	-
21:16	ldid58_raid	Specifies the RAID for LDID 58	RW	6'h0
15:14	Reserved	Reserved	RO	-
13:8	ldid57_raid	Specifies the RAID for LDID 57	RW	6'h0
7:6	Reserved	Reserved	RO	-
5:0	ldid56_raid	Specifies the RAID for LDID 56	RW	6'h0

por_cxg_ra_rni_ldid_to_raid_reg0

Specifies the mapping of RN-I LDID to RAID for LDIDs 0 to 7.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hEE0

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.ldid_ctl

The following image shows the higher register bit assignments.

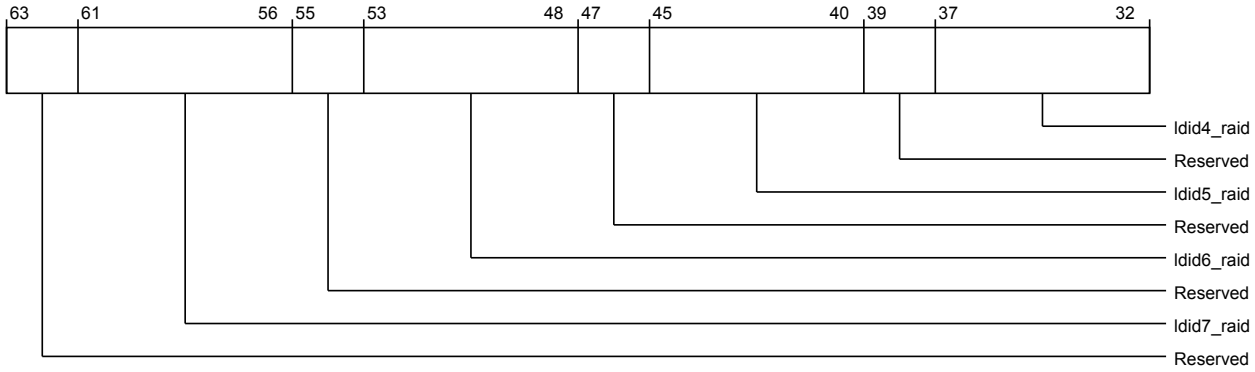

Figure 3-1196 por_cxg_ra_rni_ldid_to_raid_reg0 (high)

The following table shows the por_cxg_ra_rni_ldid_to_raid_reg0 higher register bit assignments.

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Table 3-1210 por_cxg_ra_rni_ldid_to_raid_reg0 (high)

Bits	Field name	Description	Type	Reset
63:62	Reserved	Reserved	RO	-
61:56	ldid7_raid	Specifies the RAID for LDID 7	RW	6'h0
55:54	Reserved	Reserved	RO	-
53:48	ldid6_raid	Specifies the RAID for LDID 6	RW	6'h0
47:46	Reserved	Reserved	RO	-
45:40	ldid5_raid	Specifies the RAID for LDID 5	RW	6'h0
39:38	Reserved	Reserved	RO	-
37:32	ldid4_raid	Specifies the RAID for LDID 4	RW	6'h0

The following image shows the lower register bit assignments.

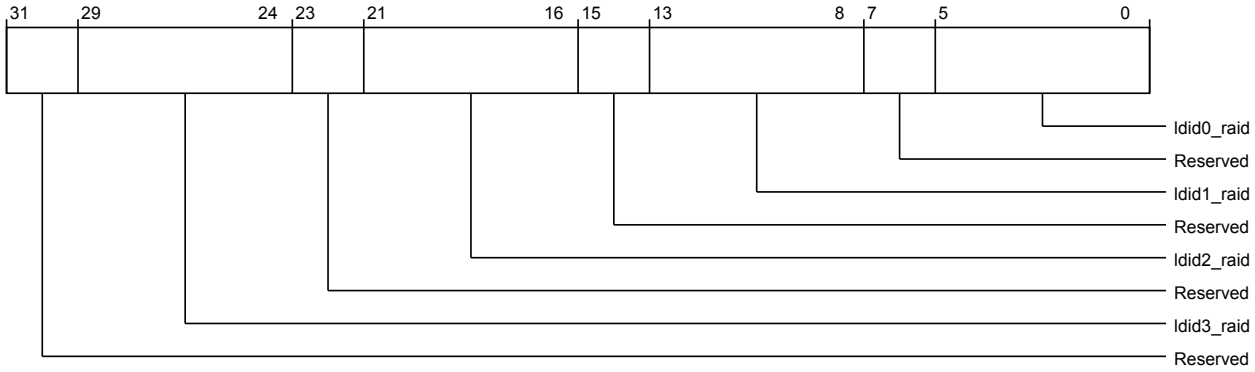

Figure 3-1197 por_cxg_ra_rni_ldid_to_raid_reg0 (low)

The following table shows the por_cxg_ra_rni_ldid_to_raid_reg0 lower register bit assignments.

Table 3-1211 por_cxg_ra_rni_ldid_to_raid_reg0 (low)

Bits	Field name	Description	Type	Reset
31:30	Reserved	Reserved	RO	-
29:24	ldid3_raid	Specifies the RAID for LDID 3	RW	6'h0
23:22	Reserved	Reserved	RO	-
21:16	ldid2_raid	Specifies the RAID for LDID 2	RW	6'h0
15:14	Reserved	Reserved	RO	-
13:8	ldid1_raid	Specifies the RAID for LDID 1	RW	6'h0
7:6	Reserved	Reserved	RO	-
5:0	ldid0_raid	Specifies the RAID for LDID 0	RW	6'h0

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por_cxg_ra_rni_ldid_to_raid_reg1

Specifies the mapping of RN-I LDID to RAID for LDIDs 8 to 15.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hEE8

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.ldid_ctl

The following image shows the higher register bit assignments.

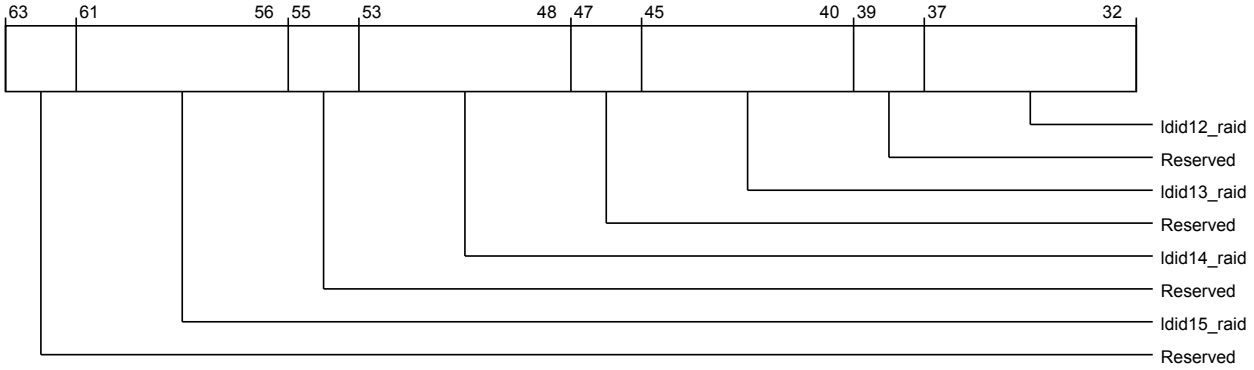

Figure 3-1198 por_cxg_ra_rni_ldid_to_raid_reg1 (high)

The following table shows the por_cxg_ra_rni_ldid_to_raid_reg1 higher register bit assignments.

Table 3-1212 por_cxg_ra_rni_ldid_to_raid_reg1 (high)

Bits	Field name	Description	Type	Reset
63:62	Reserved	Reserved	RO	-
61:56	ldid15_raid	Specifies the RAID for LDID 15	RW	6'h0
55:54	Reserved	Reserved	RO	-
53:48	ldid14_raid	Specifies the RAID for LDID 14	RW	6'h0
47:46	Reserved	Reserved	RO	-
45:40	ldid13_raid	Specifies the RAID for LDID 13	RW	6'h0
39:38	Reserved	Reserved	RO	-
37:32	ldid12_raid	Specifies the RAID for LDID 12	RW	6'h0

The following image shows the lower register bit assignments.

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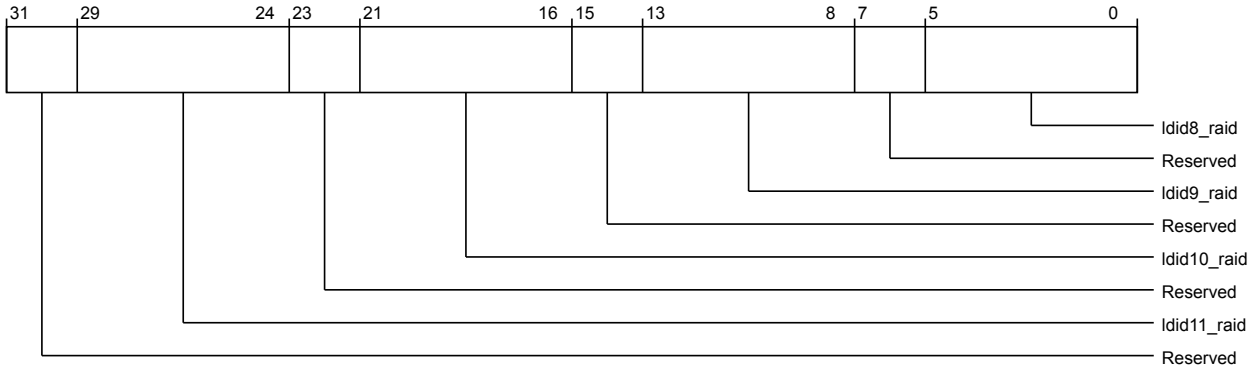

Figure 3-1199 por_cxg_ra_rni_ldid_to_raid_reg1 (low)

The following table shows the por_cxg_ra_rni_ldid_to_raid_reg1 lower register bit assignments.

Table 3-1213 por_cxg_ra_rni_ldid_to_raid_reg1 (low)

Bits	Field name	Description	Type	Reset
31:30	Reserved	Reserved	RO	-
29:24	ldid11_raid	Specifies the RAID for LDID 11	RW	6'h0
23:22	Reserved	Reserved	RO	-
21:16	ldid10_raid	Specifies the RAID for LDID 10	RW	6'h0
15:14	Reserved	Reserved	RO	-
13:8	ldid9_raid	Specifies the RAID for LDID 9	RW	6'h0
7:6	Reserved	Reserved	RO	-
5:0	ldid8_raid	Specifies the RAID for LDID 8	RW	6'h0

por_cxg_ra_rni_ldid_to_raid_reg2

Specifies the mapping of RN-I LDID to RAID for LDIDs 16 to 23.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hEF0

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.ldid_ctl

The following image shows the higher register bit assignments.

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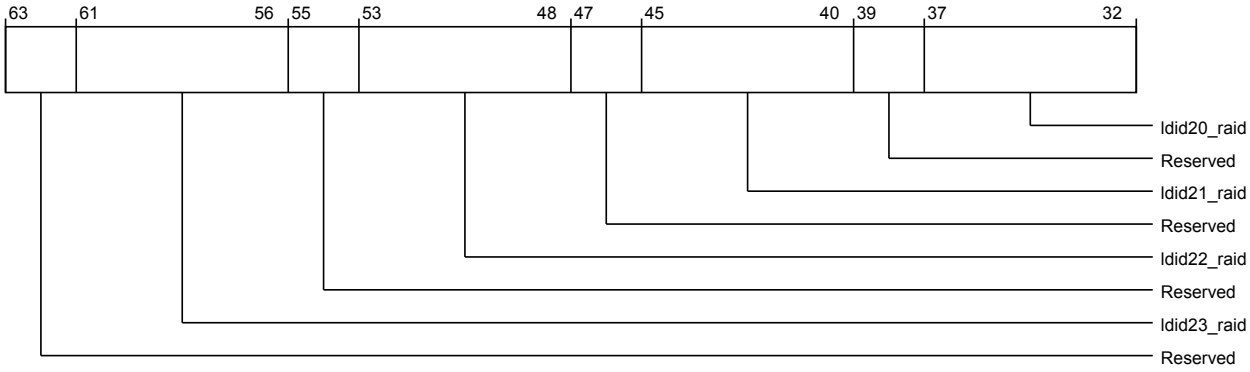

Figure 3-1200 por_cxg_ra_rni_ldid_to_raid_reg2 (high)

The following table shows the por_cxg_ra_rni_ldid_to_raid_reg2 higher register bit assignments.

Table 3-1214 por_cxg_ra_rni_ldid_to_raid_reg2 (high)

Bits	Field name	Description	Type	Reset
63:62	Reserved	Reserved	RO	-
61:56	ldid23_raid	Specifies the RAID for LDID 23	RW	6'h0
55:54	Reserved	Reserved	RO	-
53:48	ldid22_raid	Specifies the RAID for LDID 22	RW	6'h0
47:46	Reserved	Reserved	RO	-
45:40	ldid21_raid	Specifies the RAID for LDID 21	RW	6'h0
39:38	Reserved	Reserved	RO	-
37:32	ldid20_raid	Specifies the RAID for LDID 20	RW	6'h0

The following image shows the lower register bit assignments.

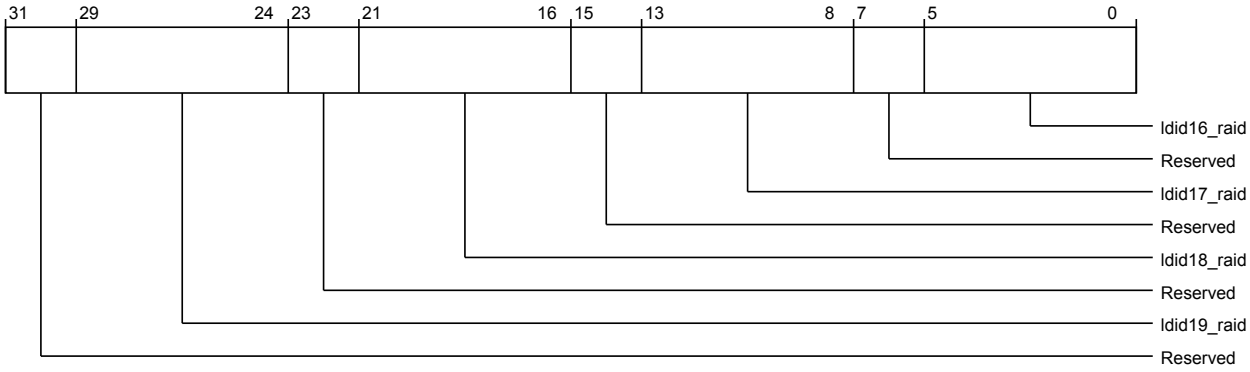

Figure 3-1201 por_cxg_ra_rni_ldid_to_raid_reg2 (low)

The following table shows the por_cxg_ra_rni_ldid_to_raid_reg2 lower register bit assignments.

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Table 3-1215 por_cxg_ra_rni_ldid_to_raid_reg2 (low)

Bits	Field name	Description	Type	Reset
31:30	Reserved	Reserved	RO	-
29:24	ldid19_raid	Specifies the RAID for LDID 19	RW	6'h0
23:22	Reserved	Reserved	RO	-
21:16	ldid18_raid	Specifies the RAID for LDID 18	RW	6'h0
15:14	Reserved	Reserved	RO	-
13:8	ldid17_raid	Specifies the RAID for LDID 17	RW	6'h0
7:6	Reserved	Reserved	RO	-
5:0	ldid16_raid	Specifies the RAID for LDID 16	RW	6'h0

por_cxg_ra_rni_ldid_to_raid_reg3

Specifies the mapping of RN-I LDID to RAID for LDIDs 24 to 31.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hEF8

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.ldid_ctl

The following image shows the higher register bit assignments.

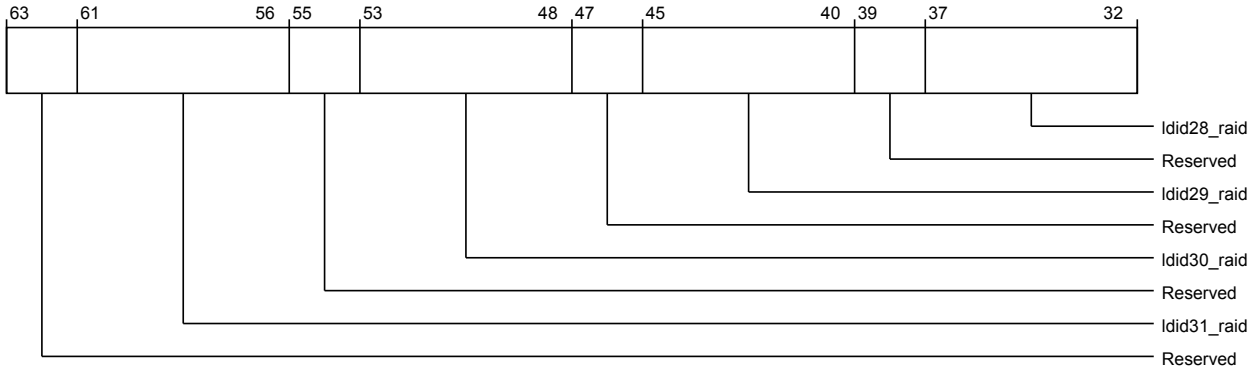

Figure 3-1202 por_cxg_ra_rni_ldid_to_raid_reg3 (high)

The following table shows the por_cxg_ra_rni_ldid_to_raid_reg3 higher register bit assignments.

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Table 3-1216 por_cxg_ra_rni_ldid_to_raid_reg3 (high)

Bits	Field name	Description	Type	Reset
63:62	Reserved	Reserved	RO	-
61:56	ldid31_raid	Specifies the RAID for LDID 31	RW	6'h0
55:54	Reserved	Reserved	RO	-
53:48	ldid30_raid	Specifies the RAID for LDID 30	RW	6'h0
47:46	Reserved	Reserved	RO	-
45:40	ldid29_raid	Specifies the RAID for LDID 29	RW	6'h0
39:38	Reserved	Reserved	RO	-
37:32	ldid28_raid	Specifies the RAID for LDID 28	RW	6'h0

The following image shows the lower register bit assignments.

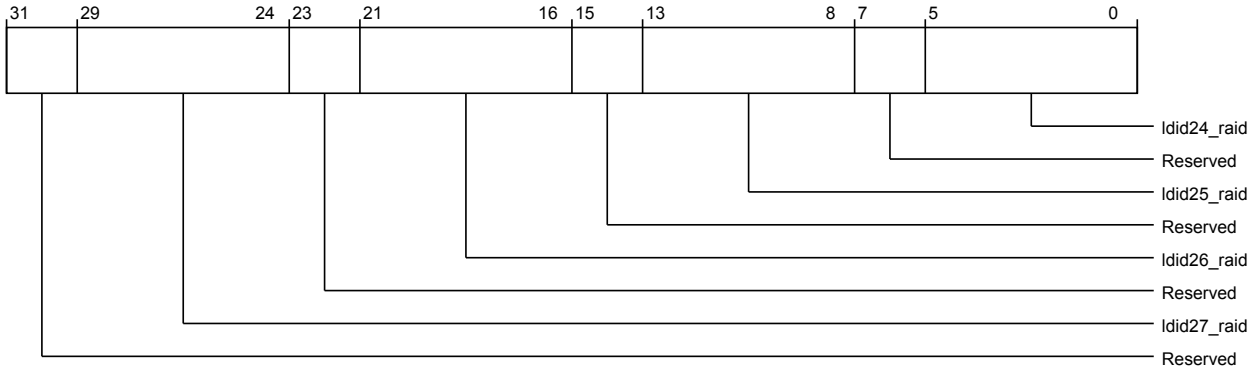

Figure 3-1203 por_cxg_ra_rni_ldid_to_raid_reg3 (low)

The following table shows the por_cxg_ra_rni_ldid_to_raid_reg3 lower register bit assignments.

Table 3-1217 por_cxg_ra_rni_ldid_to_raid_reg3 (low)

Bits	Field name	Description	Type	Reset
31:30	Reserved	Reserved	RO	-
29:24	ldid27_raid	Specifies the RAID for LDID 27	RW	6'h0
23:22	Reserved	Reserved	RO	-
21:16	ldid26_raid	Specifies the RAID for LDID 26	RW	6'h0
15:14	Reserved	Reserved	RO	-
13:8	ldid25_raid	Specifies the RAID for LDID 25	RW	6'h0
7:6	Reserved	Reserved	RO	-
5:0	ldid24_raid	Specifies the RAID for LDID 24	RW	6'h0

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por_cxg_ra_rnd_ldid_to_raid_reg0

Specifies the mapping of RN-D LDID to RAID for LDIDs 0 to 7.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hF00

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.ldid_ctl

The following image shows the higher register bit assignments.

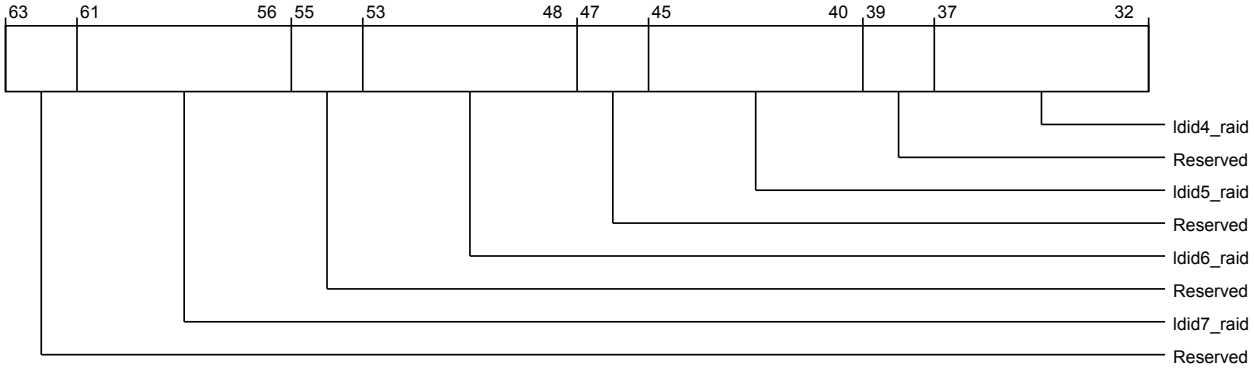

Figure 3-1204 por_cxg_ra_rnd_ldid_to_raid_reg0 (high)

The following table shows the por_cxg_ra_rnd_ldid_to_raid_reg0 higher register bit assignments.

Table 3-1218 por_cxg_ra_rnd_ldid_to_raid_reg0 (high)

Bits	Field name	Description	Type	Reset
63:62	Reserved	Reserved	RO	-
61:56	ldid7_raid	Specifies the RAID for LDID 7	RW	6'h0
55:54	Reserved	Reserved	RO	-
53:48	ldid6_raid	Specifies the RAID for LDID 6	RW	6'h0
47:46	Reserved	Reserved	RO	-
45:40	ldid5_raid	Specifies the RAID for LDID 5	RW	6'h0
39:38	Reserved	Reserved	RO	-
37:32	ldid4_raid	Specifies the RAID for LDID 4	RW	6'h0

The following image shows the lower register bit assignments.

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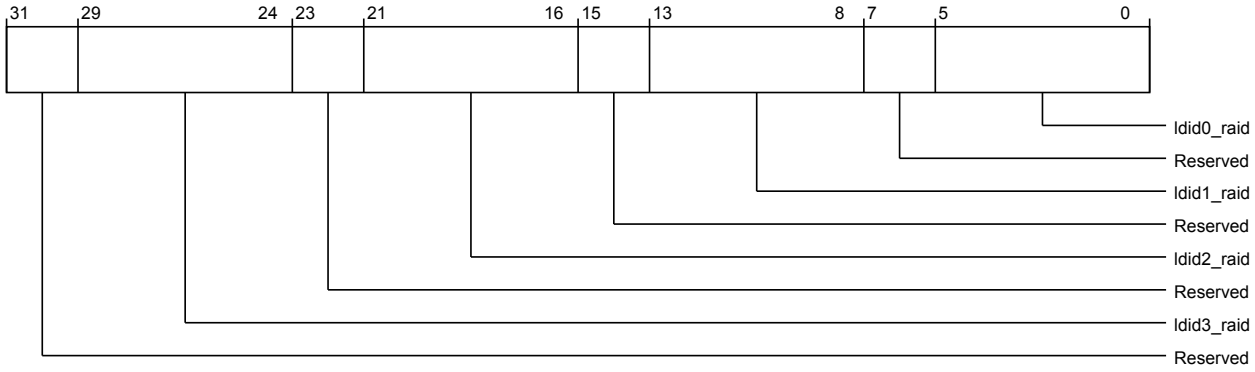

Figure 3-1205 por_cxg_ra_rnd_ldid_to_raid_reg0 (low)

The following table shows the por_cxg_ra_rnd_ldid_to_raid_reg0 lower register bit assignments.

Table 3-1219 por_cxg_ra_rnd_ldid_to_raid_reg0 (low)

Bits	Field name	Description	Type	Reset
31:30	Reserved	Reserved	RO	-
29:24	ldid3_raid	Specifies the RAID for LDID 3	RW	6'h0
23:22	Reserved	Reserved	RO	-
21:16	ldid2_raid	Specifies the RAID for LDID 2	RW	6'h0
15:14	Reserved	Reserved	RO	-
13:8	ldid1_raid	Specifies the RAID for LDID 1	RW	6'h0
7:6	Reserved	Reserved	RO	-
5:0	ldid0_raid	Specifies the RAID for LDID 0	RW	6'h0

por_cxg_ra_rnd_ldid_to_raid_reg1

Specifies the mapping of RN-D LDID to RAID for LDIDs 8 to 15.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hF08

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.ldid_ctl

The following image shows the higher register bit assignments.

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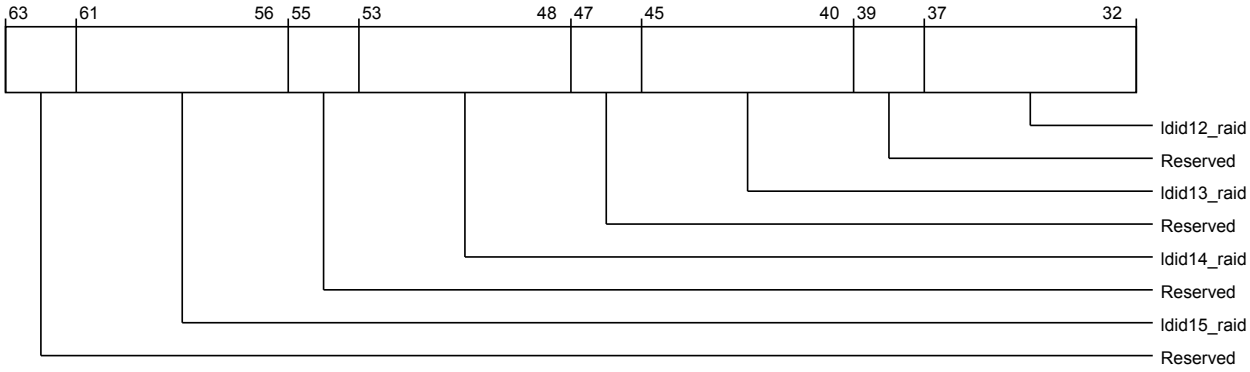

Figure 3-1206 por_cxg_ra_rnd_ldid_to_raid_reg1 (high)

The following table shows the por_cxg_ra_rnd_ldid_to_raid_reg1 higher register bit assignments.

Table 3-1220 por_cxg_ra_rnd_ldid_to_raid_reg1 (high)

Bits	Field name	Description	Type	Reset
63:62	Reserved	Reserved	RO	-
61:56	ldid15_raid	Specifies the RAID for LDID 15	RW	6'h0
55:54	Reserved	Reserved	RO	-
53:48	ldid14_raid	Specifies the RAID for LDID 14	RW	6'h0
47:46	Reserved	Reserved	RO	-
45:40	ldid13_raid	Specifies the RAID for LDID 13	RW	6'h0
39:38	Reserved	Reserved	RO	-
37:32	ldid12_raid	Specifies the RAID for LDID 12	RW	6'h0

The following image shows the lower register bit assignments.

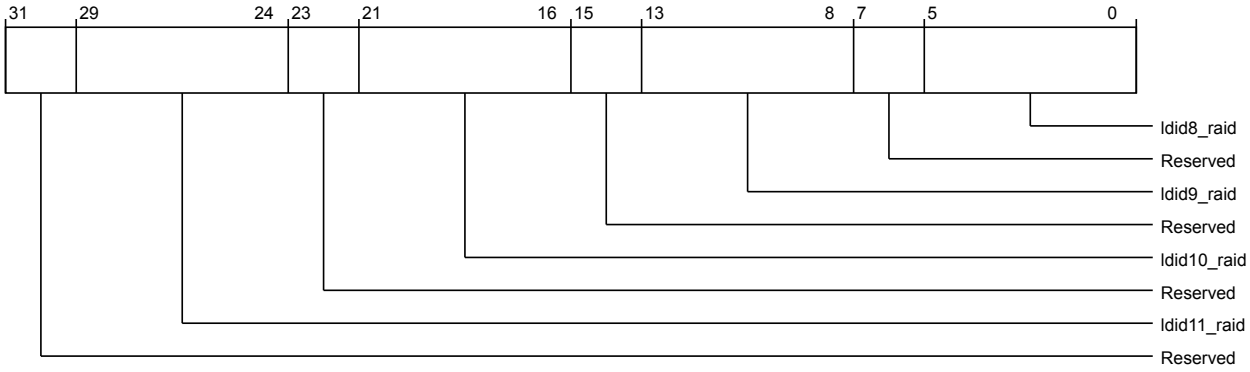

Figure 3-1207 por_cxg_ra_rnd_ldid_to_raid_reg1 (low)

The following table shows the por_cxg_ra_rnd_ldid_to_raid_reg1 lower register bit assignments.

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Table 3-1221 por_cxg_ra_rnd_ldid_to_raid_reg1 (low)

Bits	Field name	Description	Type	Reset
31:30	Reserved	Reserved	RO	-
29:24	ldid11_raid	Specifies the RAID for LDID 11	RW	6'h0
23:22	Reserved	Reserved	RO	-
21:16	ldid10_raid	Specifies the RAID for LDID 10	RW	6'h0
15:14	Reserved	Reserved	RO	-
13:8	ldid9_raid	Specifies the RAID for LDID 9	RW	6'h0
7:6	Reserved	Reserved	RO	-
5:0	ldid8_raid	Specifies the RAID for LDID 8	RW	6'h0

por_cxg_ra_rnd_ldid_to_raid_reg2

Specifies the mapping of RN-D LDID to RAID for LDIDs 16 to 23.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hF10

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.ldid_ctl

The following image shows the higher register bit assignments.

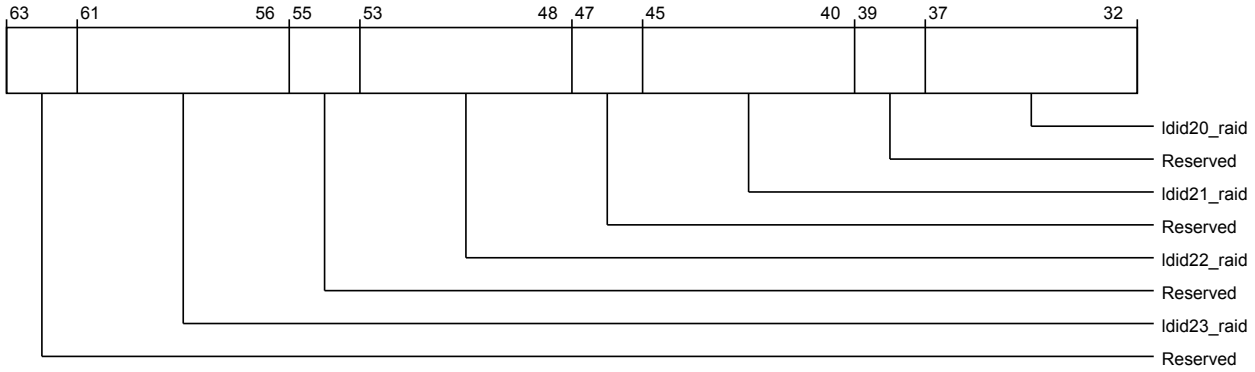

Figure 3-1208 por_cxg_ra_rnd_ldid_to_raid_reg2 (high)

The following table shows the por_cxg_ra_rnd_ldid_to_raid_reg2 higher register bit assignments.

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Table 3-1222 por_cxg_ra_rnd_ldid_to_raid_reg2 (high)

Bits	Field name	Description	Type	Reset
63:62	Reserved	Reserved	RO	-
61:56	ldid23_raid	Specifies the RAID for LDID 23	RW	6'h0
55:54	Reserved	Reserved	RO	-
53:48	ldid22_raid	Specifies the RAID for LDID 22	RW	6'h0
47:46	Reserved	Reserved	RO	-
45:40	ldid21_raid	Specifies the RAID for LDID 21	RW	6'h0
39:38	Reserved	Reserved	RO	-
37:32	ldid20_raid	Specifies the RAID for LDID 20	RW	6'h0

The following image shows the lower register bit assignments.

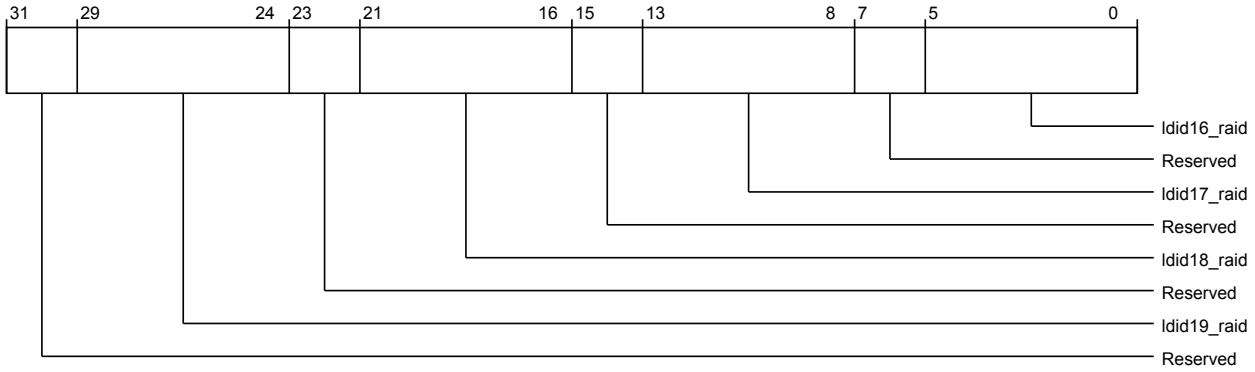

Figure 3-1209 por_cxg_ra_rnd_ldid_to_raid_reg2 (low)

The following table shows the por_cxg_ra_rnd_ldid_to_raid_reg2 lower register bit assignments.

Table 3-1223 por_cxg_ra_rnd_ldid_to_raid_reg2 (low)

Bits	Field name	Description	Type	Reset
31:30	Reserved	Reserved	RO	-
29:24	ldid19_raid	Specifies the RAID for LDID 19	RW	6'h0
23:22	Reserved	Reserved	RO	-
21:16	ldid18_raid	Specifies the RAID for LDID 18	RW	6'h0
15:14	Reserved	Reserved	RO	-
13:8	ldid17_raid	Specifies the RAID for LDID 17	RW	6'h0
7:6	Reserved	Reserved	RO	-
5:0	ldid16_raid	Specifies the RAID for LDID 16	RW	6'h0

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por_cxg_ra_rnd_ldid_to_raid_reg3

Specifies the mapping of RN-D LDID to RAID for LDIDs 24 to 31.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hF18

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.ldid_ctl

The following image shows the higher register bit assignments.

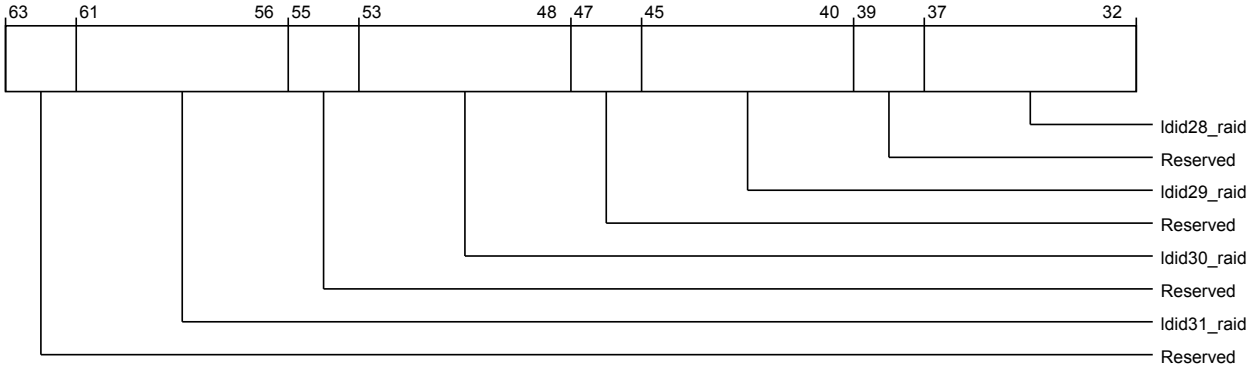

Figure 3-1210 por_cxg_ra_rnd_ldid_to_raid_reg3 (high)

The following table shows the por_cxg_ra_rnd_ldid_to_raid_reg3 higher register bit assignments.

Table 3-1224 por_cxg_ra_rnd_ldid_to_raid_reg3 (high)

Bits	Field name	Description	Type	Reset
63:62	Reserved	Reserved	RO	-
61:56	ldid31_raid	Specifies the RAID for LDID 31	RW	6'h0
55:54	Reserved	Reserved	RO	-
53:48	ldid30_raid	Specifies the RAID for LDID 30	RW	6'h0
47:46	Reserved	Reserved	RO	-
45:40	ldid29_raid	Specifies the RAID for LDID 29	RW	6'h0
39:38	Reserved	Reserved	RO	-
37:32	ldid28_raid	Specifies the RAID for LDID 28	RW	6'h0

The following image shows the lower register bit assignments.

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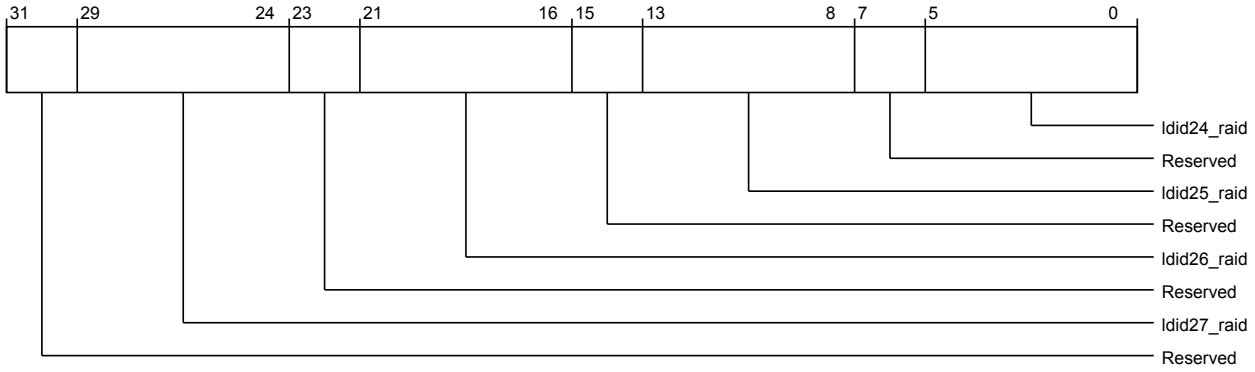

Figure 3-1211 por_cxg_ra_rnd_ldid_to_raid_reg3 (low)

The following table shows the por_cxg_ra_rnd_ldid_to_raid_reg3 lower register bit assignments.

Table 3-1225 por_cxg_ra_rnd_ldid_to_raid_reg3 (low)

Bits	Field name	Description	Type	Reset
31:30	Reserved	Reserved	RO	-
29:24	ldid27_raid	Specifies the RAID for LDID 27	RW	6'h0
23:22	Reserved	Reserved	RO	-
21:16	ldid26_raid	Specifies the RAID for LDID 26	RW	6'h0
15:14	Reserved	Reserved	RO	-
13:8	ldid25_raid	Specifies the RAID for LDID 25	RW	6'h0
7:6	Reserved	Reserved	RO	-
5:0	ldid24_raid	Specifies the RAID for LDID 24	RW	6'h0

por_cxg_ra_agentid_to_linkid_val

Specifies which Agent ID to Link ID mappings are valid.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hF20

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.linkid_ctl

The following image shows the higher register bit assignments.

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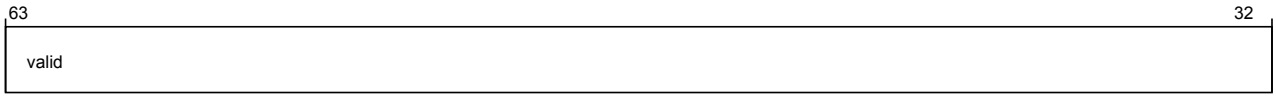

Figure 3-1212 por_cxg_ra_agentid_to_linkid_val (high)

The following table shows the por_cxg_ra_agentid_to_linkid_val higher register bit assignments.

Table 3-1226 por_cxg_ra_agentid_to_linkid_val (high)

Bits	Field name	Description	Type	Reset
63:32	valid	Specifies whether the Link ID is valid; bit number corresponds to logical Agent ID number (from 0 to 63)	RW	63'h0

The following image shows the lower register bit assignments.

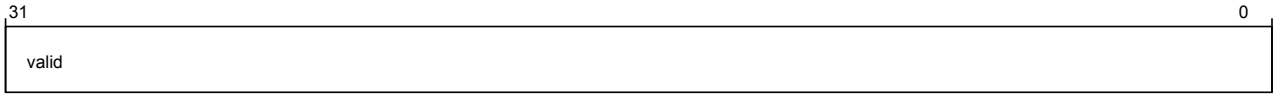

Figure 3-1213 por_cxg_ra_agentid_to_linkid_val (low)

The following table shows the por_cxg_ra_agentid_to_linkid_val lower register bit assignments.

Table 3-1227 por_cxg_ra_agentid_to_linkid_val (low)

Bits	Field name	Description	Type	Reset
31:0	valid	Specifies whether the Link ID is valid; bit number corresponds to logical Agent ID number (from 0 to 63)	RW	63'h0

por_cxg_ra_rnf_ldid_to_raid_val

Specifies which RN-F LDID to RAID mappings are valid.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hF28

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.ldid_ctl

The following image shows the higher register bit assignments.

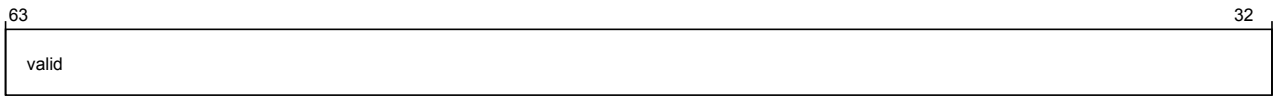

Figure 3-1214 por_cxg_ra_rnf_ldid_to_raid_val (high)

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The following table shows the por_cxg_ra_rnf_ldid_to_raid_val higher register bit assignments.

Table 3-1228 por_cxg_ra_rnf_ldid_to_raid_val (high)

Bits	Field name	Description	Type	Reset
63:32	valid	Specifies whether the RAID is valid; bit number corresponds to logical RN-F LDID number (from 0 to 63)	RW	63'h0

The following image shows the lower register bit assignments.

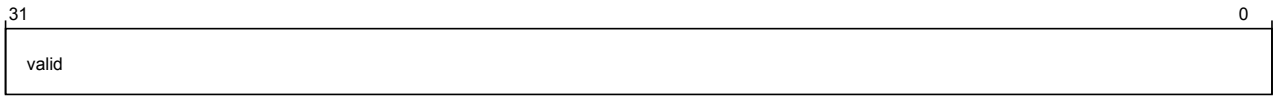

Figure 3-1215 por_cxg_ra_rnf_ldid_to_raid_val (low)

The following table shows the por_cxg_ra_rnf_ldid_to_raid_val lower register bit assignments.

Table 3-1229 por_cxg_ra_rnf_ldid_to_raid_val (low)

Bits	Field name	Description	Type	Reset
31:0	valid	Specifies whether the RAID is valid; bit number corresponds to logical RN-F LDID number (from 0 to 63)	RW	63'h0

por_cxg_ra_rni_ldid_to_raid_val

Specifies which RN-I LDID to RAID mappings are valid.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hF30

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.ldid_ctl

The following image shows the higher register bit assignments.

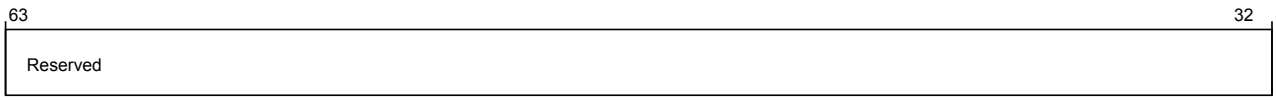

Figure 3-1216 por_cxg_ra_rni_ldid_to_raid_val (high)

The following table shows the por_cxg_ra_rni_ldid_to_raid_val higher register bit assignments.

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Table 3-1230 por_cxg_ra_rni_ldid_to_raid_val (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

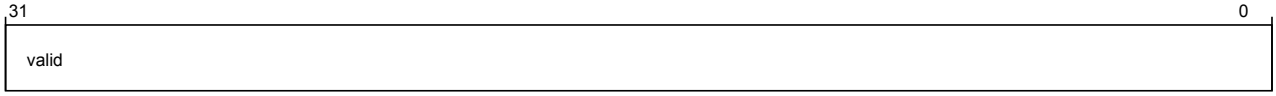

Figure 3-1217 por_cxg_ra_rni_ldid_to_raid_val (low)

The following table shows the por_cxg_ra_rni_ldid_to_raid_val lower register bit assignments.

Table 3-1231 por_cxg_ra_rni_ldid_to_raid_val (low)

Bits	Field name	Description	Type	Reset
31:0	valid	Specifies whether the RAID is valid; bit number corresponds to logical RN-I LDID number (from 0 to 31)	RW	32'h0

por_cxg_ra_rnd_ldid_to_raid_val

Specifies which RN-D LDID to RAID mappings are valid.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hF38

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxg_ra_secure_register_groups_override.ldid_ctl

The following image shows the higher register bit assignments.

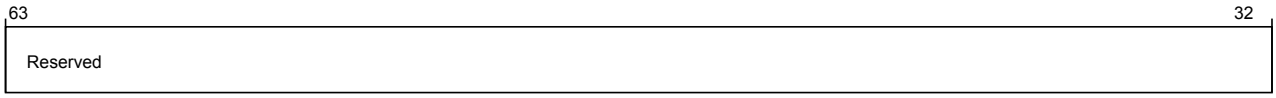

Figure 3-1218 por_cxg_ra_rnd_ldid_to_raid_val (high)

The following table shows the por_cxg_ra_rnd_ldid_to_raid_val higher register bit assignments.

Table 3-1232 por_cxg_ra_rnd_ldid_to_raid_val (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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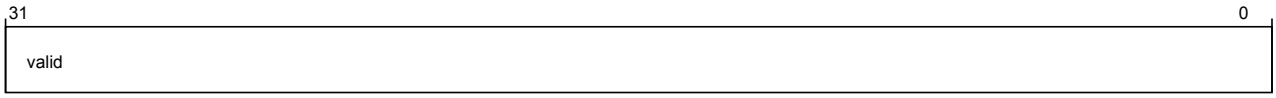

Figure 3-1219 por_cxg_ra_rnd_ldid_to_raid_val (low)

The following table shows the por_cxg_ra_rnd_ldid_to_raid_val lower register bit assignments.

Table 3-1233 por_cxg_ra_rnd_ldid_to_raid_val (low)

Bits	Field name	Description	Type	Reset
31:0	valid	Specifies whether the RAID is valid; bit number corresponds to logical RN-D LDID number (from 0 to 31)	RW	32'h0

por_cxg_ra_pmu_event_sel

Specifies the PMU event to be counted.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h2000
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

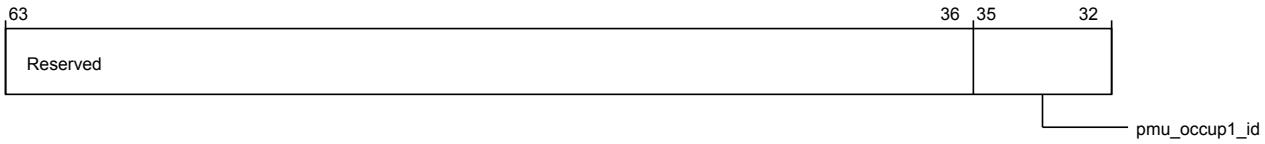

Figure 3-1220 por_cxg_ra_pmu_event_sel (high)

The following table shows the por_cxg_ra_pmu_event_sel higher register bit assignments.

Table 3-1234 por_cxg_ra_pmu_event_sel (high)

Bits	Field name	Description	Type	Reset
63:36	Reserved	Reserved	RO	-
35:32	pmu_occup1_id	PMU occupancy event selector ID	RW	4'b0

The following image shows the lower register bit assignments.

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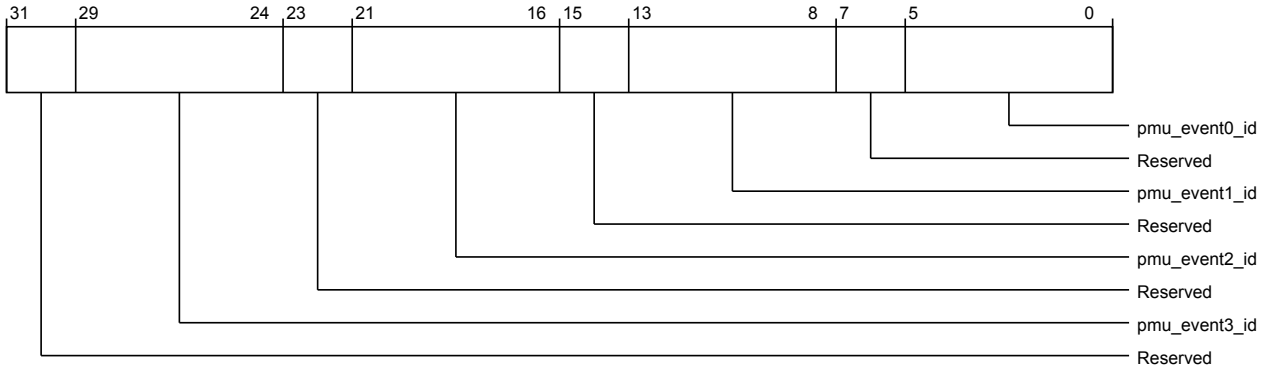

Figure 3-1221 por_cxg_ra_pmu_event_sel (low)

The following table shows the por_cxg_ra_pmu_event_sel lower register bit assignments.

Table 3-1235 por_cxg_ra_pmu_event_sel (low)

Bits	Field name	Description	Type	Reset
31:30	Reserved	Reserved	RO	-
29:24	pmu_event3_id	CXRA PMU Event 3 ID; see pmu_event0_id for encodings	RW	6'b0
23:22	Reserved	Reserved	RO	-
21:16	pmu_event2_id	CXRA PMU Event 2 ID; see pmu_event0_id for encodings	RW	6'b0
15:14	Reserved	Reserved	RO	-
13:8	pmu_event1_id	CXRA PMU Event 1 ID; see pmu_event0_id for encodings	RW	6'b0

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Table 3-1235 por_cxg_ra_pmu_event_sel (low) (continued)

Bits	Field name	Description	Type	Reset
7:6	Reserved	Reserved	RO	-
5:0	pmu_event0_id	CXRA PMU Event 0 ID 6'h00: No event 6'h01: Request Tracker (RHT) occupancy count overflow 6'h02: Snoop Tracker (SHT) occupancy count overflow 6'h03: Read Data Buffer (RDB) occupancy count overflow 6'h04: Write Data Buffer (WDB) occupancy count overflow 6'h05: Snoop Sink Buffer (SSB) occupancy count overflow 6'h06: CCIX RX broadcast snoops 6'h07: CCIX TX request chain 6'h08: CCIX TX request chain average length 6'h09: CHI internal RSP stall 6'h0A: CHI internal DAT stall 6'h0B: CCIX REQ Protocol credit Link 0 stall 6'h0C: CCIX REQ Protocol credit Link 1 stall 6'h0D: CCIX REQ Protocol credit Link 2 stall 6'h0E: CCIX DAT Protocol credit Link 0 stall 6'h0F: CCIX DAT Protocol credit Link 1 stall 6'h10: CCIX DAT Protocol credit Link 2 stall 6'h11: CHI external RSP stall 6'h12: CHI external DAT stall	RW	6'b0

por_cxg_ra_cxprtcl_link0_ctl

Functions as the CXRA CCIX Protocol Link 0 control register. Works with por_cxg_ra_cxprtcl_link0_status.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h1000
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

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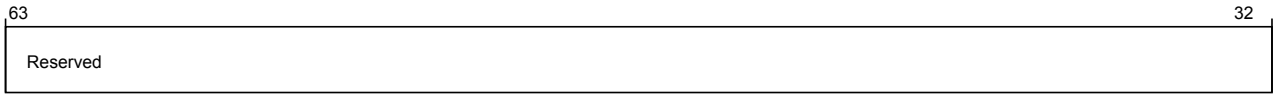

Figure 3-1222 por_cxg_ra_cxprtcl_link0_ctl (high)

The following table shows the por_cxg_ra_cxprtcl_link0_ctl higher register bit assignments.

Table 3-1236 por_cxg_ra_cxprtcl_link0_ctl (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

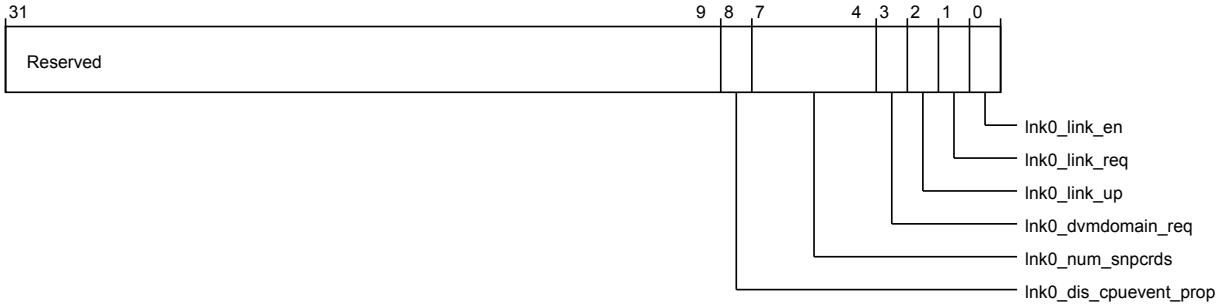

Figure 3-1223 por_cxg_ra_cxprtcl_link0_ctl (low)

The following table shows the por_cxg_ra_cxprtcl_link0_ctl lower register bit assignments.

Table 3-1237 por_cxg_ra_cxprtcl_link0_ctl (low)

Bits	Field name	Description	Type	Reset
31:9	Reserved	Reserved	RO	-
8	lnk0_dis_cpuevent_prop	When set, disables the propagation of CPU Events on CCIX Link 0 ——— **Note** ——— This field is applicable only when SMP Mode enable parameter is set. ———	RW	1'b0
7:4	lnk0_num_snpcrds	Controls the number of CCIX snoop credits assigned to Link 0 4'h0: Total credits are equally divided across all links 4'h1: 25% of credits assigned 4'h2: 50% of credits assigned 4'h3: 75% of credits assigned 4'h4: 100% of credits assigned 4'hF: 0% of credits assigned	RW	4'b0
3	lnk0_dvmdomain_req	Controls DVM domain enable (SYSCOREQ) for CCIX Link 0	RW	1'b0

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Table 3-1237 por_cxg_ra_cxprtcl_link0_ctl (low) (continued)

Bits	Field name	Description	Type	Reset
2	lnk0_link_up	Link Up status. Software writes this register bit to indicate Link status after polling Link_ACK and Link_DN status in the remote agent 1'b0: Link is not Up. Software clears Link_UP when Link_ACK status is clear and Link_DN status is set in both local and remote agents. The local agent stops responding to any protocol activity from remote agent, including acceptance of protocol credits, when Link_UP is clear 1'b1: Link is Up. Software sets Link_UP when Link_ACK status is set and Link_DN status is clear in both local and remote agents; the local agent starts sending local protocol credits to remote agent	RW	1'b0
1	lnk0_link_req	Link Up/Down request; software writes this register bit to request a Link Up or Link Down in the local agent 1'b0: Link Down request **Note** The local agent does not return remote protocol credits yet since remote agent may still be in Link_UP state. 1'b1: Link Up request	RW	1'b0
0	lnk0_link_en	Enables CCIX Link 0 when set 1'b0: Link is disabled 1'b1: Link is enabled	RW	1'b0

por_cxg_ra_cxprtcl_link0_status

Functions as the CXRA CCIX Protocol Link 0 status register. Works with por_cxg_ra_cxprtcl_link0_ctl.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h1008
Register reset 64'b0010
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

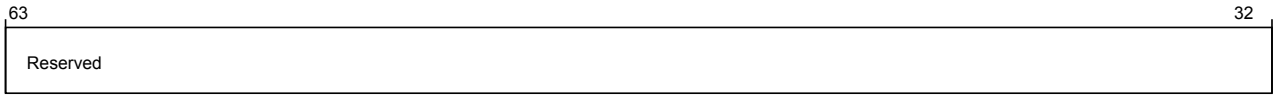

Figure 3-1224 por_cxg_ra_cxprtcl_link0_status (high)

The following table shows the por_cxg_ra_cxprtcl_link0_status higher register bit assignments.

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Table 3-1238 por_cxg_ra_cxprtcl_link0_status (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

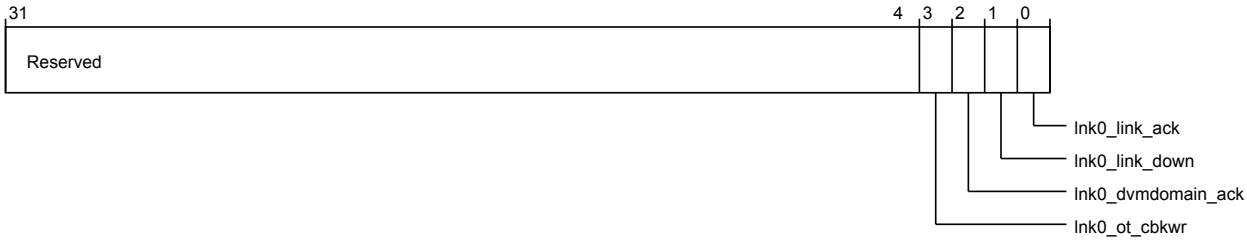

Figure 3-1225 por_cxg_ra_cxprtcl_link0_status (low)

The following table shows the por_cxg_ra_cxprtcl_link0_status lower register bit assignments.

Table 3-1239 por_cxg_ra_cxprtcl_link0_status (low)

Bits	Field name	Description	Type	Reset
31:4	Reserved	Reserved	RO	-
3	lnk0_ot_cbkwr	Provides status for outstanding CopyBack Write for CCIX Link0	RO	1'b0
2	lnk0_dvmdomain_ack	Provides DVM domain status (SYSCOACK) for CCIX Link 0	RO	1'b0
1	lnk0_link_down	Link Down status; hardware updates this register bit to indicate Link Down status 1'b0: Link is not Down; hardware clears Link_DN when it receives a Link Up request 1'b1: Link is Down; hardware sets Link_DN after the local agent has received all local protocol credits. The local agent must continue to respond to any remote protocol activity, including accepting and returning remote protocol credits until Link Up is clear	RO	1'b1
0	lnk0_link_ack	Link Up/Down acknowledge; hardware updates this register bit to acknowledge the software link request 1'b0: Link Down acknowledge; hardware clears Link_ACK on receiving a Link Down request; the local agent stops granting protocol credits and starts returning protocol credits to the remote agent when Link_ACK is clear 1'b1: Link Up acknowledge; hardware sets Link_ACK when the local agent is ready to start accepting protocol credits from the remote agent ——— **Note** ——— The local agent must clear Link_DN before setting Link_ACK. ———	RO	1'b0

por_cxg_ra_cxprtcl_link1_ctl

Functions as the CXRA CCIX Protocol Link 1 control register. Works with por_cxg_ra_cxprtcl_link1_status.

Its characteristics are:

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Type RW
Register width (Bits) 64
Address offset 14'h1010
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

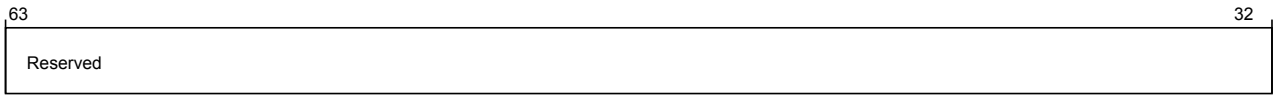

Figure 3-1226 por_cxg_ra_cxprtcl_link1_ctl (high)

The following table shows the por_cxg_ra_cxprtcl_link1_ctl higher register bit assignments.

Table 3-1240 por_cxg_ra_cxprtcl_link1_ctl (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

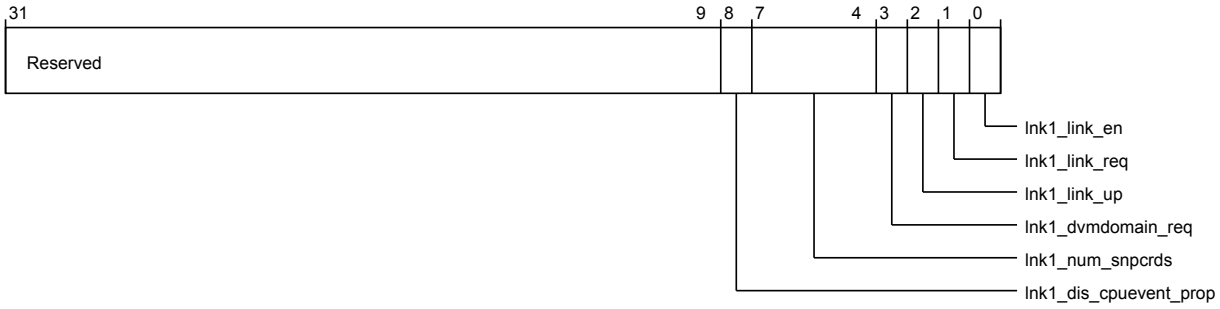

Figure 3-1227 por_cxg_ra_cxprtcl_link1_ctl (low)

The following table shows the por_cxg_ra_cxprtcl_link1_ctl lower register bit assignments.

Table 3-1241 por_cxg_ra_cxprtcl_link1_ctl (low)

Bits	Field name	Description	Type	Reset
31:9	Reserved	Reserved	RO	-
8	lnk1_dis_cpuevent_prop	When set, disables the propagation of CPU Events on CCIX Link 1 **Note** This field is applicable only when SMP Mode enable parameter is set.	RW	1'b0

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Table 3-1241 por_cxg_ra_cxprtcl_link1_ctl (low) (continued)

Bits	Field name	Description	Type	Reset
7:4	lnk1_num_snpcrds	Controls the number of CCIX snoop credits assigned to Link 1 4'h0: Total credits are equally divided across all links 4'h1: 25% of credits assigned 4'h2: 50% of credits assigned 4'h3: 75% of credits assigned 4'h4: 100% of credits assigned 4'hF: 0% of credits assigned	RW	4'b0
3	lnk1_dvmdomain_req	Controls DVM domain enable (SYSCOREQ) for CCIX Link 1	RW	1'b0
2	lnk1_link_up	Link Up status. Software writes this register bit to indicate Link status after polling Link_ACK and Link_DN status in the remote agent 1'b0: Link is not Up. Software clears Link_UP when Link_ACK status is clear and Link_DN status is set in both local and remote agents. The local agent stops responding to any protocol activity from remote agent, including acceptance of protocol credits, when Link_UP is clear 1'b1: Link is Up. Software sets Link_UP when Link_ACK status is set and Link_DN status is clear in both local and remote agents; the local agent starts sending local protocol credits to remote agent	RW	1'b0
1	lnk1_link_req	Link Up/Down request; software writes this register bit to request a Link Up or Link Down in the local agent 1'b0: Link Down request **Note** The local agent does not return remote protocol credits yet since remote agent may still be in Link_UP state. 1'b1: Link Up request	RW	1'b0
0	lnk1_link_en	Enables CCIX Link 1 when set 1'b0: Link is disabled 1'b1: Link is enabled	RW	1'b0

por_cxg_ra_cxprtcl_link1_status

Functions as the CXRA CCIX Protocol Link 1 status register. Works with por_cxg_ra_cxprtcl_link1_ctl.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h1018
Register reset 64'b0010
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

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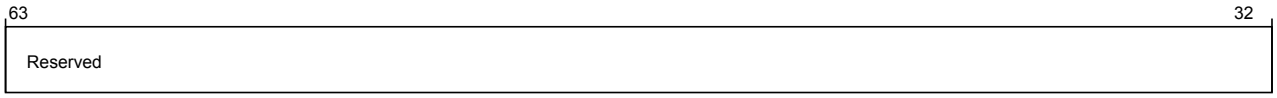

Figure 3-1228 por_cxg_ra_cxprtcl_link1_status (high)

The following table shows the por_cxg_ra_cxprtcl_link1_status higher register bit assignments.

Table 3-1242 por_cxg_ra_cxprtcl_link1_status (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

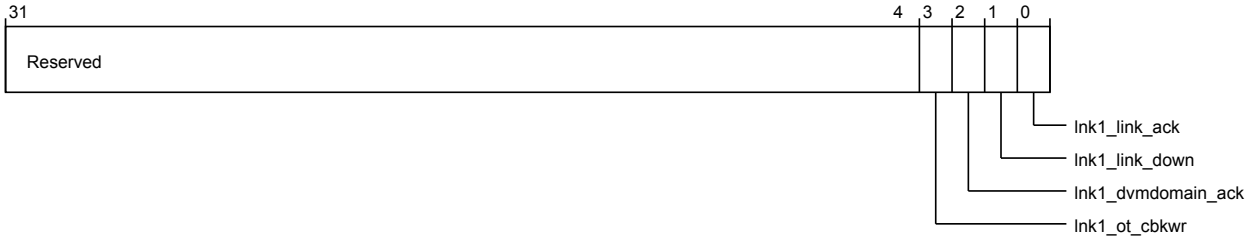

Figure 3-1229 por_cxg_ra_cxprtcl_link1_status (low)

The following table shows the por_cxg_ra_cxprtcl_link1_status lower register bit assignments.

Table 3-1243 por_cxg_ra_cxprtcl_link1_status (low)

Bits	Field name	Description	Type	Reset
31:4	Reserved	Reserved	RO	-
3	lnk1_ot_cbkwr	Provides status for outstanding CopyBack Write for CCIX Link1	RO	1'b0
2	lnk1_dvmdomain_ack	Provides DVM domain status (SYSCOACK) for CCIX Link 1	RO	1'b0

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Table 3-1243 por_cxg_ra_cxprtcl_link1_status (low) (continued)

Bits	Field name	Description	Type	Reset
1	lnk1_link_down	Link Down status; hardware updates this register bit to indicate Link Down status 1'b0: Link is not Down; hardware clears Link_DN when it receives a Link Up request 1'b1: Link is Down; hardware sets Link_DN after the local agent has received all local protocol credits. The local agent must continue to respond to any remote protocol activity, including accepting and returning remote protocol credits until Link Up is clear	RO	1'b1
0	lnk1_link_ack	Link Up/Down acknowledge; hardware updates this register bit to acknowledge the software link request 1'b0: Link Down acknowledge; hardware clears Link_ACK on receiving a Link Down request; the local agent stops sending protocol credits to the remote agent when Link_ACK is clear 1'b1: Link Up acknowledge; hardware sets Link_ACK when the local agent is ready to start accepting protocol credits from the remote agent ——— **Note** ——— The local agent must clear Link_DN before setting Link_ACK. ———	RO	1'b0

por_cxg_ra_cxprtcl_link2_ctl

Functions as the CXRA CCIX Protocol Link 2 control register. Works with por_cxg_ra_cxprtcl_link2_status.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h1020
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

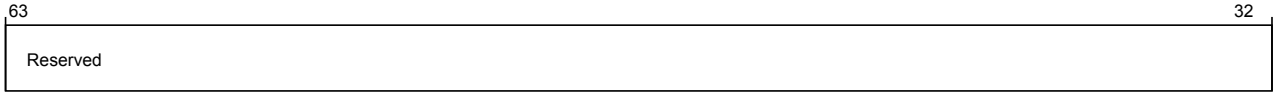

Figure 3-1230 por_cxg_ra_cxprtcl_link2_ctl (high)

The following table shows the por_cxg_ra_cxprtcl_link2_ctl higher register bit assignments.

Table 3-1244 por_cxg_ra_cxprtcl_link2_ctl (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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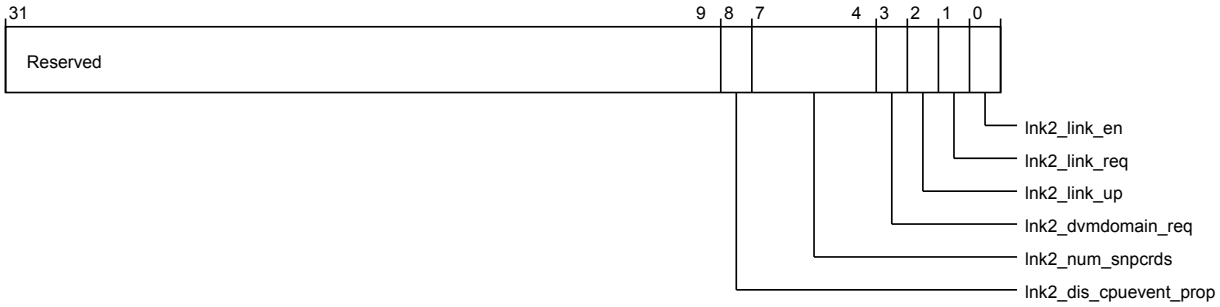

Figure 3-1231 por_cxg_ra_cxprtcl_link2_ctl (low)

The following table shows the por_cxg_ra_cxprtcl_link2_ctl lower register bit assignments.

Table 3-1245 por_cxg_ra_cxprtcl_link2_ctl (low)

Bits	Field name	Description	Type	Reset
31:9	Reserved	Reserved	RO	-
8	lnk2_dis_cpuevent_prop	When set, disables the propagation of CPU Events on CCIX Link 2 **Note** This field is applicable only when SMP Mode enable parameter is set.	RW	1'b0
7:4	lnk2_num_snpcrds	Controls the number of CCIX snoop credits assigned to Link 2 4'h0: Total credits are equally divided across all links 4'h1: 25% of credits assigned 4'h2: 50% of credits assigned 4'h3: 75% of credits assigned 4'h4: 100% of credits assigned 4'hF: 0% of credits assigned	RW	4'b0
3	lnk2_dvmdomain_req	Controls DVM domain enable (SYSCOREQ) for CCIX Link 2	RW	1'b0
2	lnk2_link_up	Link Up status. Software writes this register bit to indicate Link status after polling Link_ACK and Link_DN status in the remote agent 1'b0: Link is not Up. Software clears Link_UP when Link_ACK status is clear and Link_DN status is set in both local and remote agents. The local agent stops responding to any protocol activity from remote agent, including acceptance of protocol credits, when Link_UP is clear 1'b1: Link is Up. Software sets Link_UP when Link_ACK status is set and Link_DN status is clear in both local and remote agents; the local agent starts sending local protocol credits to remote agent	RW	1'b0

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Table 3-1245 por_cxg_ra_cxprtcl_link2_ctl (low) (continued)

Bits	Field name	Description	Type	Reset
1	lnk2_link_req	Link Up/Down request; software writes this register bit to request a Link Up or Link Down in the local agent 1'b0: Link Down request ——— **Note** ——— The local agent does not return remote protocol credits yet since remote agent may still be in Link_UP state. ——— 1'b1: Link Up request	RW	1'b0
0	lnk2_link_en	Enables CCIX Link 2 when set 1'b0: Link is disabled 1'b1: Link is enabled	RW	1'b0

por_cxg_ra_cxprtcl_link2_status

Functions as the CXRA CCIX Protocol Link 2 status register. Works with por_cxg_ra_cxprtcl_link2_ctl.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h1028
Register reset 64'b0010
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

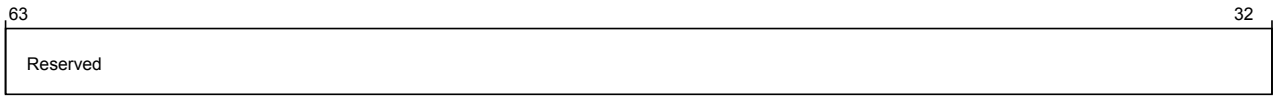

Figure 3-1232 por_cxg_ra_cxprtcl_link2_status (high)

The following table shows the por_cxg_ra_cxprtcl_link2_status higher register bit assignments.

Table 3-1246 por_cxg_ra_cxprtcl_link2_status (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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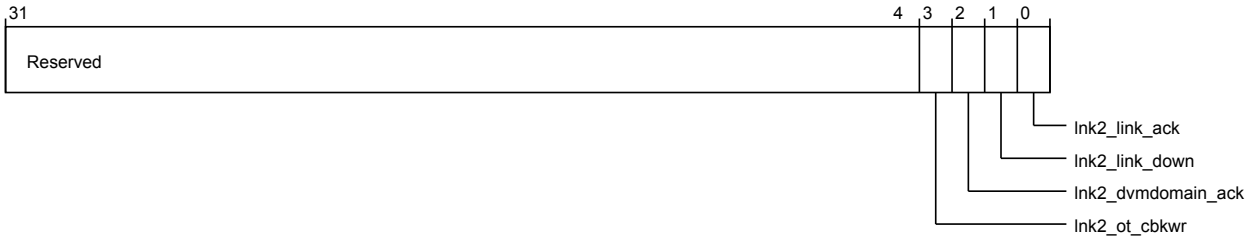

Figure 3-1233 por_cxg_ra_cxprtcl_link2_status (low)

The following table shows the por_cxg_ra_cxprtcl_link2_status lower register bit assignments.

Table 3-1247 por_cxg_ra_cxprtcl_link2_status (low)

Bits	Field name	Description	Type	Reset
31:4	Reserved	Reserved	RO	-
3	lnk2_ot_cbkwr	Provides status for outstanding CopyBack Write for CCIX Link2	RO	1'b0
2	lnk2_dvmdomain_ack	Provides DVM domain status (SYSCOACK) for CCIX Link 2	RO	1'b0
1	lnk2_link_down	Link Down status; hardware updates this register bit to indicate Link Down status 1'b0: Link is not Down; hardware clears Link_DN when it receives a Link Up request 1'b1: Link is Down; hardware sets Link_DN after the local agent has received all local protocol credits. The local agent must continue to respond to any remote protocol activity, including accepting and returning remote protocol credits until Link Up is clear	RO	1'b1
0	lnk2_link_ack	Link Up/Down acknowledge; hardware updates this register bit to acknowledge the software link request 1'b0: Link Down acknowledge; hardware clears Link_ACK on receiving a Link Down request; the local agent stops sending protocol credits to the remote agent when Link_ACK is clear 1'b1: Link Up acknowledge; hardware sets Link_ACK when the local agent is ready to start accepting protocol credits from the remote agent ——— **Note** ——— The local agent must clear Link_DN before setting Link_ACK. ———	RO	1'b0

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3.3.13 CXLA configuration registers

This section lists the CXLA configuration registers.

por_cxla_node_info

Provides component identification information.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h0
Register reset Configuration dependent
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

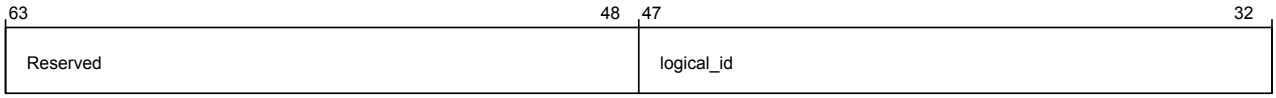

Figure 3-1234 por_cxla_node_info (high)

The following table shows the por_cxla_node_info higher register bit assignments.

Table 3-1248 por_cxla_node_info (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:32	logical_id	Component logical ID	RO	Configuration dependent

The following image shows the lower register bit assignments.

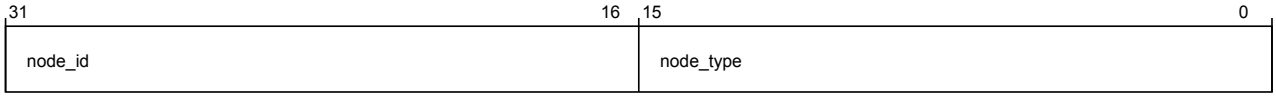

Figure 3-1235 por_cxla_node_info (low)

The following table shows the por_cxla_node_info lower register bit assignments.

Table 3-1249 por_cxla_node_info (low)

Bits	Field name	Description	Type	Reset
31:16	node_id	Component CHI node ID	RO	Configuration dependent
15:0	node_type	CMN-600 node type identifier	RO	16'h0102

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por_cxla_child_info

Provides component child identification information.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'h80
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

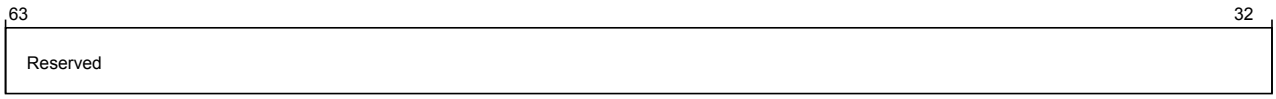

Figure 3-1236 por_cxla_child_info (high)

The following table shows the por_cxla_child_info higher register bit assignments.

Table 3-1250 por_cxla_child_info (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

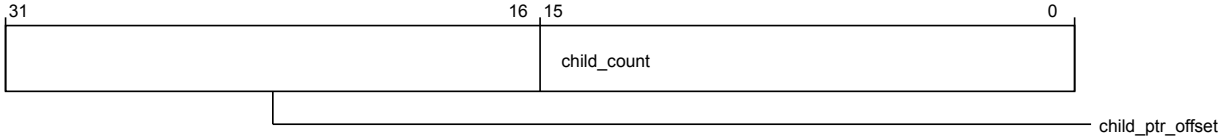

Figure 3-1237 por_cxla_child_info (low)

The following table shows the por_cxla_child_info lower register bit assignments.

Table 3-1251 por_cxla_child_info (low)

Bits	Field name	Description	Type	Reset
31:16	child_ptr_offset	Starting register offset which contains pointers to the child nodes	RO	16'h0
15:0	child_count	Number of child nodes; used in discovery process	RO	16'b0

por_cxla_secure_register_groups_override

Allows non-secure access to predefined groups of secure registers.

Its characteristics are:

Type RW
Register width (Bits) 64

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Address offset 14'h980

Register reset 64'b0

Usage constraints Only accessible by secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following image shows the higher register bit assignments.

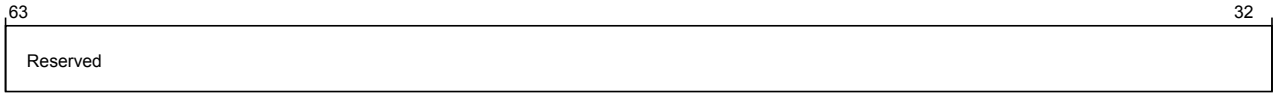

Figure 3-1238 por_cxla_secure_register_groups_override (high)

The following table shows the por_cxla_secure_register_groups_override higher register bit assignments.

Table 3-1252 por_cxla_secure_register_groups_override (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

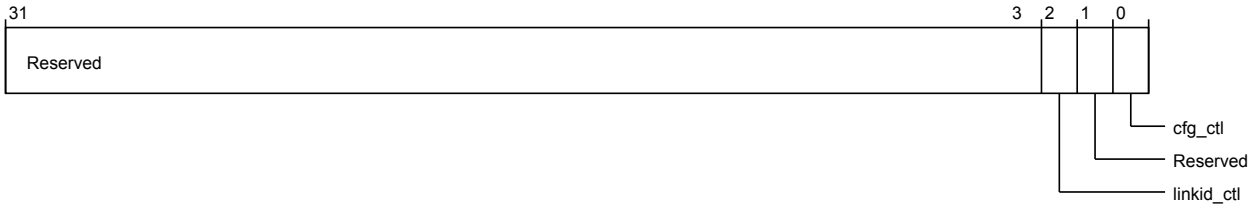

Figure 3-1239 por_cxla_secure_register_groups_override (low)

The following table shows the por_cxla_secure_register_groups_override lower register bit assignments.

Table 3-1253 por_cxla_secure_register_groups_override (low)

Bits	Field name	Description	Type	Reset
31:3	Reserved	Reserved	RO	-
2	linkid_ctl	Allows non-secure access to secure LA Link ID registers	RW	1'b0
1	Reserved	Reserved	RO	-
0	cfg_ctl	Allows non-secure access to secure configuration control register	RW	1'b0

por_cxla_unit_info

Provides component identification information for CXLA.

Its characteristics are:

Type RO

Register width (Bits) 64

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Address offset 14'h900

Register reset Configuration dependent

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

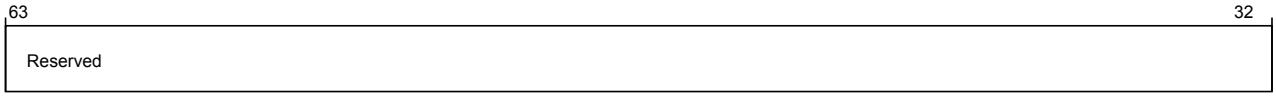

Figure 3-1240 por_cxla_unit_info (high)

The following table shows the por_cxla_unit_info higher register bit assignments.

Table 3-1254 por_cxla_unit_info (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

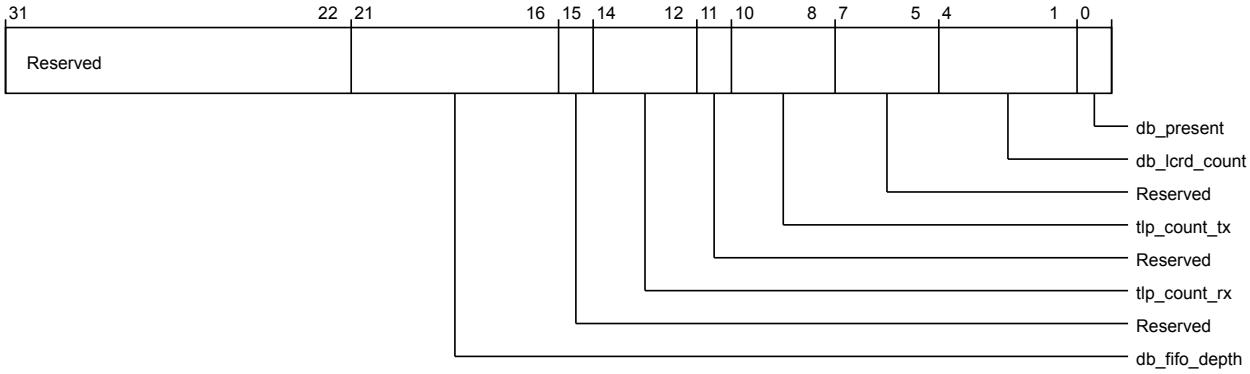

Figure 3-1241 por_cxla_unit_info (low)

The following table shows the por_cxla_unit_info lower register bit assignments.

Table 3-1255 por_cxla_unit_info (low)

Bits	Field name	Description	Type	Reset
31:22	Reserved	Reserved	RO	-
21:16	db_fifo_depth	FIFO Depth in CXLA Domain Bridges - CXDB, PDB	RO	Configuration dependent
15	Reserved	Reserved	RO	-
14:12	tlp_count_rx	Maximum number of TLPs supported by RX TLP buffer	RO	Configuration dependent
11	Reserved	Reserved	RO	-
10:8	tlp_count_tx	Maximum number of TLPs supported by TX TLP buffer	RO	Configuration dependent

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Table 3-1255 por_cxla_unit_info (low) (continued)

Bits	Field name	Description	Type	Reset
7:5	Reserved	Reserved	RO	-
4:1	db_lcrd_count	Number of flit credits between CXG and CXLA	RO	Configuration dependent
0	db_present	DB present in CXLA	RO	Configuration dependent

por_cxla_aux_ctl

Functions as the auxiliary control register for CXLA.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hA08

Register reset 1'b1

Usage constraints Only accessible by secure accesses. This register can be modified only with prior written permission from Arm.

The following image shows the higher register bit assignments.

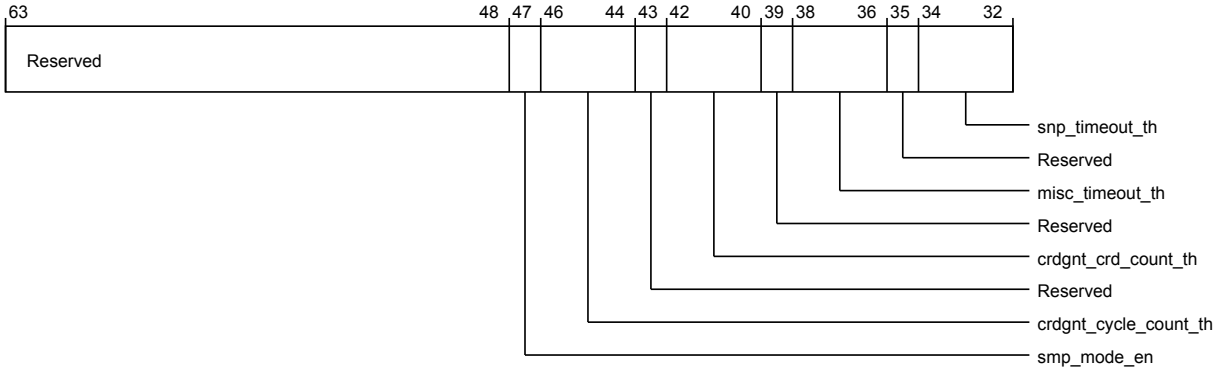

Figure 3-1242 por_cxla_aux_ctl (high)

The following table shows the por_cxla_aux_ctl higher register bit assignments.

Table 3-1256 por_cxla_aux_ctl (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47	smp_mode_en	When set, enables Symmetric Multiprocessor Mode (SMP) Mode.	RW	1'b1

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Table 3-1256 por_cxla_aux_ctl (high) (continued)

Bits	Field name	Description	Type	Reset
46:44	crdgnt_cycle_count_th	Maximum number of cycles that need to be elapsed since the end of previous TLP to send a credit grant message 3'b000: 32 cycles 3'b001: 64 cycles 3'b010: 128 cycles 3'b011: 256 cycles	RW	3'b010
43	Reserved	Reserved	RO	-
42:40	crdgnt_crd_count_th	Maximum number of credits that need to be accumulated to send a credit grant message 3'b000: 16 credits 3'b001: 32 credits 3'b010: 64 credits 3'b011: 128 credits	RW	3'b010
39	Reserved	Reserved	RO	-
38:36	misc_timeout_th	Maximum number of cycles a MISC message packed into a TLP waits to complete/end the TLP; applies for message packing 3'b000: same as idle_timeout_th 3'b001: 4 cycles 3'b010: 8 cycles 3'b011: 16 cycles 3'b100: 32 cycles	RW	3'b000
35	Reserved	Reserved	RO	-
34:32	snp_timeout_th	Maximum number of cycles a SNP message packed into a TLP waits to complete/end the TLP; applies for message packing 3'b000: same as idle_timeout_th 3'b001: 4 cycles 3'b010: 8 cycles 3'b011: 16 cycles 3'b100: 32 cycles	RW	3'b000

The following image shows the lower register bit assignments.

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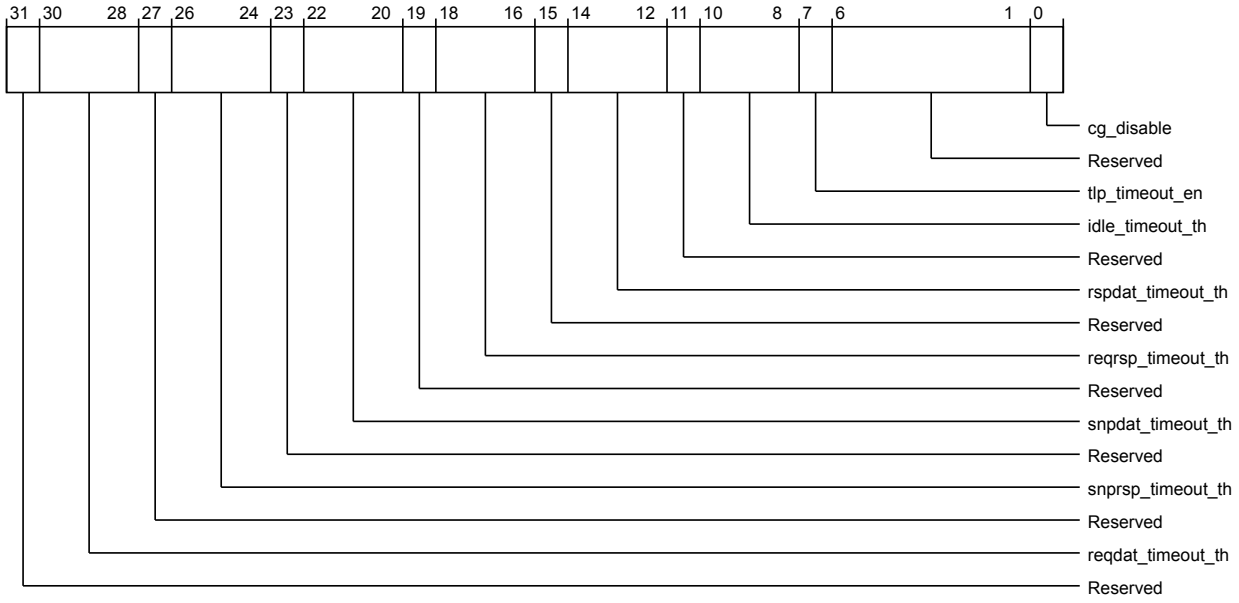

Figure 3-1243 por_cxla_aux_ctl (low)

The following table shows the por_cxla_aux_ctl lower register bit assignments.

Table 3-1257 por_cxla_aux_ctl (low)

Bits	Field name	Description	Type	Reset
31	Reserved	Reserved	RO	-
30:28	reqdat_timeout_th	Maximum number of cycles a REQDAT message packed into a TLP waits to complete/end the TLP; applies for message packing 3'b000: same as idle_timeout_th 3'b001: 4 cycles 3'b010: 8 cycles 3'b011: 16 cycles 3'b100: 32 cycles	RW	3'b000
27	Reserved	Reserved	RO	-
26:24	snprsp_timeout_th	Maximum number of cycles a SNPRSP message packed into a TLP waits to complete/end the TLP; applies for message packing 3'b000: same as idle_timeout_th 3'b001: 4 cycles 3'b010: 8 cycles 3'b011: 16 cycles 3'b100: 32 cycles	RW	3'b000
23	Reserved	Reserved	RO	-

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Table 3-1257 por_cxla_aux_ctl (low) (continued)

Bits	Field name	Description	Type	Reset
22:20	snpdat_timeout_th	Maximum number of cycles a SNPDAT message packed into a TLP waits to complete/end the TLP; applies for message packing 3'b000: same as idle_timeout_th 3'b001: 4 cycles 3'b010: 8 cycles 3'b011: 16 cycles 3'b100: 32 cycles	RW	3'b000
19	Reserved	Reserved	RO	-
18:16	reqrsp_timeout_th	Maximum number of cycles a REQRSP message packed into a TLP waits to complete/end the TLP; applies for message packing 3'b000: same as idle_timeout_th 3'b001: 4 cycles 3'b010: 8 cycles 3'b011: 16 cycles 3'b100: 32 cycles	RW	3'b000
15	Reserved	Reserved	RO	-
14:12	rspdat_timeout_th	Maximum number of cycles a RSPDAT message packed into a TLP waits to complete/end the TLP; applies for message packing 3'b000: same as idle_timeout_th 3'b001: 4 cycles 3'b010: 8 cycles 3'b011: 16 cycles 3'b100: 32 cycles	RW	3'b000
11	Reserved	Reserved	RO	-
10:8	idle_timeout_th	Maximum number of idle cycles a TLP waits for a message to pack to complete/end the TLP; applies for message packing 3'b000: 4 cycles 3'b001: 8 cycles 3'b010: 16 cycles 3'b011: 32 cycles	RW	3'b001
7	tlp_timeout_en	Enables TLP timeout based on thresholds set for each message type; doesn't apply for idle timeout; applies for message packing	RW	1'b1
6:1	Reserved	Reserved	RO	-
0	cg_disable	Disables CXLA architectural clock gates	RW	1'b0

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por_cxla_ccix_prop_capabilities

Contains CCIX-supported properties.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'hC00
Register reset Configuration dependent
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

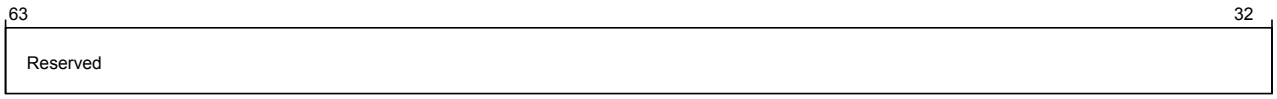

Figure 3-1244 por_cxla_ccix_prop_capabilities (high)

The following table shows the por_cxla_ccix_prop_capabilities higher register bit assignments.

Table 3-1258 por_cxla_ccix_prop_capabilities (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

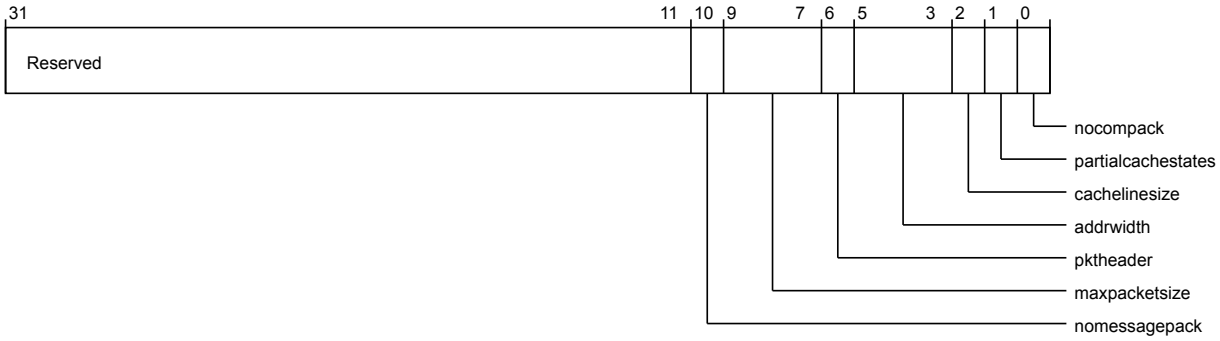

Figure 3-1245 por_cxla_ccix_prop_capabilities (low)

The following table shows the por_cxla_ccix_prop_capabilities lower register bit assignments.

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Table 3-1259 por_cxla_ccix_prop_capabilities (low)

Bits	Field name	Description	Type	Reset
31:11	Reserved	Reserved	RO	-
10	nomessagepack	No message packing only supported 1'b0: False 1'b1: True	RO	1'b1
9:7	maxpacketsize	Maximum packet size supported 3'b000: 128B 3'b001: 256B 3'b010: 512B	RO	3'b010
6	pktheader	Packet header supported 1'b0: PCIe compatible header 1'b1: Optimized header	RO	1'b0
5:3	addrwidth	Address width supported 3'b000: 48b 3'b001: 52b 3'b010: 56b 3'b011: 60b 3'b100: 64b	RO	3'b000
2	cachelinesize	Cacheline size supported 1'b0: 64B 1'b1: 128B	RO	1'b0
1	partialcachestates	Partial cache states supported 1'b0: False 1'b1: True	RO	1'b0
0	nocompack	No CompAck supported 1'b0: False 1'b1: True	RO	1'b0

por_cxla_ccix_prop_configured

Contains CCIX-configured properties.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hC08
Register reset 64'b10000000000

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Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

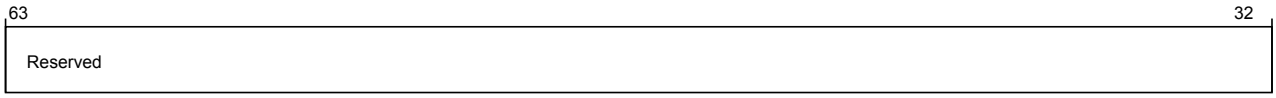

Figure 3-1246 por_cxla_ccix_prop_configured (high)

The following table shows the por_cxla_ccix_prop_configured higher register bit assignments.

Table 3-1260 por_cxla_ccix_prop_configured (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

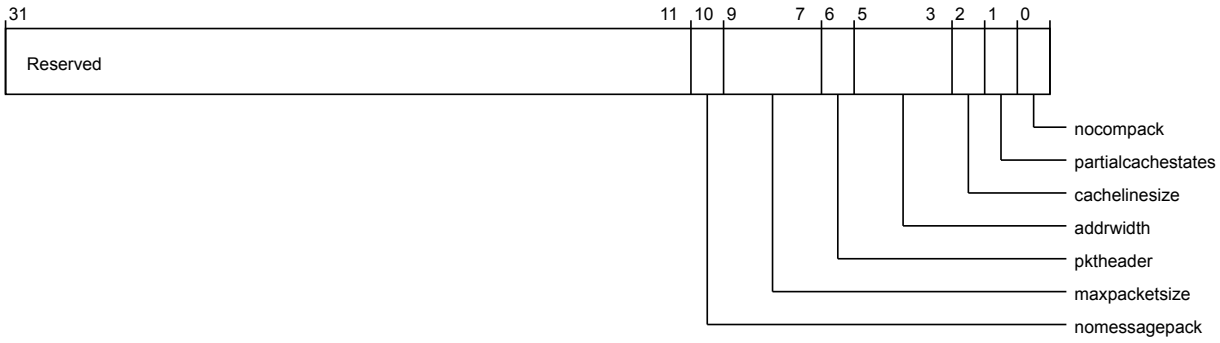

Figure 3-1247 por_cxla_ccix_prop_configured (low)

The following table shows the por_cxla_ccix_prop_configured lower register bit assignments.

Table 3-1261 por_cxla_ccix_prop_configured (low)

Bits	Field name	Description	Type	Reset
31:11	Reserved	Reserved	RO	-
10	nomessagepack	No message packing configured 1'b0: False 1'b1: True	RW	1'b1
9:7	maxpacketsize	Maximum packet size configured 3'b000: 128B 3'b001: 256B 3'b010: 512B	RW	3'b000

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Table 3-1261 por_cxla_ccix_prop_configured (low) (continued)

Bits	Field name	Description	Type	Reset
6	pktheader	Packet header configured 1'b0: PCIe compatible header 1'b1: Optimized header	RW	1'b0
5:3	addrwidth	Address width configured 3'b000: 48b 3'b001: 52b 3'b010: 56b 3'b011: 60b 3'b100: 64b	RW	3'b000
2	cachelinesize	CacheLine size configured 1'b0: 64B 1'b1: 128B	RW	1'b0
1	partialcachestates	Partial cache states configured 1'b0: False 1'b1: True	RW	1'b0
0	nocompack	No CompAck configured 1'b0: False 1'b1: True	RW	1'b0

por_cxla_tx_cxs_attr_capabilities

Contains TX CXS supported attributes.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'hC10
Register reset Configuration dependent
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

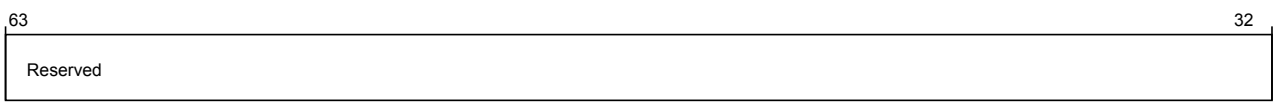

Figure 3-1248 por_cxla_tx_cxs_attr_capabilities (high)

The following table shows the por_cxla_tx_cxs_attr_capabilities higher register bit assignments.

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Table 3-1262 por_cxla_tx_cxs_attr_capabilities (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

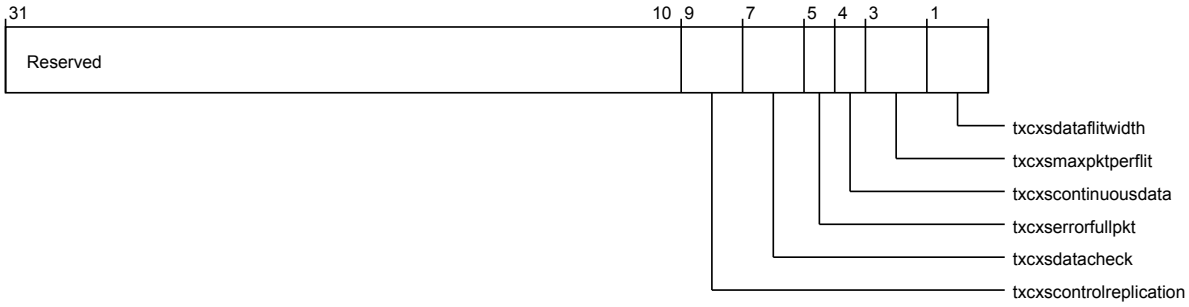

Figure 3-1249 por_cxla_tx_cxs_attr_capabilities (low)

The following table shows the por_cxla_tx_cxs_attr_capabilities lower register bit assignments.

Table 3-1263 por_cxla_tx_cxs_attr_capabilities (low)

Bits	Field name	Description	Type	Reset
31:10	Reserved	Reserved	RO	-
9:8	txcxscontrolreplication	TX CXS control replication supported 2'b00: None 2'b01: Duplicate 2'b10: Triplicate	RO	2'b00
7:6	txcxsdatacheck	TX CXS datacheck supported 2'b00: None 2'b01: Parity 2'b10: SECDED	RO	2'b00
5	txcxserrorfullpkt	TX CXS error full packet supported 1'b0: False 1'b1: True	RO	1'b1
4	txcxscontinuousdata	TX CXS continuous data supported 1'b0: False 1'b1: True	RO	1'b1

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Table 3-1263 por_cxla_tx_cxs_attr_capabilities (low) (continued)

Bits	Field name	Description	Type	Reset
3:2	txcxsmaxpktperflit	TX CXS maximum packets per flit supported 2'b00: 2 2'b01: 3 2'b10: 4	RO	2'b00
1:0	txcxsdataflitwidth	TX CXS data flit width supported 2'b00: 256b 2'b01: 512b 2'b10: 1024b	RO	2'b00

por_cxla_rx_cxs_attr_capabilities

Contains RX CXS supported attributes.

Its characteristics are:

Type RO
Register width (Bits) 64
Address offset 14'hC18
Register reset Configuration dependent
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

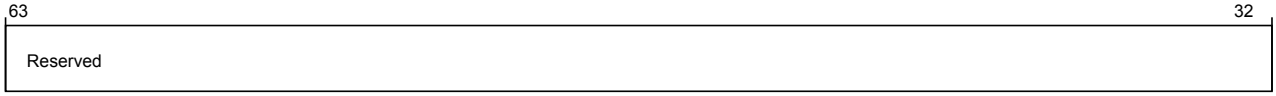

Figure 3-1250 por_cxla_rx_cxs_attr_capabilities (high)

The following table shows the por_cxla_rx_cxs_attr_capabilities higher register bit assignments.

Table 3-1264 por_cxla_rx_cxs_attr_capabilities (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

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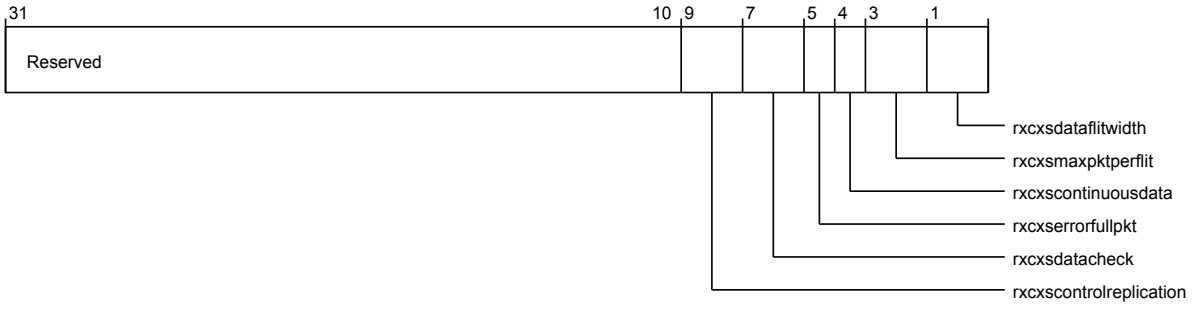

Figure 3-1251 por_cxla_rx_cxs_attr_capabilities (low)

The following table shows the por_cxla_rx_cxs_attr_capabilities lower register bit assignments.

Table 3-1265 por_cxla_rx_cxs_attr_capabilities (low)

Bits	Field name	Description	Type	Reset
31:10	Reserved	Reserved	RO	-
9:8	rxcxscontrolreplication	RX CXS control replication supported 2'b00: None 2'b01: Duplicate 2'b10: Triplicate	RO	2'b00
7:6	rxcxsdatacheck	RX CXS datacheck supported 2'b00: None 2'b01: Parity 2'b10: SECDED	RO	2'b00
5	rxcxserrorfullpkt	RX CXS error full packet supported 1'b0: False 1'b1: True	RO	1'b1
4	rxcxscontinuousdata	RX CXS continuous data supported 1'b0: False 1'b1: True	RO	1'b0
3:2	rxcxsmaxpktperflit	RX CXS maximum packets per flit supported 2'b00: 2 2'b01: 3 2'b10: 4	RO	2'b00
1:0	rxcxsdataflitwidth	RX CXS data flit width supported 2'b00: 256b 2'b01: 512b 2'b10: 1024b	RO	2'b00

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por_cxla_agentid_to_linkid_reg0

Specifies the mapping of Agent ID to Link ID for Agent IDs 0 to 7.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC30

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxla_secure_register_groups_override.linkid_ctl

The following image shows the higher register bit assignments.

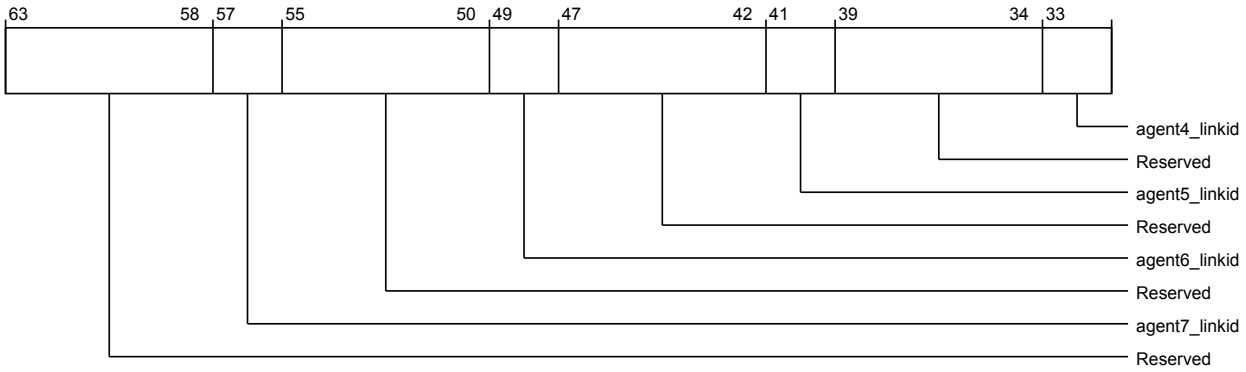

Figure 3-1252 por_cxla_agentid_to_linkid_reg0 (high)

The following table shows the por_cxla_agentid_to_linkid_reg0 higher register bit assignments.

Table 3-1266 por_cxla_agentid_to_linkid_reg0 (high)

Bits	Field name	Description	Type	Reset
63:58	Reserved	Reserved	RO	-
57:56	agent7_linkid	Specifies the Link ID for Agent ID 7	RW	2'h0
55:50	Reserved	Reserved	RO	-
49:48	agent6_linkid	Specifies the Link ID for Agent ID 6	RW	2'h0
47:42	Reserved	Reserved	RO	-
41:40	agent5_linkid	Specifies the Link ID for Agent ID 5	RW	2'h0
39:34	Reserved	Reserved	RO	-
33:32	agent4_linkid	Specifies the Link ID for Agent ID 4	RW	2'h0

The following image shows the lower register bit assignments.

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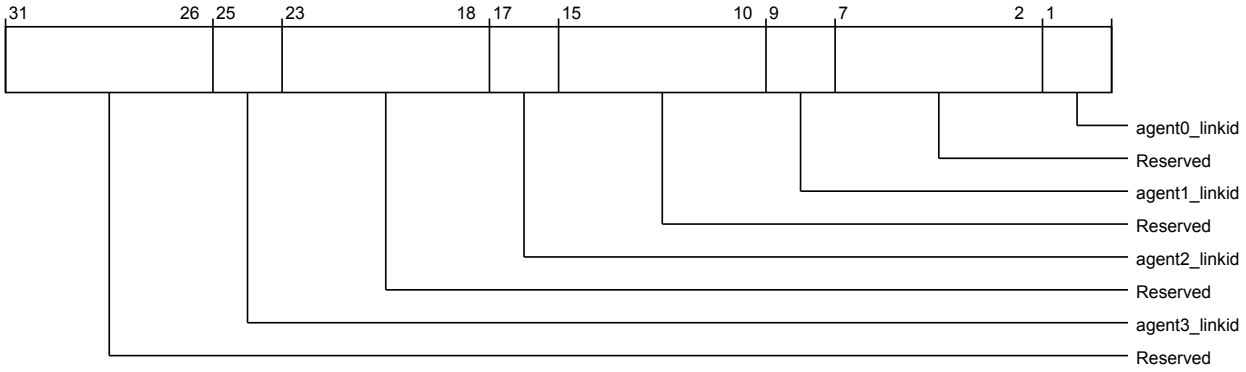

Figure 3-1253 por_cxla_agentid_to_linkid_reg0 (low)

The following table shows the por_cxla_agentid_to_linkid_reg0 lower register bit assignments.

Table 3-1267 por_cxla_agentid_to_linkid_reg0 (low)

Bits	Field name	Description	Type	Reset
31:26	Reserved	Reserved	RO	-
25:24	agent3_linkid	Specifies the Link ID for Agent ID 3	RW	2'h0
23:18	Reserved	Reserved	RO	-
17:16	agent2_linkid	Specifies the Link ID for Agent ID 2	RW	2'h0
15:10	Reserved	Reserved	RO	-
9:8	agent1_linkid	Specifies the Link ID for Agent ID 1	RW	2'h0
7:2	Reserved	Reserved	RO	-
1:0	agent0_linkid	Specifies the Link ID for Agent ID 0	RW	2'h0

por_cxla_agentid_to_linkid_reg1

Specifies the mapping of Agent ID to Link ID for Agent IDs 8 to 15.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC38

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxla_secure_register_groups_override.linkid_ctl

The following image shows the higher register bit assignments.

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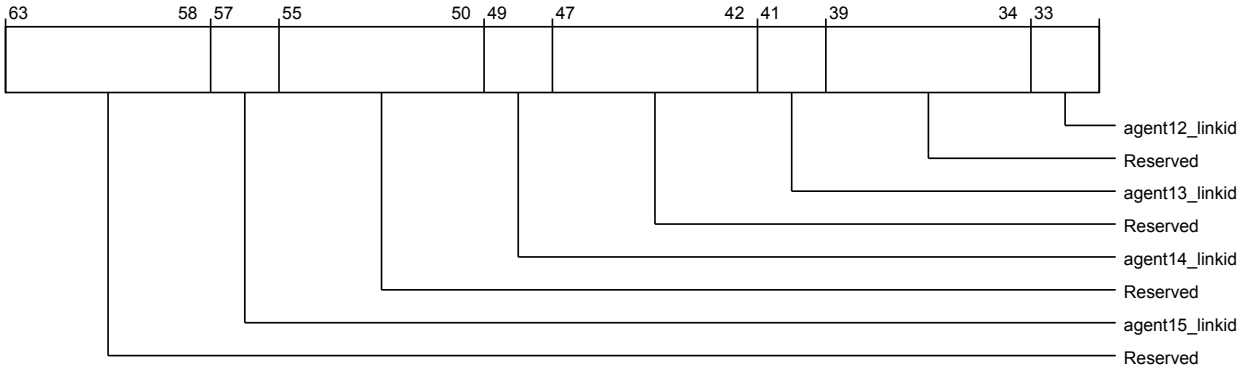

Figure 3-1254 por_cxla_agentid_to_linkid_reg1 (high)

The following table shows the por_cxla_agentid_to_linkid_reg1 higher register bit assignments.

Table 3-1268 por_cxla_agentid_to_linkid_reg1 (high)

Bits	Field name	Description	Type	Reset
63:58	Reserved	Reserved	RO	-
57:56	agent15_linkid	Specifies the Link ID for Agent ID 15	RW	2'h0
55:50	Reserved	Reserved	RO	-
49:48	agent14_linkid	Specifies the Link ID for Agent ID 14	RW	2'h0
47:42	Reserved	Reserved	RO	-
41:40	agent13_linkid	Specifies the Link ID for Agent ID 13	RW	2'h0
39:34	Reserved	Reserved	RO	-
33:32	agent12_linkid	Specifies the Link ID for Agent ID 12	RW	2'h0

The following image shows the lower register bit assignments.

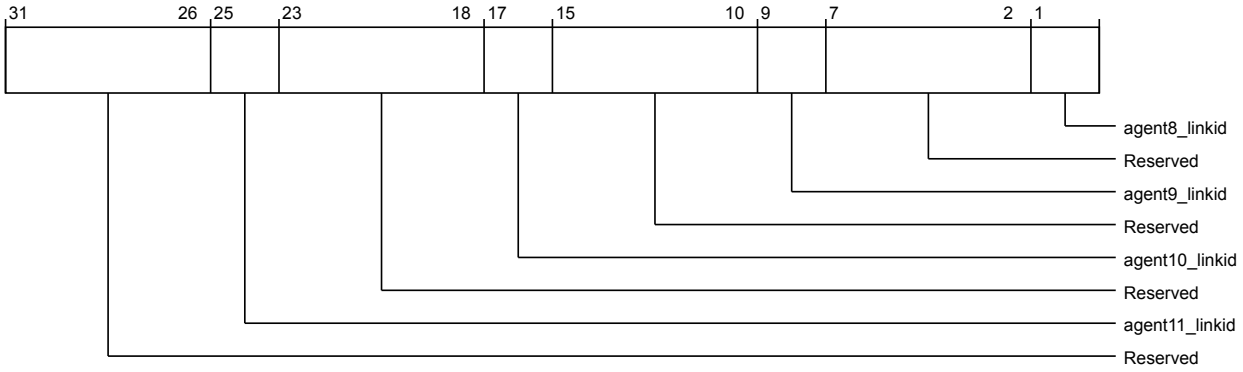

Figure 3-1255 por_cxla_agentid_to_linkid_reg1 (low)

The following table shows the por_cxla_agentid_to_linkid_reg1 lower register bit assignments.

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Table 3-1269 por_cxla_agentid_to_linkid_reg1 (low)

Bits	Field name	Description	Type	Reset
31:26	Reserved	Reserved	RO	-
25:24	agent11_linkid	Specifies the Link ID for Agent ID 11	RW	2'h0
23:18	Reserved	Reserved	RO	-
17:16	agent10_linkid	Specifies the Link ID for Agent ID 10	RW	2'h0
15:10	Reserved	Reserved	RO	-
9:8	agent9_linkid	Specifies the Link ID for Agent ID 9	RW	2'h0
7:2	Reserved	Reserved	RO	-
1:0	agent8_linkid	Specifies the Link ID for Agent ID 8	RW	2'h0

por_cxla_agentid_to_linkid_reg2

Specifies the mapping of Agent ID to Link ID for Agent IDs 16 to 23.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC40

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxla_secure_register_groups_override.linkid_ctl

The following image shows the higher register bit assignments.

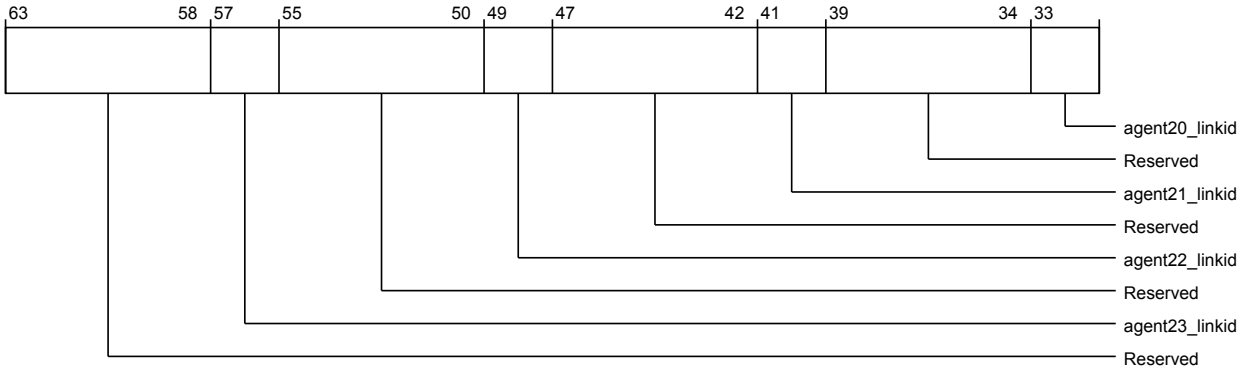

Figure 3-1256 por_cxla_agentid_to_linkid_reg2 (high)

The following table shows the por_cxla_agentid_to_linkid_reg2 higher register bit assignments.

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Table 3-1270 por_cxla_agentid_to_linkid_reg2 (high)

Bits	Field name	Description	Type	Reset
63:58	Reserved	Reserved	RO	-
57:56	agent23_linkid	Specifies the Link ID for Agent ID 23	RW	2'h0
55:50	Reserved	Reserved	RO	-
49:48	agent22_linkid	Specifies the Link ID for Agent ID 22	RW	2'h0
47:42	Reserved	Reserved	RO	-
41:40	agent21_linkid	Specifies the Link ID for Agent ID 21	RW	2'h0
39:34	Reserved	Reserved	RO	-
33:32	agent20_linkid	Specifies the Link ID for Agent ID 20	RW	2'h0

The following image shows the lower register bit assignments.

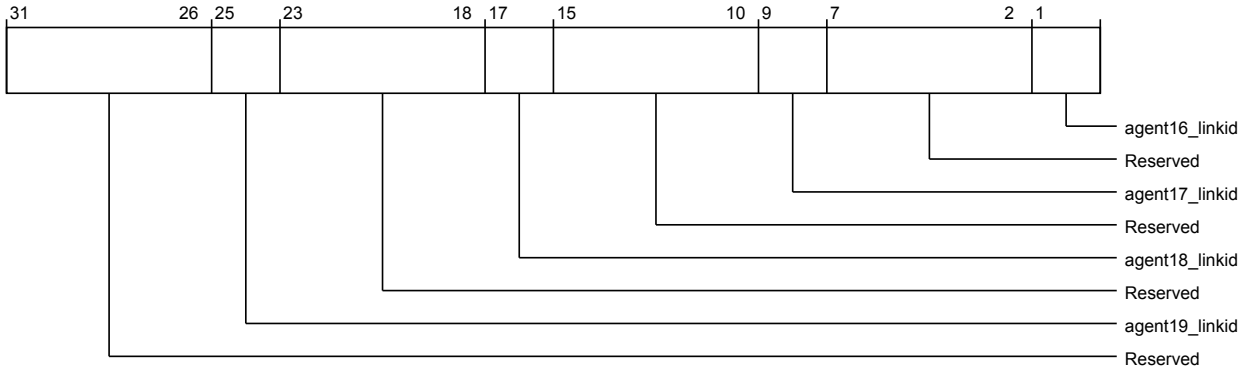

Figure 3-1257 por_cxla_agentid_to_linkid_reg2 (low)

The following table shows the por_cxla_agentid_to_linkid_reg2 lower register bit assignments.

Table 3-1271 por_cxla_agentid_to_linkid_reg2 (low)

Bits	Field name	Description	Type	Reset
31:26	Reserved	Reserved	RO	-
25:24	agent19_linkid	Specifies the Link ID for Agent ID 19	RW	2'h0
23:18	Reserved	Reserved	RO	-
17:16	agent18_linkid	Specifies the Link ID for Agent ID 18	RW	2'h0
15:10	Reserved	Reserved	RO	-
9:8	agent17_linkid	Specifies the Link ID for Agent ID 17	RW	2'h0
7:2	Reserved	Reserved	RO	-
1:0	agent16_linkid	Specifies the Link ID for Agent ID 16	RW	2'h0

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por_cxla_agentid_to_linkid_reg3

Specifies the mapping of Agent ID to Link ID for Agent IDs 24 to 31.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC48

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxla_secure_register_groups_override.linkid_ctl

The following image shows the higher register bit assignments.

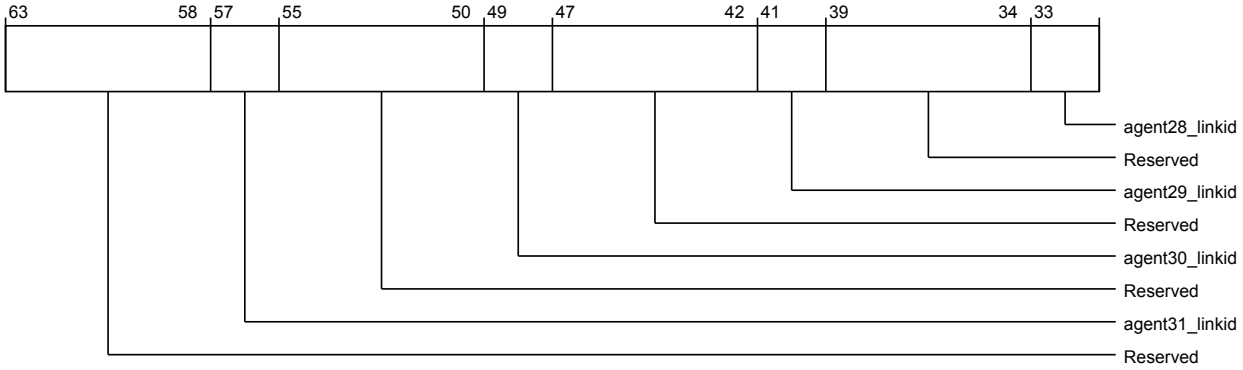

Figure 3-1258 por_cxla_agentid_to_linkid_reg3 (high)

The following table shows the por_cxla_agentid_to_linkid_reg3 higher register bit assignments.

Table 3-1272 por_cxla_agentid_to_linkid_reg3 (high)

Bits	Field name	Description	Type	Reset
63:58	Reserved	Reserved	RO	-
57:56	agent31_linkid	Specifies the Link ID for Agent ID 31	RW	2'h0
55:50	Reserved	Reserved	RO	-
49:48	agent30_linkid	Specifies the Link ID for Agent ID 30	RW	2'h0
47:42	Reserved	Reserved	RO	-
41:40	agent29_linkid	Specifies the Link ID for Agent ID 29	RW	2'h0
39:34	Reserved	Reserved	RO	-
33:32	agent28_linkid	Specifies the Link ID for Agent ID 28	RW	2'h0

The following image shows the lower register bit assignments.

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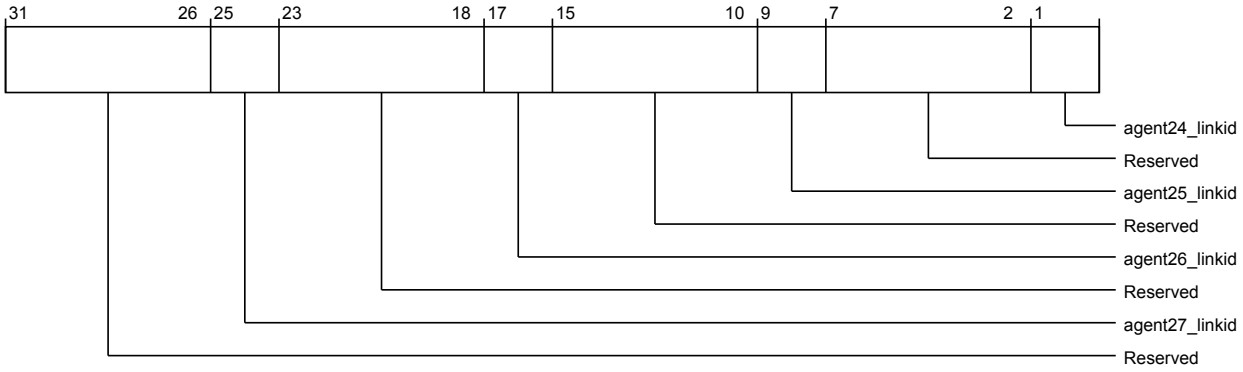

Figure 3-1259 por_cxla_agentid_to_linkid_reg3 (low)

The following table shows the por_cxla_agentid_to_linkid_reg3 lower register bit assignments.

Table 3-1273 por_cxla_agentid_to_linkid_reg3 (low)

Bits	Field name	Description	Type	Reset
31:26	Reserved	Reserved	RO	-
25:24	agent27_linkid	Specifies the Link ID for Agent ID 27	RW	2'h0
23:18	Reserved	Reserved	RO	-
17:16	agent26_linkid	Specifies the Link ID for Agent ID 26	RW	2'h0
15:10	Reserved	Reserved	RO	-
9:8	agent25_linkid	Specifies the Link ID for Agent ID 25	RW	2'h0
7:2	Reserved	Reserved	RO	-
1:0	agent24_linkid	Specifies the Link ID for Agent ID 24	RW	2'h0

por_cxla_agentid_to_linkid_reg4

Specifies the mapping of Agent ID to Link ID for Agent IDs 32 to 39.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC50

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxla_secure_register_groups_override.linkid_ctl

The following image shows the higher register bit assignments.

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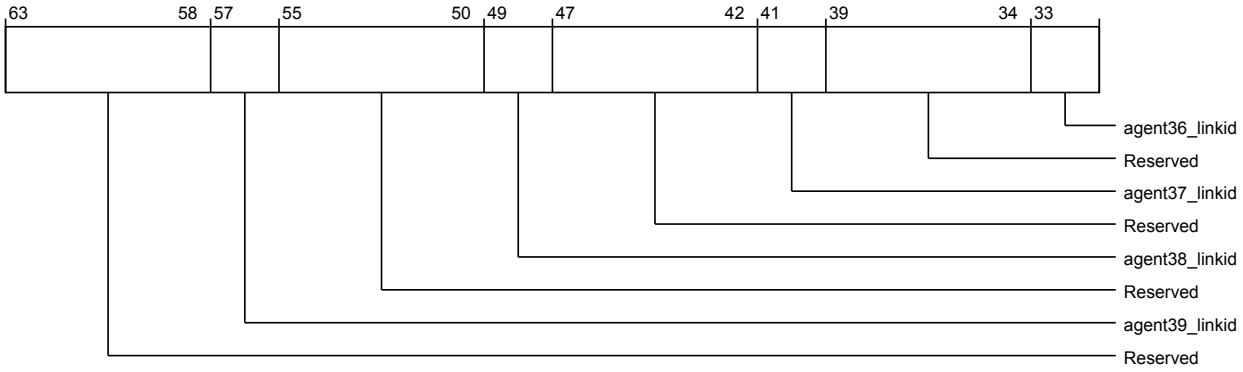

Figure 3-1260 por_cxla_agentid_to_linkid_reg4 (high)

The following table shows the por_cxla_agentid_to_linkid_reg4 higher register bit assignments.

Table 3-1274 por_cxla_agentid_to_linkid_reg4 (high)

Bits	Field name	Description	Type	Reset
63:58	Reserved	Reserved	RO	-
57:56	agent39_linkid	Specifies the Link ID for Agent ID 39	RW	2'h0
55:50	Reserved	Reserved	RO	-
49:48	agent38_linkid	Specifies the Link ID for Agent ID 38	RW	2'h0
47:42	Reserved	Reserved	RO	-
41:40	agent37_linkid	Specifies the Link ID for Agent ID 37	RW	2'h0
39:34	Reserved	Reserved	RO	-
33:32	agent36_linkid	Specifies the Link ID for Agent ID 36	RW	2'h0

The following image shows the lower register bit assignments.

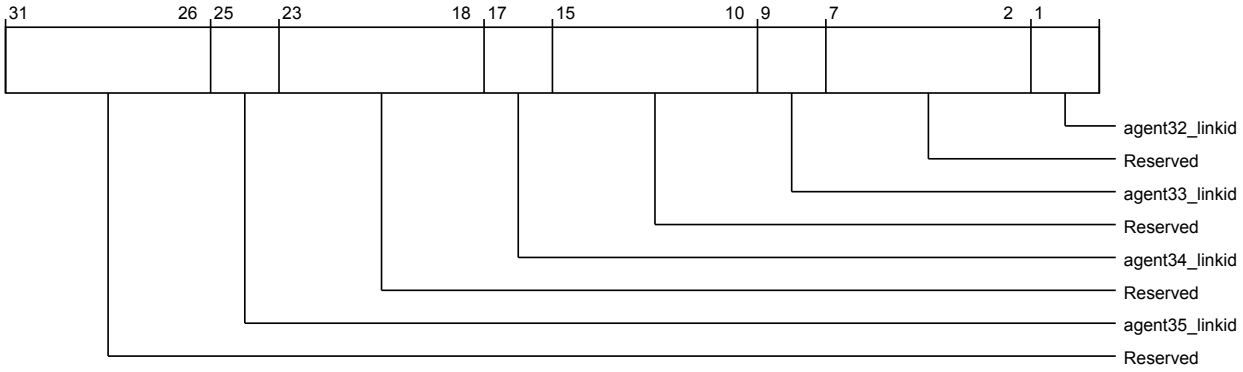

Figure 3-1261 por_cxla_agentid_to_linkid_reg4 (low)

The following table shows the por_cxla_agentid_to_linkid_reg4 lower register bit assignments.

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Table 3-1275 por_cxla_agentid_to_linkid_reg4 (low)

Bits	Field name	Description	Type	Reset
31:26	Reserved	Reserved	RO	-
25:24	agent35_linkid	Specifies the Link ID for Agent ID 35	RW	2'h0
23:18	Reserved	Reserved	RO	-
17:16	agent34_linkid	Specifies the Link ID for Agent ID 34	RW	2'h0
15:10	Reserved	Reserved	RO	-
9:8	agent33_linkid	Specifies the Link ID for Agent ID 33	RW	2'h0
7:2	Reserved	Reserved	RO	-
1:0	agent32_linkid	Specifies the Link ID for Agent ID 32	RW	2'h0

por_cxla_agentid_to_linkid_reg5

Specifies the mapping of Agent ID to Link ID for Agent IDs 40 to 47.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC58

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxla_secure_register_groups_override.linkid_ctl

The following image shows the higher register bit assignments.

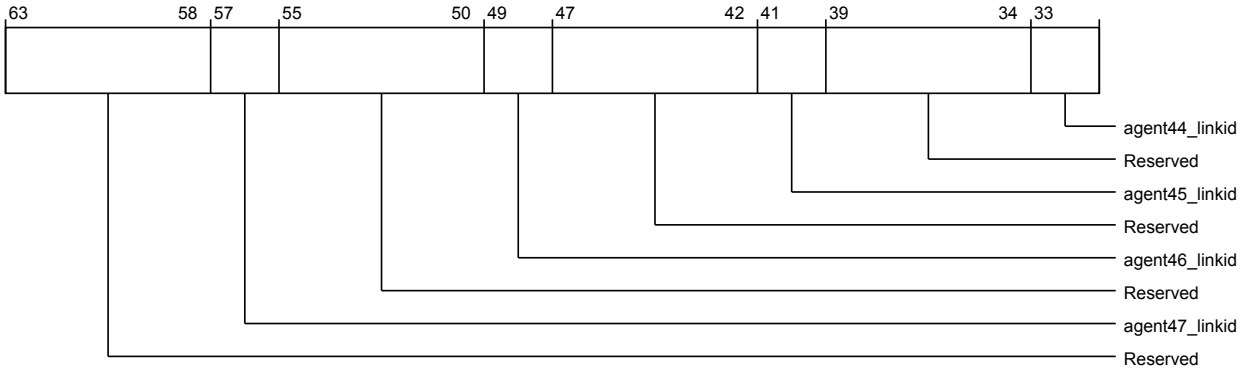

Figure 3-1262 por_cxla_agentid_to_linkid_reg5 (high)

The following table shows the por_cxla_agentid_to_linkid_reg5 higher register bit assignments.

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Table 3-1276 por_cxla_agentid_to_linkid_reg5 (high)

Bits	Field name	Description	Type	Reset
63:58	Reserved	Reserved	RO	-
57:56	agent47_linkid	Specifies the Link ID for Agent ID 47	RW	2'h0
55:50	Reserved	Reserved	RO	-
49:48	agent46_linkid	Specifies the Link ID for Agent ID 46	RW	2'h0
47:42	Reserved	Reserved	RO	-
41:40	agent45_linkid	Specifies the Link ID for Agent ID 45	RW	2'h0
39:34	Reserved	Reserved	RO	-
33:32	agent44_linkid	Specifies the Link ID for Agent ID 44	RW	2'h0

The following image shows the lower register bit assignments.

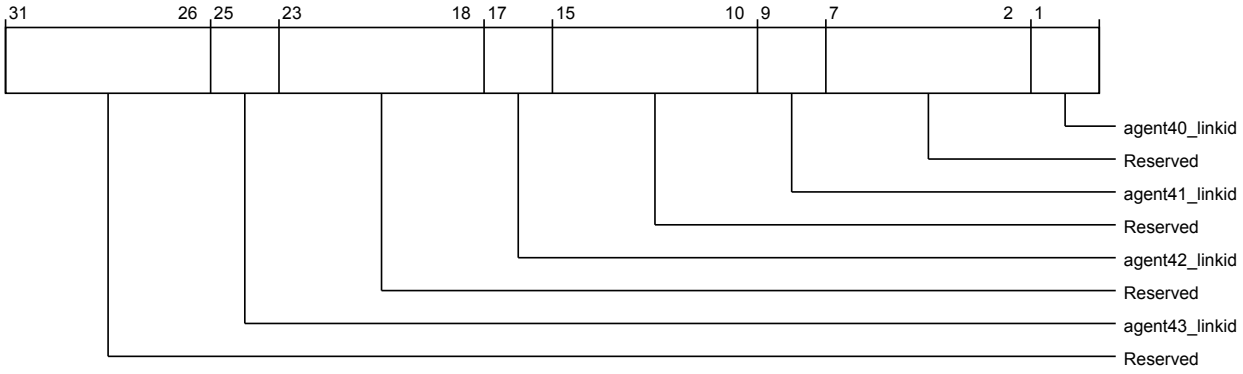

Figure 3-1263 por_cxla_agentid_to_linkid_reg5 (low)

The following table shows the por_cxla_agentid_to_linkid_reg5 lower register bit assignments.

Table 3-1277 por_cxla_agentid_to_linkid_reg5 (low)

Bits	Field name	Description	Type	Reset
31:26	Reserved	Reserved	RO	-
25:24	agent43_linkid	Specifies the Link ID for Agent ID 43	RW	2'h0
23:18	Reserved	Reserved	RO	-
17:16	agent42_linkid	Specifies the Link ID for Agent ID 42	RW	2'h0
15:10	Reserved	Reserved	RO	-
9:8	agent41_linkid	Specifies the Link ID for Agent ID 41	RW	2'h0
7:2	Reserved	Reserved	RO	-
1:0	agent40_linkid	Specifies the Link ID for Agent ID 40	RW	2'h0

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por_cxla_agentid_to_linkid_reg6

Specifies the mapping of Agent ID to Link ID for Agent IDs 48 to 55.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC60

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxla_secure_register_groups_override.linkid_ctl

The following image shows the higher register bit assignments.

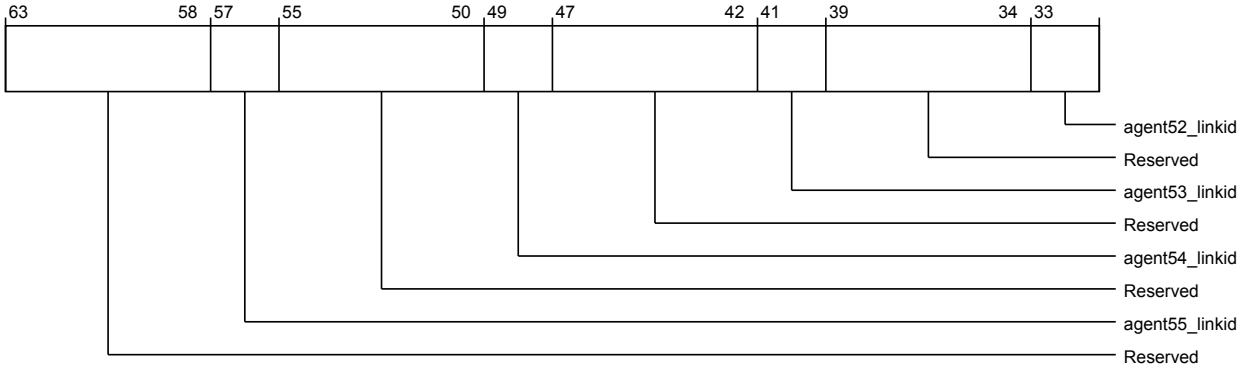

Figure 3-1264 por_cxla_agentid_to_linkid_reg6 (high)

The following table shows the por_cxla_agentid_to_linkid_reg6 higher register bit assignments.

Table 3-1278 por_cxla_agentid_to_linkid_reg6 (high)

Bits	Field name	Description	Type	Reset
63:58	Reserved	Reserved	RO	-
57:56	agent55_linkid	Specifies the Link ID for Agent ID 55	RW	2'h0
55:50	Reserved	Reserved	RO	-
49:48	agent54_linkid	Specifies the Link ID for Agent ID 54	RW	2'h0
47:42	Reserved	Reserved	RO	-
41:40	agent53_linkid	Specifies the Link ID for Agent ID 53	RW	2'h0
39:34	Reserved	Reserved	RO	-
33:32	agent52_linkid	Specifies the Link ID for Agent ID 52	RW	2'h0

The following image shows the lower register bit assignments.

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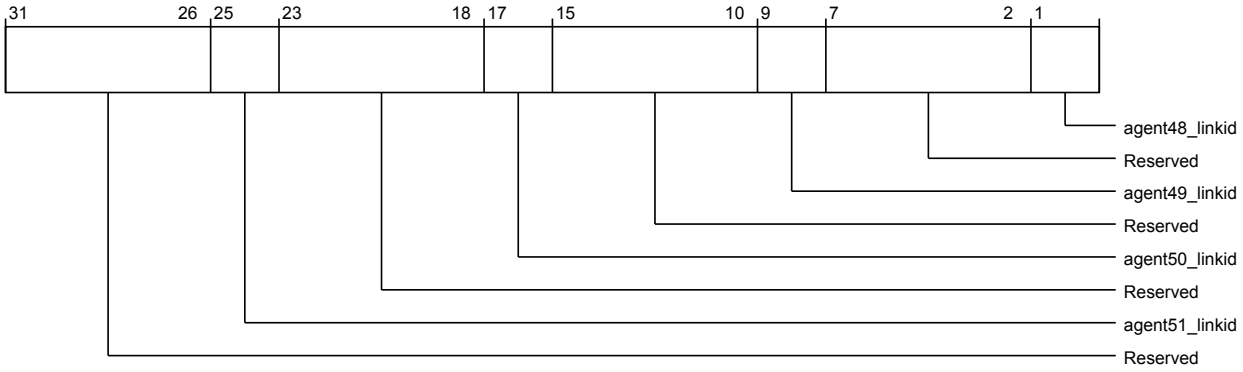

Figure 3-1265 por_cxla_agentid_to_linkid_reg6 (low)

The following table shows the por_cxla_agentid_to_linkid_reg6 lower register bit assignments.

Table 3-1279 por_cxla_agentid_to_linkid_reg6 (low)

Bits	Field name	Description	Type	Reset
31:26	Reserved	Reserved	RO	-
25:24	agent51_linkid	Specifies the Link ID for Agent ID 51	RW	2'h0
23:18	Reserved	Reserved	RO	-
17:16	agent50_linkid	Specifies the Link ID for Agent ID 50	RW	2'h0
15:10	Reserved	Reserved	RO	-
9:8	agent49_linkid	Specifies the Link ID for Agent ID 49	RW	2'h0
7:2	Reserved	Reserved	RO	-
1:0	agent48_linkid	Specifies the Link ID for Agent ID 48	RW	2'h0

por_cxla_agentid_to_linkid_reg7

Specifies the mapping of Agent ID to Link ID for Agent IDs 56 to 63.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC68

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxla_secure_register_groups_override.linkid_ctl

The following image shows the higher register bit assignments.

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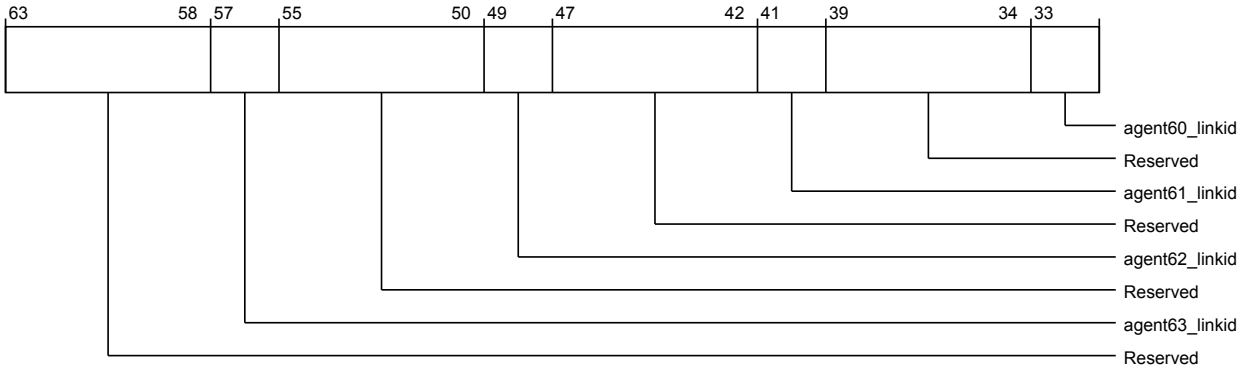

Figure 3-1266 por_cxla_agentid_to_linkid_reg7 (high)

The following table shows the por_cxla_agentid_to_linkid_reg7 higher register bit assignments.

Table 3-1280 por_cxla_agentid_to_linkid_reg7 (high)

Bits	Field name	Description	Type	Reset
63:58	Reserved	Reserved	RO	-
57:56	agent63_linkid	Specifies the Link ID for Agent ID 63	RW	2'h0
55:50	Reserved	Reserved	RO	-
49:48	agent62_linkid	Specifies the Link ID for Agent ID 62	RW	2'h0
47:42	Reserved	Reserved	RO	-
41:40	agent61_linkid	Specifies the Link ID for Agent ID 61	RW	2'h0
39:34	Reserved	Reserved	RO	-
33:32	agent60_linkid	Specifies the Link ID for Agent ID 60	RW	2'h0

The following image shows the lower register bit assignments.

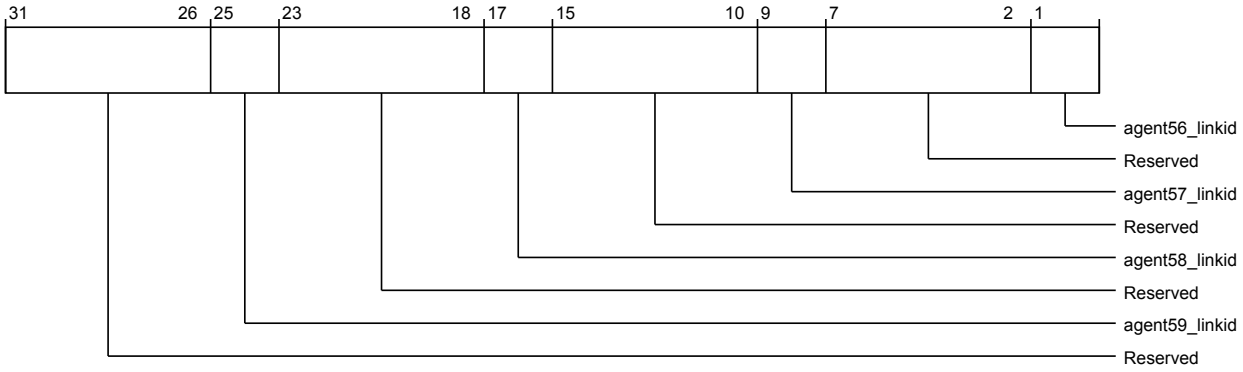

Figure 3-1267 por_cxla_agentid_to_linkid_reg7 (low)

The following table shows the por_cxla_agentid_to_linkid_reg7 lower register bit assignments.

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Table 3-1281 por_cxla_agentid_to_linkid_reg7 (low)

Bits	Field name	Description	Type	Reset
31:26	Reserved	Reserved	RO	-
25:24	agent59_linkid	Specifies the Link ID for Agent ID 59	RW	2'h0
23:18	Reserved	Reserved	RO	-
17:16	agent58_linkid	Specifies the Link ID for Agent ID 58	RW	2'h0
15:10	Reserved	Reserved	RO	-
9:8	agent57_linkid	Specifies the Link ID for Agent ID 57	RW	2'h0
7:2	Reserved	Reserved	RO	-
1:0	agent56_linkid	Specifies the Link ID for Agent ID 56	RW	2'h0

por_cxla_agentid_to_linkid_val

Specifies which Agent ID to Link ID mappings are valid.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hC70

Register reset 64'b0

Usage constraints Only accessible by secure accesses.

Secure group override por_cxla_secure_register_groups_override.linkid_ctl

The following image shows the higher register bit assignments.

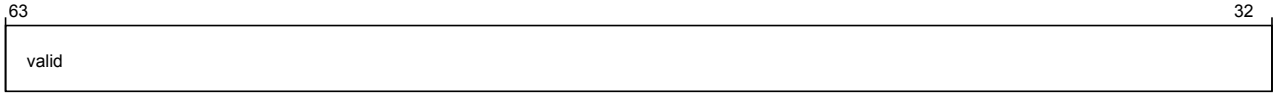

Figure 3-1268 por_cxla_agentid_to_linkid_val (high)

The following table shows the por_cxla_agentid_to_linkid_val higher register bit assignments.

Table 3-1282 por_cxla_agentid_to_linkid_val (high)

Bits	Field name	Description	Type	Reset
63:32	valid	Specifies whether the Link ID is valid; bit number corresponds to logical Agent ID number (from 0 to 63)	RW	63'h0

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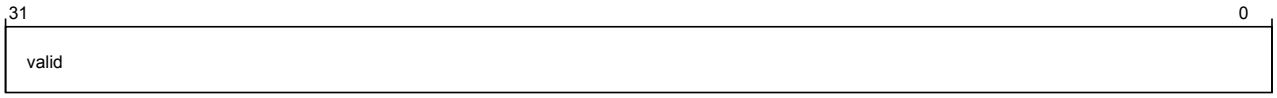

Figure 3-1269 por_cxla_agentid_to_linkid_val (low)

The following table shows the por_cxla_agentid_to_linkid_val lower register bit assignments.

Table 3-1283 por_cxla_agentid_to_linkid_val (low)

Bits	Field name	Description	Type	Reset
31:0	valid	Specifies whether the Link ID is valid; bit number corresponds to logical Agent ID number (from 0 to 63)	RW	63'h0

por_cxla_linkid_to_pcie_bus_num

Specifies the mapping of CCIX Link ID to PCIe bus number.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hC78
Register reset 64'b0
Usage constraints Only accessible by secure accesses.

The following image shows the higher register bit assignments.

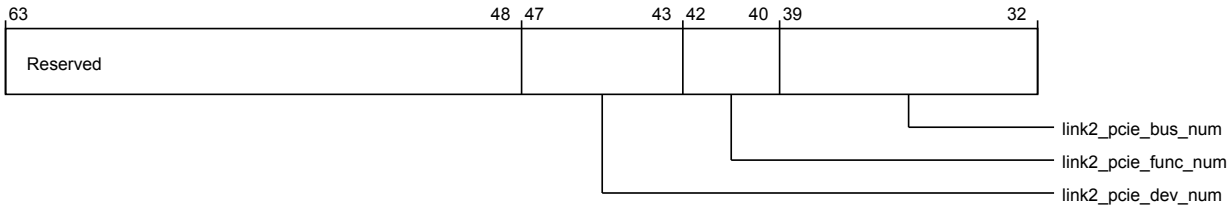

Figure 3-1270 por_cxla_linkid_to_pcie_bus_num (high)

The following table shows the por_cxla_linkid_to_pcie_bus_num higher register bit assignments.

Table 3-1284 por_cxla_linkid_to_pcie_bus_num (high)

Bits	Field name	Description	Type	Reset
63:48	Reserved	Reserved	RO	-
47:43	link2_pcie_dev_num	PCIe Device number for Link ID 2	RW	5'h00
42:40	link2_pcie_func_num	PCIe Function number for Link ID 2	RW	3'h0
39:32	link2_pcie_bus_num	PCIe bus number for Link ID 2	RW	8'h00

The following image shows the lower register bit assignments.

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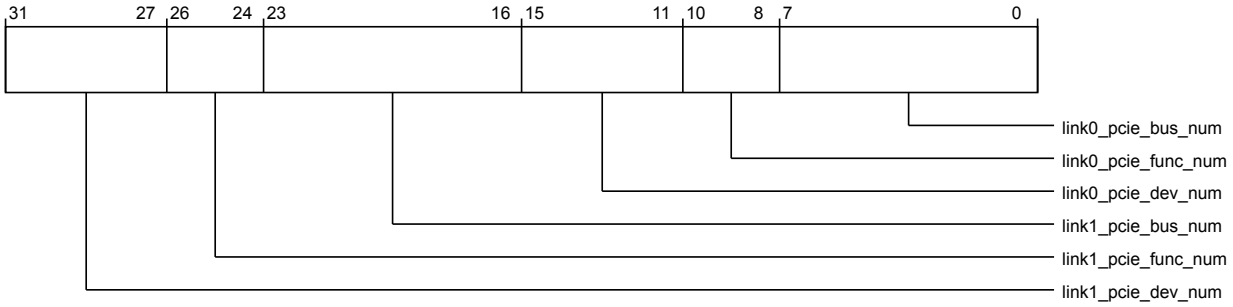

Figure 3-1271 por_cxla_linkid_to_pcie_bus_num (low)

The following table shows the por_cxla_linkid_to_pcie_bus_num lower register bit assignments.

Table 3-1285 por_cxla_linkid_to_pcie_bus_num (low)

Bits	Field name	Description	Type	Reset
31:27	link1_pcie_dev_num	PCIe Device number for Link ID 1	RW	5'h00
26:24	link1_pcie_func_num	PCIe Function number for Link ID 1	RW	3'h0
23:16	link1_pcie_bus_num	PCIe bus number for Link ID 1	RW	8'h00
15:11	link0_pcie_dev_num	PCIe Device number for Link ID 0	RW	5'h00
10:8	link0_pcie_func_num	PCIe Function number for Link ID 0	RW	3'h0
7:0	link0_pcie_bus_num	PCIe bus number for Link ID 0	RW	8'h00

por_cxla_tlp_hdr_fields

Configures TLP header field values.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 16'hC80
Register reset 64'b0111111100000000000000000001110010
Usage constraints Only accessible by Secure accesses. Writes to this register must occur prior to the first non-configuration access targeting the device.

The following figure shows the higher register bit assignments.

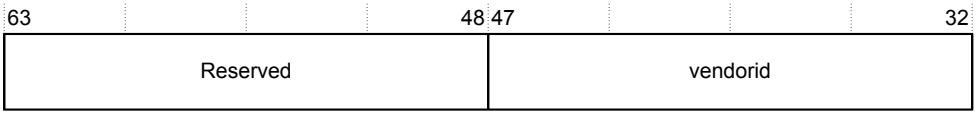

Figure 3-1272 por_cxla_tlp_hdr_fields (high)

The following table shows the por_cxla_tlp_hdr_fields higher register bit assignments.

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Table 3-1286 por_cxla_tlp_hdr_fields (high)

Bits	Field name	Description	Type	Reset
63:48	-	Reserved	RO	-
47:32	vendorid	Vendor ID	RW	16'b0

The following figure shows the lower register bit assignments.

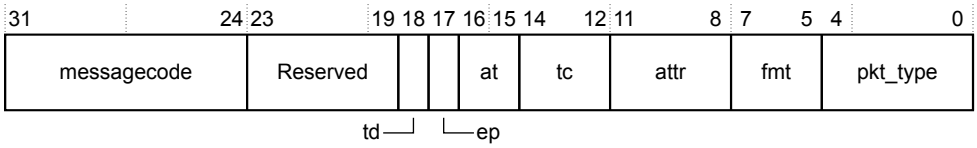

Figure 3-1273 por_cxla_tlp_hdr_fields (low)

The following table shows the por_cxla_tlp_hdr_fields lower register bit assignments.

Table 3-1287 por_cxla_tlp_hdr_fields (low)

Bits	Field name	Description	Type	Reset
31:24	messagecode	Message code	RW	8'b01111111
23:19	-	Reserved	RO	-
18	td	TLP digest	RW	1'b0
17	ep	Error forwarding	RW	1'b0
16:15	at	Address type	RW	2'b00
14:12	tc	Traffic class	RW	3'b000
11:8	attr	Attributes	RW	4'b0000
7:5	fmt	Format	RW	3'b011
4:0	pkt_type	Type	RW	5'b10010

por_cxla_permsg_pyld_0_63

Contains bits[63:0] of CCIX Protocol Error (PER) Message payload.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hD00
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

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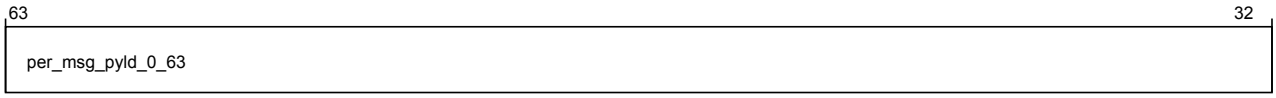

Figure 3-1274 por_cxla_permsg_pyld_0_63 (high)

The following table shows the por_cxla_permsg_pyld_0_63 higher register bit assignments.

Table 3-1288 por_cxla_permsg_pyld_0_63 (high)

Bits	Field name	Description	Type	Reset
63:32	per_msg_pyld_0_63	Protocol Error Msg Payload[63:0]	RW	64'b0

The following image shows the lower register bit assignments.

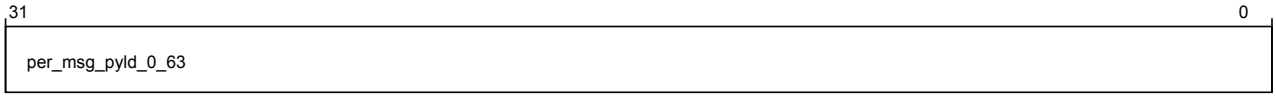

Figure 3-1275 por_cxla_permsg_pyld_0_63 (low)

The following table shows the por_cxla_permsg_pyld_0_63 lower register bit assignments.

Table 3-1289 por_cxla_permsg_pyld_0_63 (low)

Bits	Field name	Description	Type	Reset
31:0	per_msg_pyld_0_63	Protocol Error Msg Payload[63:0]	RW	64'b0

por_cxla_permsg_pyld_64_127

Contains bits[127:64] of CCIX Protocol Error (PER) Message payload.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hD08
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

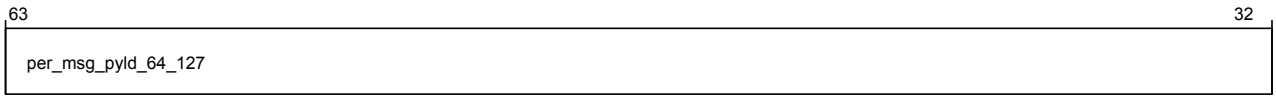

Figure 3-1276 por_cxla_permsg_pyld_64_127 (high)

The following table shows the por_cxla_permsg_pyld_64_127 higher register bit assignments.

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Table 3-1290 por_cxla_permsg_pyld_64_127 (high)

Bits	Field name	Description	Type	Reset
63:32	per_msg_pyld_64_127	Protocol Error Msg Payload[127:64]	RW	64'b0

The following image shows the lower register bit assignments.

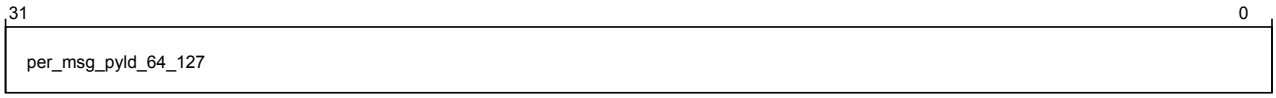

Figure 3-1277 por_cxla_permsg_pyld_64_127 (low)

The following table shows the por_cxla_permsg_pyld_64_127 lower register bit assignments.

Table 3-1291 por_cxla_permsg_pyld_64_127 (low)

Bits	Field name	Description	Type	Reset
31:0	per_msg_pyld_64_127	Protocol Error Msg Payload[127:64]	RW	64'b0

por_cxla_permsg_pyld_128_191

Contains bits[192:128] of CCIX Protocol Error (PER) Message payload.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hD10
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

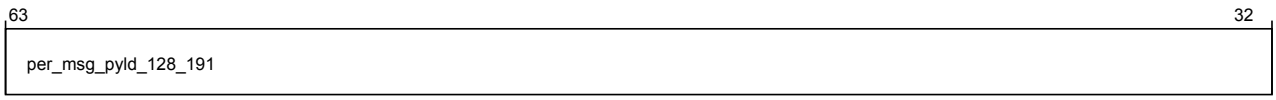

Figure 3-1278 por_cxla_permsg_pyld_128_191 (high)

The following table shows the por_cxla_permsg_pyld_128_191 higher register bit assignments.

Table 3-1292 por_cxla_permsg_pyld_128_191 (high)

Bits	Field name	Description	Type	Reset
63:32	per_msg_pyld_128_191	Protocol Error Msg Payload[191:128]	RW	64'b0

The following image shows the lower register bit assignments.

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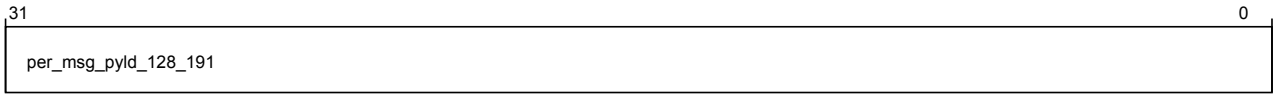

Figure 3-1279 por_cxla_permsg_pyld_128_191 (low)

The following table shows the por_cxla_permsg_pyld_128_191 lower register bit assignments.

Table 3-1293 por_cxla_permsg_pyld_128_191 (low)

Bits	Field name	Description	Type	Reset
31:0	per_msg_pyld_128_191	Protocol Error Msg Payload[191:128]	RW	64'b0

por_cxla_permsg_pyld_192_255

Contains bits[255:192] of CCIX Protocol Error (PER) Message payload.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'hD18
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

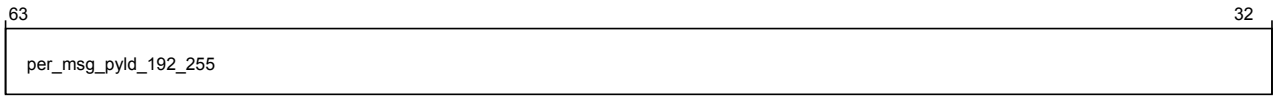

Figure 3-1280 por_cxla_permsg_pyld_192_255 (high)

The following table shows the por_cxla_permsg_pyld_192_255 higher register bit assignments.

Table 3-1294 por_cxla_permsg_pyld_192_255 (high)

Bits	Field name	Description	Type	Reset
63:32	per_msg_pyld_192_255	Protocol Error Msg Payload[255:192]	RW	64'b0

The following image shows the lower register bit assignments.

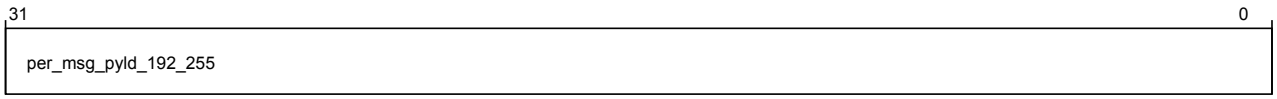

Figure 3-1281 por_cxla_permsg_pyld_192_255 (low)

The following table shows the por_cxla_permsg_pyld_192_255 lower register bit assignments.

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Table 3-1295 por_cxla_permsg_pyld_192_255 (low)

Bits	Field name	Description	Type	Reset
31:0	per_msg_pyld_192_255	Protocol Error Msg Payload[255:192]	RW	64'b0

por_cxla_permsg_ctl

Contains Control bits to trigger CCIX Protocol Error (PER) Message.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD20

Register reset 64'b0

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

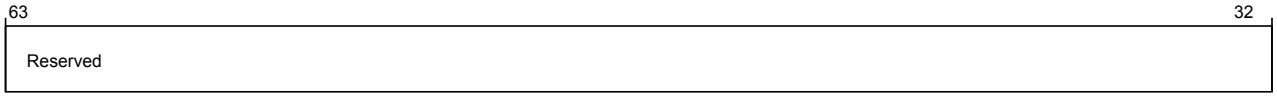

Figure 3-1282 por_cxla_permsg_ctl (high)

The following table shows the por_cxla_permsg_ctl higher register bit assignments.

Table 3-1296 por_cxla_permsg_ctl (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

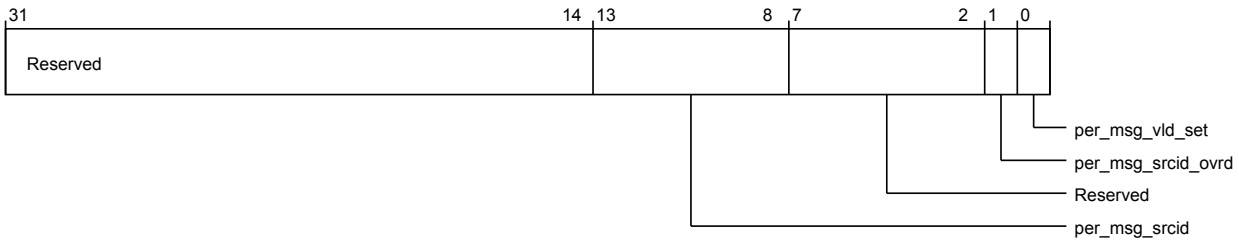

Figure 3-1283 por_cxla_permsg_ctl (low)

The following table shows the por_cxla_permsg_ctl lower register bit assignments.

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Table 3-1297 por_cxla_permsg_ctl (low)

Bits	Field name	Description	Type	Reset
31:14	Reserved	Reserved	RO	-
13:8	per_msg_srcid	Contains Source ID used on CCIX Protocol Error Msg. Used when per_msg_srcid_ovrd is set.	RW	6'b0
7:2	Reserved	Reserved	RO	-
1	per_msg_srcid_ovrd	When set, overrides the Source ID on Protocol Error Msg by value specified in this register. Or else the source ID from payload[55:48] is used.	RW	1'b0
0	per_msg_vld_set	When set, sends CCIX Protocol Error Msg. Must be cleared after the current error is processed and before a new error message is triggered	RW	1'b0

por_cxla_err_agent_id

Contains Error Agent ID. Must be programmed by CCIX discovery s/w. Used as TargetID on CCIX Protocol Error (PER) Message.

Its characteristics are:

Type RW

Register width (Bits) 64

Address offset 14'hD28

Register reset 64'b0

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

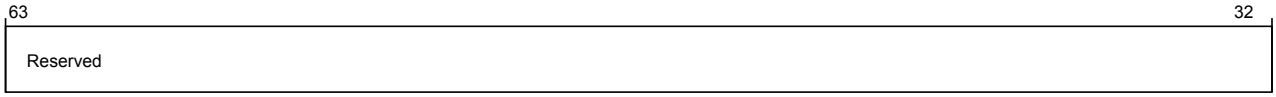

Figure 3-1284 por_cxla_err_agent_id (high)

The following table shows the por_cxla_err_agent_id higher register bit assignments.

Table 3-1298 por_cxla_err_agent_id (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

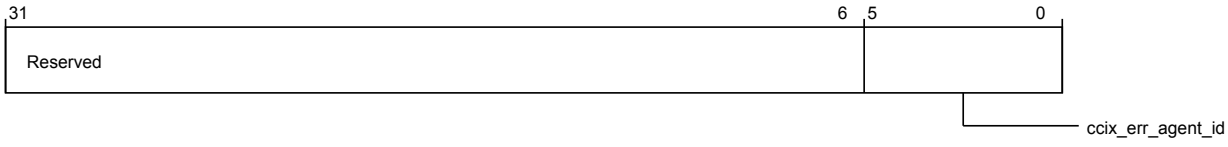

Figure 3-1285 por_cxla_err_agent_id (low)

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The following table shows the por_cxla_err_agent_id lower register bit assignments.

Table 3-1299 por_cxla_err_agent_id (low)

Bits	Field name	Description	Type	Reset
31:6	Reserved	Reserved	RO	-
5:0	ccix_err_agent_id	CCIX Error AgentID	RW	6'b0

por_cxla_pmu_event_sel

Specifies the PMU event to be counted.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h2000
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

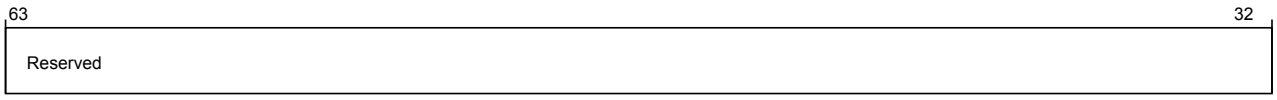

Figure 3-1286 por_cxla_pmu_event_sel (high)

The following table shows the por_cxla_pmu_event_sel higher register bit assignments.

Table 3-1300 por_cxla_pmu_event_sel (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

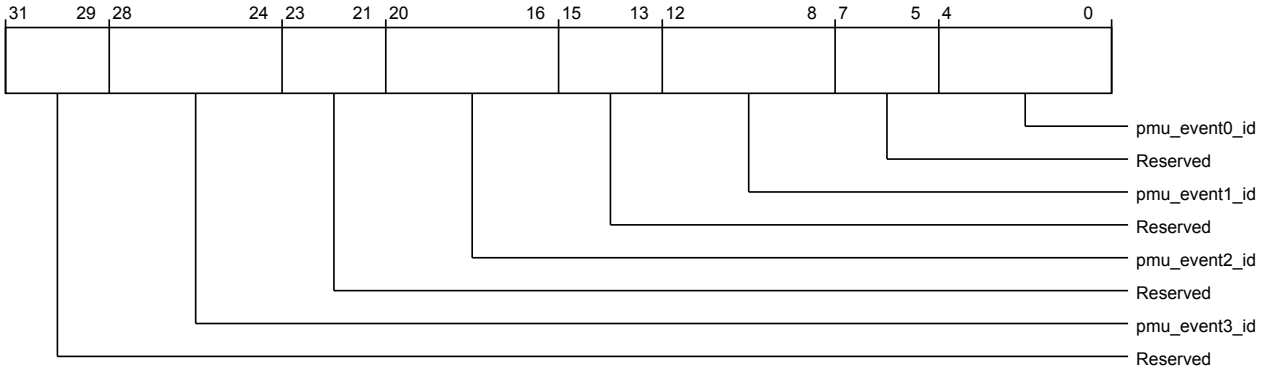

Figure 3-1287 por_cxla_pmu_event_sel (low)

The following table shows the por_cxla_pmu_event_sel lower register bit assignments.

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Table 3-1301 por_cxla_pmu_event_sel (low)

Bits	Field name	Description	Type	Reset
31:29	Reserved	Reserved	RO	-
28:24	pmu_event3_id	CXLA PMU Event 3 ID; see pmu_event0_id for encodings	RW	5'b0
23:21	Reserved	Reserved	RO	-
20:16	pmu_event2_id	CXLA PMU Event 2 ID; see pmu_event0_id for encodings	RW	5'b0
15:13	Reserved	Reserved	RO	-
12:8	pmu_event1_id	CXLA PMU Event 1 ID; see pmu_event0_id for encodings	RW	5'b0
7:5	Reserved	Reserved	RO	-
4:0	pmu_event0_id	CXLA PMU Event 0 ID 5'h00: No event 5'h01: RX TLP for Link 0 5'h02: RX TLP for Link 1 5'h03: RX TLP for Link 2 5'h04: TX TLP for Link 0 5'h05: TX TLP for Link 1 5'h06: TX TLP for Link 2 5'h07: RX CXS for Link 0 5'h08: RX CXS for Link 1 5'h09: RX CXS for Link 2 5'h0A: TX CXS for Link 0 5'h0B: TX CXS for Link 1 5'h0B: TX CXS for Link 2 5'h0D: Average RX TLP size in DWs 5'h0E: Average TX TLP size in DWs 5'h0F: Average RX TLP size in CCIX messages 5'h10: Average TX TLP size in CCIX messages 5'h11: Average size of RX CXS in DWs within a beat 5'h12: Average size of TX CXS in DWs within a beat 5'h13: TX CXS link credit backpressure 5'h14: RX TLP buffer full and backpressured 5'h15: TX TLP buffer full and backpressured 5'h16: Average latency to process an RX TLP 5'h17: Average latency to form a TX TLP	RW	5'b0

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por_cxla_pmu_config

Configures the CXLA PMU.

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h2210
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

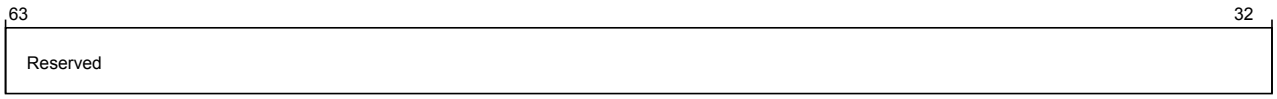

Figure 3-1288 por_cxla_pmu_config (high)

The following table shows the por_cxla_pmu_config higher register bit assignments.

Table 3-1302 por_cxla_pmu_config (high)

Bits	Field name	Description	Type	Reset
63:32	Reserved	Reserved	RO	-

The following image shows the lower register bit assignments.

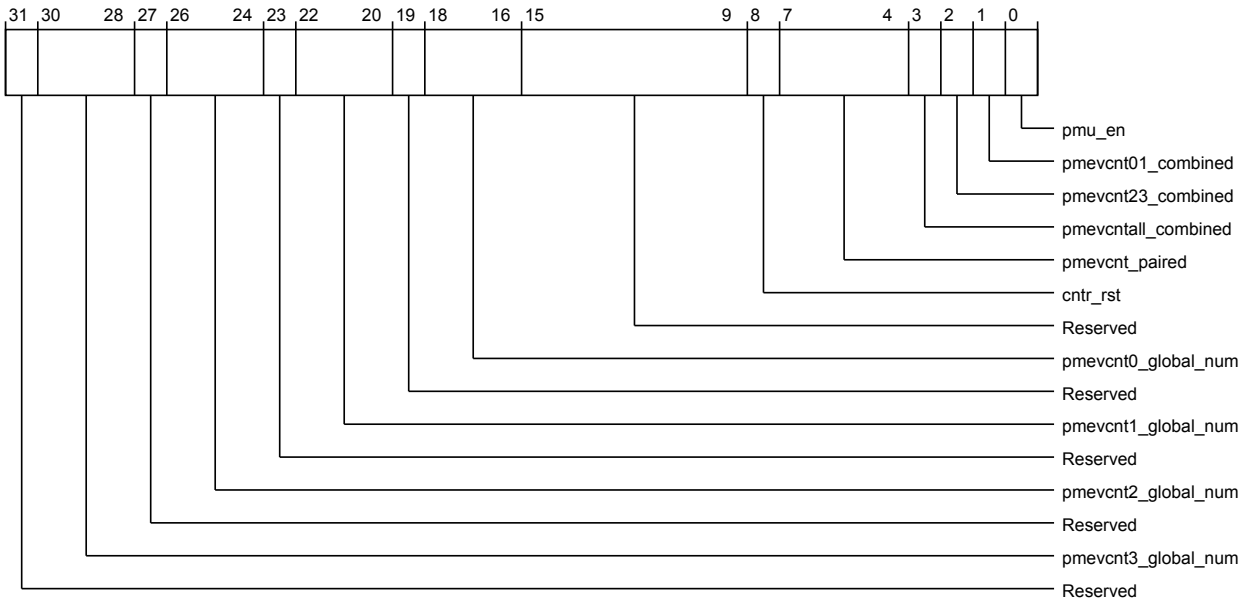

Figure 3-1289 por_cxla_pmu_config (low)

The following table shows the por_cxla_pmu_config lower register bit assignments.

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Table 3-1303 por_cxla_pmu_config (low)

Bits	Field name	Description	Type	Reset
31	Reserved	Reserved	RO	-
30:28	pmevcnt3_global_num	Global counter to pair with PMU counter 3; see pmevcnt0_global_num for encodings	RW	3'b0
27	Reserved	Reserved	RO	-
26:24	pmevcnt2_global_num	Global counter to pair with PMU counter 2; see pmevcnt0_global_num for encodings	RW	3'b0
23	Reserved	Reserved	RO	-
22:20	pmevcnt1_global_num	Global counter to pair with PMU counter 1; see pmevcnt0_global_num for encodings	RW	3'b0
19	Reserved	Reserved	RO	-
18:16	pmevcnt0_global_num	Global counter to pair with PMU counter 0 3'b000: Global PMU event counter A 3'b001: Global PMU event counter B 3'b010: Global PMU event counter C 3'b011: Global PMU event counter D 3'b100: Global PMU event counter E 3'b101: Global PMU event counter F 3'b110: Global PMU event counter G 3'b111: Global PMU event counter H	RW	3'b0
15:9	Reserved	Reserved	RO	-
8	cntr_rst	Enables clearing of live counters upon assertion of snapshot	RW	1'b0
7:4	pmevcnt_paired	PMU local counter paired with global counter	RW	4'b0
3	pmevcntall_combined	Enables combination of all PMU counters (0, 1, 2, 3) ——— **Note** ——— When set, pmevcnt01_combined and pmevcnt23_combined have no effect. ———	RW	1'b0
2	pmevcnt23_combined	Enables combination of PMU counters 2 and 3	RW	1'b0
1	pmevcnt01_combined	Enables combination of PMU counters 0 and 1	RW	1'b0
0	pmu_en	CXLA PMU enable ——— **Note** ——— All other fields in this register are valid only if this bit is set. ———	RW	1'b0

por_cxla_pmevcnt

Contains all PMU event counters (0, 1, 2, 3).

Its characteristics are:

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Type RW
Register width (Bits) 64
Address offset 14'h2220
Register reset 64'b0
Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

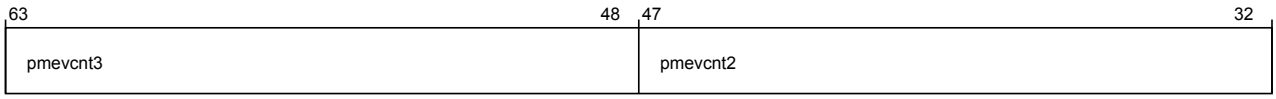

Figure 3-1290 por_cxla_pmevcnt (high)

The following table shows the por_cxla_pmevcnt higher register bit assignments.

Table 3-1304 por_cxla_pmevcnt (high)

Bits	Field name	Description	Type	Reset
63:48	pmevcnt3	PMU event counter 3	RW	16'h0000
47:32	pmevcnt2	PMU event counter 2	RW	16'h0000

The following image shows the lower register bit assignments.

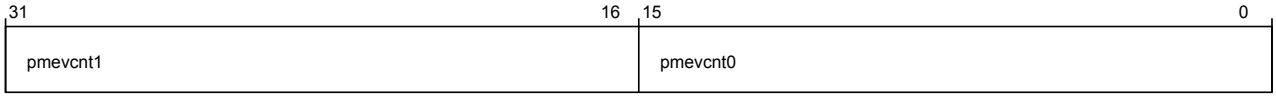

Figure 3-1291 por_cxla_pmevcnt (low)

The following table shows the por_cxla_pmevcnt lower register bit assignments.

Table 3-1305 por_cxla_pmevcnt (low)

Bits	Field name	Description	Type	Reset
31:16	pmevcnt1	PMU event counter 1	RW	16'h0000
15:0	pmevcnt0	PMU event counter 0	RW	16'h0000

por_cxla_pmevcntsr

Functions as the PMU event counter shadow register for all counters (0, 1, 2, 3).

Its characteristics are:

Type RW
Register width (Bits) 64
Address offset 14'h2240

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Register reset 64'b0

Usage constraints There are no usage constraints.

The following image shows the higher register bit assignments.

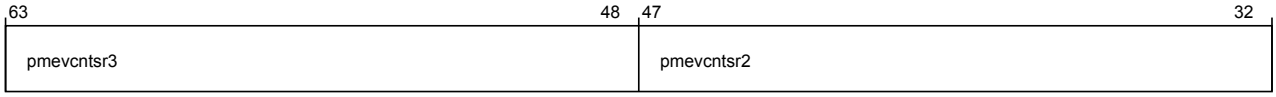

Figure 3-1292 por_cxla_pmevcntsr (high)

The following table shows the por_cxla_pmevcntsr higher register bit assignments.

Table 3-1306 por_cxla_pmevcntsr (high)

Bits	Field name	Description	Type	Reset
63:48	pmevcntsr3	PMU event counter 3 shadow register	RW	16'h0000
47:32	pmevcntsr2	PMU event counter 2 shadow register	RW	16'h0000

The following image shows the lower register bit assignments.

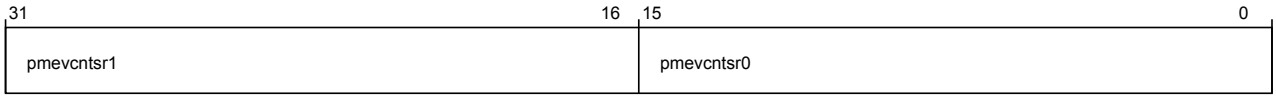

Figure 3-1293 por_cxla_pmevcntsr (low)

The following table shows the por_cxla_pmevcntsr lower register bit assignments.

Table 3-1307 por_cxla_pmevcntsr (low)

Bits	Field name	Description	Type	Reset
31:16	pmevcntsr1	PMU event counter 1 shadow register	RW	16'h0000
15:0	pmevcntsr0	PMU event counter 0 shadow register	RW	16'h0000

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3.4 CMN-600 programming

This section contains CMN-600 programming information.

This section contains the following subsections:

3.4.1 Boot-time programming sequence

A specific boot-time programming sequence must be used to set up CMN-600 correctly. An example sequence is provided, which uses a *System Control Processor* (SCP) to perform the initial boot configuration.

After reset, the following configuration steps must happen before broad access to CMN-600 components is available:

1. CMN-600 uses a default configuration to access boot flash through the HN-D ACE-Lite master interface and also the configuration registers.
2. An RN-F, or a master that is connected to an RN-I, must then access the configuration registers to configure CMN-600. This boot-time configuration must happen before there is broader access to components such as HN-F or SN.

The following example provides more information on the boot process. It assumes an SCP is performing the CMN-600 configuration.

1. The SCP boots, either from local memory or through CMN-600 memory accesses targeting memory behind the HN-D:
   - All other masters are either held in reset or issue no requests to CMN-600 until the boot programming is complete.
   - The HN-D is identified through straps on the RN SAM.
2. If necessary, the SCP discovers the system.
3. The SCP determines the wanted address map and corresponding SAM register values.
4. If necessary, the SCP remaps the configuration register space by completing the following steps:
   a. It drains all requests in flight by waiting for their responses.
   b. It issues a single 64-bit store to a PERIPHBASE register behind the HN-D. This register would be in logic that is external to CMN-600 and an update would cause the signal values on the CFGM_PERIPHBASE input to change.
   c. It waits for the response for that store.
5. If necessary, the SCP writes to the CMN-600 configuration registers to program the SAM for all HN-Fs.
6. The SCP writes to the CMN-600 configuration registers to program the SAM for all RNs including the one being used by the SCP.

   Note

   RN-F ESAM types cannot block transactions, therefore an external mechanism must block transactions.

   After programming the SAM for all RNs, the SCP sets a bit that enables use of the programmed address map instead of the default address map. This bit indicates that the SAM setup is complete.

Once the preceding steps are complete, the SCP can make general accesses anywhere in the address space and other masters can begin issuing requests.

3.4.2 Runtime programming requirements

This section describes the requirements for programming during runtime.

The hardware for handling RN membership in the coherence domain or DVM domain has been shifted to the XP to which the RN is attached. A low-level four-phase handshake mechanism, **SYSCOREQ**/**SYSCOACK**, is added to allow quick and local entry to and exit from snoop and DVM domains. No

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communication with central hardware resources is required. When a block is removed from the coherence or DVM domain, the XP acts as a protocol agent to give a generic response to any snoop or DVM messages.

For legacy devices that do not support the **SYSCOREQ**/**SYSCOACK** mechanism, direct configuration writes to the XP by software can trigger the same mechanism. For more information, see *2.28 RN entry to and exit from Snoop and DVM domains* on page 2-163.

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3.5 CML programming

The system must be programmed to enable correct operation with CML.

This section contains the following subsections:

3.5.1 CML-related programmable registers

This section contains a list of CML programmable registers.

CXRA

- RA SAM address region registers (por_cxg_ra_sam_addr_region_reg<X>)
- LDID to RAID LUT registers:
  - por_cxg_ra_rnf_ldid_to_raid_reg<X>
  - por_cxg_ra_rnd_ldid_to_raid_reg<X>
  - por_cxg_ra_rni_ldid_to_raid_reg<X>
  - por_cxg_ra_rnf_ldid_to_raid_val
  - por_cxg_ra_rni_ldid_to_raid_val
  - por_cxg_ra_rnd_ldid_to_raid_val
- RAID or HAID to LinkID LUT registers:
  - por_cxg_ra_agentid_to_linkid_reg<X>
  - por_cxg_ra_agentid_to_linkid_val
- CCIX Protocol Link Control and Status registers:
  - por_cxg_ra_cxprtcl_link<X>_ctl
  - por_cxg_ra_cxprtcl_link<X>_status
- Auxiliary Control register (por_cxg_ra_aux_ctl)
- Configuration Control register (por_cxg_ra_cfg_ctl)

CXHA

- HAID register (por_cxg_ha_id)
- RAID to LDID LUT registers:
  - por_cxg_ha_rnf_raid_to_ldid_reg<X>
  - por_cxg_ha_rnf_raid_to_ldid_val
- RAID or HAID to LinkID LUT registers:
  - por_cxg_ha_agentid_to_linkid_reg<X>
  - por_cxg_ha_agentid_to_linkid_val
- CCIX Protocol Link Control and Status registers:
  - por_cxg_ha_cxprtcl_link<X>_ctl
  - por_cxg_ha_cxprtcl_link<X>_status
- Auxiliary Control register (por_cxg_ha_aux_ctl)
- RN SAM

CXLA

- CCIX capabilities (por_cxla_ccix_prop_capabilities). This register is RO.
- CCIX Configured Properties (por_cxla_ccix_prop_configured)
- CXS Interface Properties Registers. These registers are RO:

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  - por_cxla_tx_cxs_attr_capabilities
  - por_cxla_rx_cxs_attr_capabilities
- RAID or HAID to LinkID LUT registers:
  - por_cxla_agentid_to_linkid_reg<X>
  - por_cxla_agentid_to_linkid_val
- LinkID to PCIe Bus Number LUT register (por_cxla_linkid_to_pcie_bus_num)
- Auxiliary Control register (por_cxla_aux_ctl)

HN-F

- LDID to CHI NodeID registers (por_hnf_rn_phys_id<X>)
- CCIX Port Aggregation Mask register (por_hnf_cml_port_aggr_grp0_add_mask)
- CCIX Port Aggregation Control register (por_hnf_cml_port_aggr_grp0_reg)

RN-F/RN-I/RN-D

- RN SAM
- CCIX Port Aggregation Mode Enable and Control registers:
  - cml_port_aggr_grp0_reg
  - cml_port_aggr_mode_ctrl_reg
- CCIX Port Aggregation Mask register (cml_port_aggr_grp0_add_mask)

3.5.2 Bring up a CML system

Use the following sequence to bring up a CML system.

Procedure

1. Discover and bring up the local CMN-600 system.

   For more information, see *Discover and bring up a local CMN-600 system* on page 3-1072.
2. Discover CCIX devices and CCIX systems.

   For more information, see *Discover CCIX devices in CCIX system* on page 3-1073.
3. Enumerate and configure CCIX devices.

   For more information, see *Enumerate and configure CCIX devices* on page 3-1073.

Next Steps

For information about the programming requirements that are necessary for communication between CCIX components, see *3.5.3 Program CML system to enable CCIX communication* on page 3-1074.

Discover and bring up a local CMN-600 system

Use this process to bring up a local CMN-600 system during a full bring up of a CML system.

This procedure is the first step in the sequence to bring up a CMN-600 CML system. For the full sequence, see *3.5.2 Bring up a CML system* on page 3-1072.

Procedure

1. Complete the CMN-600 discovery mechanism to discover node types, their corresponding locations (node IDs), and their logical IDs.

   2.4 Node ID mapping on page 2-52 and *2.5 Discovery* on page 2-55 define the discovery mechanism. Node types that are relevant to CML-specific programming are RN-Fs, RN-Is, RN-Ds, HN-Fs, and CCIX gateway blocks (CXRA, CXHA, and CXLA).
2. Bring up the local system to allow normal local operations. To bring up all local non-CCIX components (HN-F, HN-D, HN-I, RN-I, SN-F, and XP):
   a. Complete CMN-600 boot time programming.

      For more information, see *3.4.1 Boot-time programming sequence* on page 3-1069.
   b. Program RN SAM with the local address map.

      For more information, see *2.20.1 Program the SAM* on page 2-119.

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Next Steps

For information about how to discover the CCIX devices in your CML configuration, see *Discover CCIX devices in CCIX system* on page 3-1073.

Discover CCIX devices in CCIX system

CCIX system discovery can involve going through the PCIe link activation and device enumeration mechanism. Use this process to discover CCIX devices in your CCIX system.

This procedure is the second step in the sequence to bring up a CMN-600 CML system. For the full sequence, see *3.5.2 Bring up a CML system* on page 3-1072.

Prerequisites

You must first discover and bring up your local CMN-600 system. For more information, see *Discover and bring up a local CMN-600 system* on page 3-1072.

Procedure

- Follow the standard PCIe device enumeration steps to detect CCIX capable devices.

  For more information, see *Cache Coherent Interconnect for Accelerators CCIX Base Specification Revision 1.0 Version 0.9*.

Next Steps

If one or more CCIX-capable devices are detected during PCIe device enumeration, then complete the following steps:

- See *Enumerate and configure CCIX devices* on page 3-1073, which shows how to enumerate CCIX devices.
- Program the PCIe-RC to enable multiple *Virtual Channels* (VCs).

Enumerate and configure CCIX devices

Use this procedure to enumerate CCIX devices in your CML system and configure their CCIX properties during bring up.

This procedure is the last step in the sequence to bring up a CMN-600 CML system. For the full sequence, see *3.5.2 Bring up a CML system* on page 3-1072.

Prerequisites

Before enumerating CCIX devices, you must first complete the following steps:

- Discover and bring up your local CMN-600 system. For more information, see *Discover and bring up a local CMN-600 system* on page 3-1072.
- Discover CCIX devices in your CCIX system. For more information, see *Discover CCIX devices in CCIX system* on page 3-1073.

Procedure

1. Discover all CCIX agents (RA and HA) at each CCIX device.

   These agents must be uniquely identifiable. If any CCIX device contains CMN-600, follow the CMN-600 discovery mechanism to discover node types, their corresponding locations (node IDs), and their logical IDs. The discovery mechanism is described in *2.4 Node ID mapping* on page 2-52 and *2.5 Discovery* on page 2-55.
2. Discover the address map requirements of each CCIX device.
3. Read the CCIX capabilities of each CCIX device.
   a. Read the por_cxla_ccix_prop_capabilities register, which is present in each CXLA, to determine the CCIX capabilities of CMN-600.
4. Determine the common properties and capabilities that all CCIX devices support and configure them in each CCIX device.

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5. Program the properties that are determined in the preceding step in the por_cxla_ccix_prop_configured register, which is present in each CMN-600 CXLA.

Next Steps

To enable CCIX communication, follow the programming procedures that are described in *3.5.3 Program CML system to enable CCIX communication* on page 3-1074.

3.5.3 Program CML system to enable CCIX communication

Use this procedure to enable CCIX communication between different CCIX entities. The steps can be completed in any order.

The terms *link*, *CCIX link*, and *CCIX protocol link* that are used in subsequent sections refer to CCIX logical link.

The CCIX logical link is defined in the *Cache Coherent Interconnect for Accelerators CCIX Base Specification Revision 1.0 Version 0.9*.

Prerequisites

Before enabling CCIX communication, you must first complete the bring up process. For more information, see *3.5.2 Bring up a CML system* on page 3-1072.

Procedure

- Program the auxiliary control and configuration control registers.

  For more information about specific optional functionality, see *Options when programming CXG auxiliary control and configuration control registers* on page 3-1074.
- Program IDs for local CXRAs and CXHAs.

  For more information, see *Assign IDs for local CXRAs and CXHAs* on page 3-1075.
- Program remote CCIX agents:
  - Assign LinkIDs to remote CCIX protocol links. For more information, see *Assign LinkIDs to remote CCIX protocol links* on page 3-1075.
  - Assign PCIe bus numbers for LinkIDs. For more information, see *Assign PCIe bus numbers for LinkIDs* on page 3-1076.
  - Assign LDIDs to remote caching agents. For more information, see *Assign LDIDs to remote caching agents* on page 3-1076.
  - Program RA SAMs. For more information, see *Program RA SAM* on page 3-1077.
  - Program RNSAM in CXHAs. For more information, see *Program RN SAM in CXHA* on page 3-1077.
  - Program CCIX protocol link control registers. For more information, see *Program CCIX protocol link control registers* on page 3-1077.
  - Program CPA functionality in RN SAM, if using CPAGs. For more information, see *Program CPA functionality in RN SAM* on page 3-1078.
  - Program CPA functionality in HN-F SAM, if using CPAGs. For more information, see *Program CPA functionality in HN-F SAM* on page 3-1079.

Options when programming CXG auxiliary control and configuration control registers

CMN-600 has optional CML functionality that can be enabled when you program the CXG auxiliary control and configuration control registers. There are specific constraints that you must follow when enabling this functionality for your CML system.

CMN-600 supports the following functionality in the CXG auxiliary and configuration control registers:

- SMP mode
- CXSA mode

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SMP mode

SMP mode is enabled by setting the smp_mode_en bit in the following registers:

- por_cxg_ra_aux_ctl
- por_cxg_ha_aux_ctl
- por_cxla_aux_ctl

You must configure SMP mode in the same way for the CXRA, CXHA, and CXLA of a specific CXG instance. You must also configure SMP mode in the same way for all communicating CXG pairs.

CXSA mode

CXSA mode is enabled by setting the cxsa_mode_en bit in the por_cxg_ra_cfg_ctl register of the CXRA.

When this mode is enabled, the CXRA inside the CXG is used to communicate with a remote CXSA. In this mode, the CXRA receives requests from local HN-Fs.

Assign IDs for local CXRAs and CXHAs

Use this procedure to assign CCIX identifiers for local CXRAs and CXHAs and configure them in the relevant registers.

This task is part of the requirements to enable communication between local and remote CCIX agents. For the full list of requirements, see *3.5.3 Program CML system to enable CCIX communication* on page 3-1074.

Procedure

- Assign *Requesting Agent IDs* (RAIDs) for local CXRAs.
  1. Program all the local RAIDs in the following registers for all CXRAs:
     - por_cxg_ra_rnf_ldid_to_raid_reg<X>
     - por_cxg_ra_rni_ldid_to_raid_reg<X>
     - por_cxg_ra_rnd_ldid_to_raid_reg<X>

     This programming sets up the LDID to RAID LUT.
  2. Set the corresponding valid bit in the following registers that are present in each CXRA:
     - por_cxg_ra_rnf_ldid_to_raid_val
     - por_cxg_ra_rni_ldid_to_raid_val
     - por_cxg_ra_rnd_ldid_to_raid_val
  3. Program the following items if CXSA mode is enabled:
     - CCIX Source ID (Agent ID) in entry 0 of the por_cxg_ra_rnf_ldid_to_raid_reg0 register
     - Corresponding valid bit in the por_cxg_ra_rnf_ldid_to_raid_val register
- Program *Home Agent IDs* (HAIDs) for all local CXHAs into the por_cxg_ha_id registers that are present in each CXHA.

  This programming is not required if CXSA mode is enabled.

  Because all CXHAs can communicate with all local HNs (HN-F, HN-I, and HN-D, they can have the same HAID. However, if uniqueness is between HAIDs is required for routing purposes, HAIDs do not have to be the same.

  For compliance with the CCIX specification, a CXHA and CXRA with the same ID must reside behind the same CCIX protocol link. For more information, see *Cache Coherent Interconnect for Accelerators CCIX Base Specification Revision 1.0 Version 0.9*.

Assign LinkIDs to remote CCIX protocol links

Use this procedure to assign a unique LinkID to each remote CCIX protocol link with which a CXG can communicate.

This task is part of the requirements to enable communication between local and remote CCIX agents. For the full list of requirements, see *3.5.3 Program CML system to enable CCIX communication* on page 3-1074.

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Each CMN-600 CXG contains a CXRA, CXHA, and CXLA node. Each CXG can communicate with up to three remote CCIX protocol links. These links are marked sequentially as links 0, 1, and 2. Remote links are identified using LinkIDs.

Remote CCIX agents (RAs or HAs) are identified using their RAID or HAID. Each remote RA or HA that a CXG can communicate with must be behind only one link.

It is only necessary for LinkIDs to be unique within a CXG. Each CXG has a respective LinkID space. Each remote link has its own CCIX protocol link control and status registers.

Procedure

1. Determine the LinkID of each remote agent, in other words the targets, of the CXG.
2. Program these LinkIDs in the following registers, which are present in the CXRA, CXHA, and CXLA:
   - por_cxg_ra_agentid_to_linkid_reg<X>
   - por_cxg_ha_agentid_to_linkid_reg<X>
   - por_cxla_agentid_to_linkid_reg<X>

   This step sets up the AgentID (RAID or HAID) to LinkID LUT.

   If CXSA mode is enabled for a link, it is not necessary to program the por_cxg_ha_agentid_to_linkid_reg<X> register. The por_cxg_ra_agentid_to_linkid_reg<X> register must be programmed with the CCIX Slave Agent ID for the link.
3. Set the respective valid bits in the following registers:
   - por_cxg_ra_agentid_to_linkid_val
   - por_cxg_ha_agentid_to_linkid_val
   - por_cxla_agentid_to_linkid_val

Assign PCIe bus numbers for LinkIDs

Use this procedure to set up the LinkID to PCIe bus number LUT in the CXLA. This programming is only required if the PCIe header is used to route a CCIX TLP.

This task is part of the requirements to enable communication between local and remote CCIX agents. For the full list of requirements, see *3.5.3 Program CML system to enable CCIX communication on page 3-1074*.

Procedure

- Program the PCIe bus number for each remote link in the por_cxla_linkid_to_pcie_bus_num register, which is present in each CXLA.

Assign LDIDs to remote caching agents

Use this procedure to assign a unique LDID for each remote caching agent (RN-F) that can send requests to HNs (HN-F, HN-I, and HN-D).

This task is part of the requirements to enable communication between local and remote CCIX agents. For the full list of requirements, see *3.5.3 Program CML system to enable CCIX communication on page 3-1074*.

HN-Fs use the LDID of remote caching agents for SF tracking. LDID assignment is not required for non-caching RAs, which are not required to be snooped.

This programming is not required if CXSA mode is enabled.

Procedure

1. Program unique LDIDs for each remote caching agent in the por_cxg_ha_rnf_raid_to_ldid_reg<X> register that is present in each CXHA.

   The LDID values for remote RN-Fs must be greater than those values that are used by the local RN-F nodes.

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2. Set the ldid<X>_rnf bit to mark the remote agent as a caching agent.
3. Set the respective valid bit in the por_cxg_ha_rnf_raid_to_ldid_val register.
4. Program the NodeID of each CXHA in the por_hnf_rn_phys_id<X> register in the HN-F. Program each remote RN-F (caching agent) that is proxied through that CXHA.

Program RA SAM

Use this procedure to program the RA SAM, which generates the target ID for CCIX requests.

This task is part of the requirements to enable communication between local and remote CCIX agents. For the full list of requirements, see *3.5.3 Program CML system to enable CCIX communication* on page 3-1074.

Procedure

- Program the following properties for each remote HA into the por_cxg_ra_sam_addr_region_reg<X> register that is present in each CXRA, and set the corresponding valid bit.
  - The base address of the address region and the corresponding size of the address region
  - The HAID that requests for the address range are mapped to

  If CXSA mode is enabled, RA SAM must be programmed with the address range and the Agent ID of the remote CCIX Slave Agent.

Program RN SAM in CXHA

Use this procedure to program the RN SAM in each CXHA.

You can program CXHA RN SAM as part of local system bring up.

This programming is not required if CXSA mode is enabled.

Procedure

- Program the RN SAM present in each CXHA with the address and memory map of the local HNs.

  For more information on RN SAM programming, see *2.20 RN and HN-F SAM* on page 2-117.

Program CCIX protocol link control registers

Use this procedure to set up CCIX protocol links for a CXG and configure the distribution of credits that the CXG uses.

There is a CCIX protocol link control register for each CCIX protocol link that a given CCIX gateway block (CXRA, CXHA, and CXLA) can communicate with.

Procedure

1. Program the por_cxg_ra_cxprtcl_link<X>_ctl and por_cxg_ha_cxprtcl_link<X>_ctl registers that are present in each CXRA and CXHA.

   If CXSA mode is enabled, it is not necessary to program the protocol link control registers of the CXHA. In this case, the lnk0_num_snpcrds of the CXRA can be set to `4'hF`.
2. Set the lnk<X>_link_en bit for each CCIX protocol link that can be used in the future.

   If this bit is not set, credits are not set aside for this link.
3. Program the lnk<X>_num_{snpcrds, reqcrds, datcrds} fields with the percentage of protocol credits that must be assigned or granted for a given link.

   This step is optional. Default credits are equally assigned or granted to each enabled link as determined by the link enable bit (lnk<X>_link_en). For more information about credit distribution and the permitted configurations, see *CCIX protocol link credit distribution* on page 3-1078.

   You must ensure that the total percentage of credits that are allocated to all links does not exceed 100.

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CCIX protocol link credit distribution

When setting up CCIX protocol links, you can specify the CCIX protocol link credit distribution. The distribution can be configured when programming the CCIX protocol link control registers.

The link enable bits (lnk<X>_link_en) of the por_cxg_ra_cxprtcl_link<X>_ctl and por_cxg_ha_cxprtcl_link<X>_ctl registers determine how many links are active for a CXG. By default, credits are equally assigned or granted to each enabled link. However, you can program these registers to configure the distribution of credits across multiple links.

The following table shows the number of links and allowed credit distribution percentages for that number of links.

Table 3-1308 Number of links and allowed credit distribution percentage

Number of links	Allowed credit distribution
1	100%
2	50% : 50%
	25% : 75%
3	50% : 25% : 25%
	33% : 33% : 33%

After distributing credits based on the programmed percentage across all the links available, any remaining credits are allocated to link0. For example, link0 is allocated 44 credits while link1 and link2 are allocated 42 credits each for the 128 credit, 33% credit distribution configuration.

For more information about programming the CCIX protocol link control registers, see *Program CCIX protocol link control registers* on page 3-1077.

Program CPA functionality in RN SAM

There is a specific sequence of programming steps that must be followed to set up the RN SAM to distribute requests to CPAGs.

This task is part of the requirements to enable communication between local and remote CCIX agents. For the full list of requirements, see *3.5.3 Program CML system to enable CCIX communication* on page 3-1074.

To enable CPA, you must program registers in both the RN SAM and HN-F SAM. For the programming sequence for the HN-F SAM registers, see *Program CPA functionality in HN-F SAM* on page 3-1079.

There are certain rules and restrictions that apply to how CPA can be enabled in a CMN-600 system. For more information, see *2.20.4 Support for CCIX Port Aggregation* on page 2-125.

Note

The CPA group ID control bits for non-hashed region 7 are aligned differently from other regions. For more information, see the index of the region7_pag_grpid field in *cml_port_aggr_mode_ctrl_reg* on page 3-826.

In a two-chip system with CPA enabled, the RN SAM CPA mask of Chip 0 and HN-F SAM CPA mask of Chip 1 must be programmed to match. Similarly, the RN SAM CPA mask of Chip 1 must match the HN-F SAM CPA mask of Chip 0.

Procedure

1. Set the region<n>_pag_en field of the cml_port_aggr_mode_ctrl_reg register to 1 for each non-hashed memory region that belongs to a remote chip and is required to use CPA.

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This programming enables CPA mode for the non-hashed memory region and specifies the CPAG that requests must be hashed across.

2. Set each bit that must be used to hash requests across CXGs to 1 in the addr_mask field of the cml_port_aggr_grp<n>_addr_mask register. Set each bit that must be masked from the hash function to 0.

   If CPA mode is enabled, RN SAM hashes PA bits [47:6] to distribute traffic between CXGs. The PA is compared against the addr_mask field of the cml_port_aggr_grp<n>_addr_mask_register. Any PA bit that corresponds to a bit with a 0 value in the mask register is masked from hashing.

3. Program the characteristics of the CXGs for each CPAG by completing the following steps:
   a. Program the number of CXGs in each CPAG by setting the num_cxg_pag0 field in the cml_port_aggr_grp<m> register.
   b. Program the CHI node ID of each CXG by setting the pag_tgtid<n> fields in cml_port_aggr_grp_reg0 and cml_port_aggr_grp_reg1.

   This programming is used by all regions that have CPA enabled.

4. Repeat the preceding steps for all RN SAMs in the chip.

Program CPA functionality in HN-F SAM

There is a specific sequence of programming steps that must be followed to set up the HN-F SAM to distribute snoop traffic to CPAGs.

This task is part of the requirements to enable communication between local and remote CCIX agents. For the full list of requirements, see *3.5.3 Program CML system to enable CCIX communication* on page 3-1074.

To enable CPA, you must program registers in both the RN SAM and HN-F SAM. For the programming sequence for the RN SAM registers, see *Program CPA functionality in RN SAM* on page 3-1078.

There are certain rules and restrictions that apply to how CPA can be enabled in a CMN-600 system. For more information, see *2.20.4 Support for CCIX Port Aggregation* on page 2-125.

In a two-chip system with CPA enabled, the RN SAM CPA mask of Chip 0 and HN-F SAM CPA mask of Chip 1 must be programmed to match. Similarly, the RN SAM CPA mask of Chip 1 must match the HN-F SAM CPA mask of Chip 0.

Procedure

1. Set the following fields in the por_hnf_rn_phys_id<n> registers for each valid LDID in the system:

   nodeid_ra<ldid>
   When using CPA, set this value to match the pag0_tgtid field of the por_hnf_cml_port_aggr_grp_reg<m> field of the corresponding CPAG.

   remote_ra<ldid>
   Set this value to 1 if the RN-F is a remote requestor.

   cpa_en_ra<ldid>
   Set this value to 1 if CPA is enabled for a remote RN-F.

   Local RN-F LDIDs must have the remote_ra<ldid> and cpa_en_ra<ldid> bits set to 0 and the corresponding CPA group ID set to 0.

2. Set each bit that must be used to hash snoop traffic across CXGs to 1 in the addr_mask field of the por_hnf_cml_port_aggr_grp<m>_addr_mask register. Set each bit that must be masked from the hash function to 0.

   If CPA mode is enabled, HN-F SAM hashes PA bits [47:6] to distribute snoop traffic between CXGs. The PA is compared against the addr_mask field of the cml_port_aggr_grp<m>_addr_mask_register. Any PA bit that corresponds to a bit with a 0 value in the mask register is masked from hashing.

3. Program the characteristics of the CXGs for each CPAG by completing the following steps:

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a. Program the number of CXGs in each CPAG by setting the num_cxg_pag0 field in the por_hnf_cml_port_aggr_grp<m>_reg register.
b. Program the CHI node ID of each CXG into the pag<k>_tgtid field of the same register.

This programming is used by all regions that have CPA enabled.

4. Repeat the preceding steps for all HN-F SAMs in the chip.

3.5.4 Program CMN-600 CML system at runtime

Use this procedure to program a CMN-600 CML system at runtime.

Procedure

1. Bring up CCIX protocol link.

   For more information, see *3.5.5 Establish protocol link up between CXG and remote CCIX link* on page 3-1080.

2. Add a CCIX protocol link in system coherency and DVM domains.

   For more information, see *3.5.7 CCIX entry and exit protocol links from coherency domains and DVM domains* on page 3-1082.

   Note

   If CXSA mode is enabled, this programming is not necessary.

3. Program the remote address range and corresponding CXRA node ID for each remote memory region in RN SAM present in CMN-600 RN-F, RN-I, and RN-D.

   RN SAM must not be programmed to target CXRA when enabled for CXSA mode.

   Note

   If the software can guarantee that there is no traffic to the remote address range until CCIX-related initial programming is complete and CCIX protocol links are up, then this programming should be done when programming RN SAMs with local address map.

3.5.5 Establish protocol link up between CXG and remote CCIX link

Use the following procedure to link up a CXG with a remote CCIX link that the CXG can communicate with.

A CCIX protocol link can be established between each CXG in CMN-600 and a corresponding remote CCIX link that the CXG can communicate with. The term *link* is used here to refer to a CCIX protocol link. Multiple CCIX links can be set up simultaneously by extending this sequence for each link.

CMN-600 CXGs contain CXRA, CXHA, and CXLA nodes.

Procedure

1. Poll the lnk<X>_link_en bit in both por_cxg_ra_cxprtcl_link<X>_ctl and por_cxg_ha_cxprtcl_link<X>_ctl to ensure that the link is enabled.

   If the link is enabled, then communication on the link can be established.

2. Ensure that the link is down and can accept a new link up request by polling the following bits:
   a. Poll the lnk<X>_link_up bits in the por_cxg_ra_cxprtcl_link<X>_ctl and por_cxg_ha_cxprtcl_link<X>_ctl registers to ensure that they are clear.
   b. Poll the lnk<X>_link_down bits in the por_cxg_ra_cxprtcl_link<X>_status and por_cxg_ha_cxprtcl_link<X>_status registers to ensure that they are set.
   c. Poll the lnk<X>_link_ack bits in the por_cxg_ra_cxprtcl_link<X>_status and por_cxg_ha_cxprtcl_link<X>_status registers to ensure that they are clear.
3. Set the lnk<X>_link_req bits in the por_cxg_ra_cxprtcl_link<X>_ctl and por_cxg_ha_cxprtcl_link<X>_ctl registers.

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Setting this bit generates a request to link up, which in turn brings up the link.

4. Poll the following bits in the por_cxg_ra_cxprtcl_link<X>_status and por_cxg_ha_cxprtcl_link<X>_status registers to ensure that the link up request is accepted:
   - lnk<X>_link_ack
   - lnk<X>_link_down

   The hardware acknowledges a link up request by setting the lnk<X>_link_ack bits and then clearing lnk<X>_link_down bits in CXRA and CXHA.

   Results: Hardware acknowledgment of link up means that both sides are ready to receive and grant CCIX protocol credits.
5. Set the lnk<X>_link_up bit in the por_cxg_ra_cxprtcl_link<X>_ctl and por_cxg_ha_cxprtcl_link<X>_ctl registers to instruct both sides to start granting credits.

Link<X> is now up. Both sides can now exchange CCIX protocol credits and protocol messages.

3.5.6 Prerequisites to link down a CCIX protocol link between CXG and remote CCIX link

This section describes the prerequisites to deactivate a CCIX protocol link between a CMN-600 CXG and a remote CCIX link.

Prerequisites

Software must ensure that the following conditions are met before initiating a link down sequence:

- There are no outstanding transactions that require CCIX message transfers across the link for their completion. This condition includes GIC-D in SMP mode.
- The protocol agents on both sides of the link are configured to not initiate new transactions across the link. For CMN-600:
  1. To make sure the lnk<X>_ot_cbkwr bit in the por_cxg_ra_cxprtcl_link<X>_status register is clear, poll the lnk<X>_ot_cbkwr bit. This step ensures that there are no outstanding CopyBack requests targeting the link.
  2. Take the link out of system coherency and DVM domains. For more information, see *3.5.7 CCIX entry and exit protocol links from coherency domains and DVM domains* on page 3-1082.
- If CXSA mode is enabled, CCIX links must not be brought down until all HN-Fs communicating with this CXSA are in OFF state.

Link down a CCIX protocol link between CXG and remote CCIX link

Use this procedure to deactivate a CCIX protocol link between a CMN-600 CXG and a remote CCIX link.

You must follow a specific process to bring down a CCIX protocol link between each CMN-600 CXG and the corresponding remote CCIX link that the CXG can communicate with. The term *link* is used here to refer to a CCIX protocol link. Multiple CCIX protocol links can be brought down at the same time by extending this sequence for each link.

Note

You must read the *3.5.6 Prerequisites to link down a CCIX protocol link between CXG and remote CCIX link* on page 3-1081 to link down a CCIX protocol link between CXG and a remote CCIX link.

CMN-600 CXGs contain CXRA, CXHA, and CXLA nodes.

Procedure

1. To ensure the link is up and can accept a new link down request, poll these bits in the por_cxg_ra_cxprtcl_link<X>_ctl and por_cxg_ha_cxprtcl_link<X>_ctl registers:
   - lnk<X>_link_up
   - lnk<X>_link_req

   These bits must be set before the link can accept a new link down request.

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2. Clear the lnk<X>_link_req bits in the por_cxg_ra_cxprtcl_link<X>_ctl and por_cxg_ha_cxprtcl_link<X>_ctl registers to make a link down request.
3. Poll the lnk<X>_link_ack bit in the por_cxg_ra_cxprtcl_link<X>_status and por_cxg_ha_cxprtcl_link<X>_status registers to ensure that it is cleared.

   The hardware acknowledges a link down request by clearing the lnk<X>_link_ack. After a link down request is accepted, each side must stop granting local CCIX protocol credits and start returning remote CCIX protocol credits.
4. Poll the lnk<X>_link_down bits in the por_cxg_ra_cxprtcl_link<X>_status and por_cxg_ha_cxprtcl_link<X>_status registers to ensure that each side has received all its protocol credits and is ready to go down.

   The hardware sets the lnk<X>_link_down bits to convey that it is ready for the link to go down.
5. Clear the lnk<X>_link_up bits in the por_cxg_ra_cxprtcl_link<X>_ctl and por_cxg_ha_cxprtcl_link<X>_ctl registers to instruct both sides to deactivate the link.

Link<X> is now down. No protocol message or credit transfers must occur across the link.

3.5.7 CCIX entry and exit protocol links from coherency domains and DVM domains

CMN-600 CXG blocks, which contain CXRA, CXHA, and CXLA nodes, can establish a CCIX protocol link with a remote CCIX link. Each CXG has software-programmable bits to allow the CCIX protocol links to enter and exit the system coherency domains and DVM domains.

The CXHA has 2 bits which facilitate snoop coherency domain entry and exit requests and acknowledgment:

- The lnk<X>_snoopdomain_req bit of the por_cxg_ha_cxprtcl_link<X>_ctl in each CXHA, controls snoop coherency domain requests for the link.
- The lnk<X>_snoopdomain_ack bit of the por_cxg_ha_cxprtcl_link<X>_status register, provides acknowledgment and status of the snoop coherency domain requests for the link.

The CXRA has 2 bits which facilitate DVM domain entry and exit requests and acknowledgment:

- The lnk<X>_dvmdomain_req bit in the por_cxg_ra_cxprtcl_link<X>_ctl register in each CXRA, controls DVM domain requests for the link.
- The lnk<X>_dvmdomain_ack bit in the por_cxg_ra_cxprtcl_link<X>_status register, provides acknowledgment and status of the DVM domain requests for the link.

For more information, see *2.28 RN entry to and exit from Snoop and DVM domains* on page 2-163.

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3.6 Support for RN-Fs compliant with CHI Issue A specification

Although CMN-600 natively supports devices compliant with CHI Issue B specification, it also provides support for connecting RN-Fs based on CHI Issue A specification with some feature restrictions and the corresponding CMN-600 programming requirements.

This section describes these feature restrictions.

This section contains the following subsections:

3.6.1 CHI Issue A device node ID mapping

In a CMN-600 system, all devices are assigned a unique CHI Issue B node ID such as B_NID [n:0], where n = 6, 8, or 10 based on the system node ID width.

CHI Issue A devices, however, have a fixed 7-bit wide node ID such as A_NID[6:0]. For such devices, the A_NID is derived from the CHI Issue B node ID by shifting the LSBs and padding the MSBs with zeros as necessary as shown in the following tables.

Table 3-1309 Mapping CHI Issue A device node ID into CMN-600 device node ID

Node ID width	CMN-600 device node ID	Comments
7 bits	B_NID [6:0] = (A_NID[4:0], `2'b00`)	A_NID[6:5] must be zero
9 bits	B_NID [8:0] = (A_NID[6:0], `2'b00`)	-
11 bits	B_NID [10:0] = (`2'b00`, A_NID[6:0], `2'b00`)	2 MSBs of B_NID are padded with zeros

Table 3-1310 Mapping CMN-600 device node ID into CHI Issue A device node ID

Node ID width	CHI Issue A device node ID	Comments
7 bits	A_NID [6:0] = (`2'b00`, B_NID[6:2])	B_NID[1:0] are zeros and are discarded
9 bits	A_NID [6:0] = B_NID[8:2]	B_NID[1:0] bits are zeros and are discarded
11 bits	A_NID [6:0] = B_NID[8:2]	B_NID[10:9] and B_NID[1:0] bits are zeros and are discarded

3.6.2 Stashing

CHI Issue A RN-Fs do not support stashing.

All HN-F instances are configured to not send snoop stash requests to the CHI Issue A RN-F.

3.6.3 Direct Cache Transfer

CHI Issue A RN-Fs do not support *Direct Cache Transfer* (DCT).

All HN-F instances are configured to disable DCT in snoop requests to the CHI Issue A RN-F.

3.6.4 Data poison

CHI Issue A RN-Fs do not support data poisoning.

All HN-F instances are configured to report and log data poison errors detected on SLC data sent to the CHI Issue A RN-F.

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Likewise, DMC must be configured to report and log data poison errors detected on read data.

3.6.5 RN SAM programming

CHI Issue A RN-Fs can be configured as ESAM.

When CHI Issue A RN-F is configured as ESAM, then the SAM in CMN-600 must be programmed following the steps that *2.17 RN SAM* on page 2-102 describes.

3.6.6 System coherency entry and exit

For system coherency entry or exit, either the hardware or software interface must be enabled.

2.28 RN entry to and exit from Snoop and DVM domains on page 2-163 describes how the hardware or software interface must be enabled for system coherency entry or exit.

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Chapter 4
SLC memory system

This chapter describes the SLC memory system.

It contains the following sections:

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4.1 About the SLC memory system

The SLC memory system consists of the HN-F protocol nodes in CMN-600.

There is a configurable number of instances (1-64) of the HN-F. Each HN-F node or slice has the following features:

- 0KB, 128KB, 256KB, 512KB, 1MB, 2MB, 3MB, or 4MB of SLC Data RAM and Tag RAM.
- Combined *Point-of-Coherency* (PoC) and *Point-of-Serialization* (PoS).
- SF size of 512KB, 1MB, 2MB, 4MB, or 8MB.

Each HN-F in CMN-600 is configured to manage a specific portion of the total address space. For each portion of the address, each HN-F:

- Can cache data in SLC
- Manages PoC and PoS functionality for ordering and coherency
- Tracks RN-F caching in the SF

The SLC memory system has the following features:

- *Physically Indexed and Physically Tagged* (PIPT)
- Coherency granule is a fixed length of 64B. SLC line size is a fixed length of 64B.
- Both SLC and SF are 16-way set-associative. 12-way for 3MB SLC configurations.
- By default the SLC and SF victim selection policy is:
  - Pseudo random if all ways are valid
  - If there is invalid way, it is not necessary to select a victim
  - Victim selection is required only if all ways are taken
- Optionally, CMN-600 supports an *enhanced LRU* (eLRU) cache replacement policy that can be enabled by setting a bit in the configuration register. eLRU is Dynamic Biased Replacement Policy. 2 bits per set/way are used to track and predict how soon a cache line is expected to be used again. This information is dynamically adjusted based on a few reference sets.
- SLC and SF arrays:
  - Supports one-cycle, two-cycle, or three-cycle non-pipelined tag array
  - Supports two-cycle or three-cycle non-pipelined data array
  - SLC Tag, SF Tag, and SLC Data arrays are single-ported, supporting one read or write access with no concurrency available
  - SLC Tag, SF Tag, and SLC Data arrays are ECC SECDED protected, with inline ECC checking and correction
- 32 or 64-entry address and data buffer, which is known as the *PoC Queue* (POCQ), to service:
  - All transactions from the CHI interface
  - SLC evictions to the memory controller
  - SF evictions and associated WriteBacks to the memory controller
- CMO propagation to SN-F or SBSX:
  - Conditional CMO propagation to the memory controller to support external DRAM caches
  - HN-F must be explicitly programmed using the por_hnf_sam_sn_properties register of the HN-F SAM to allow such propagation to each SN-F
- Supports QoS-based protocol flow control:
  - POCQ resources are allocated or rejected for protocol retry according to the QoS class
  - POCQ resources are watermarked for different QoS classes with user-configurable options
  - Starvation prevention for lower-priority QoS classes
  - QoS-based static grantee selection for CHI architecture credit return
- QoS priority-based request selection to the memory controller
- Supports allocation in the SLC from Snoop intervention. This feature enables data sharing through the SLC for multiple sharers.
- SLC state includes a caching LDID to detect dynamic read sharing
- Configurable 34b, 44b, or 48b *Physical Address* (PA) support
- PoC and PoS for all Snoopable and Non-snoopable, and Cacheable and Non-cacheable address space
- Supports ECC scrubbing for single-bit ECC errors on SF and SLC Tag RAMs

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- Software-controlled error injection support to enable testing of software error handler routine
- Power management states to support:
  - Full powerdown of the SLC and SF. HN-F only mode when both SLC and SF are powered down
  - Half the SLC ways powered down
  - Retention for SLC and SF
  - SLC full powerdown with SF on, when in SF only mode
- Arm TrustZone® technology support in SLC and SF
- Software-configurable (one, two, four, eight, or 12 ways) Memory Region locking support in the SLC
- Software-configurable (one, two, four, eight, or 12 ways) OCM support in the SLC
  - OCM memory does not require any physical memory backing
- Supports CHI enhancements for:
  - *Direct Cache Transfer* (DCT)
  - *Direct Memory Transfer* (DMT). DMT not supported with 128b SBSX configurations.
  - Cache Stashing
  - Atomics support
  - Data Poison
  - Data Parity (Data Check)
  - Trace Tag
- Invisible SLC support:
  - CMN-600 HN-F implements an invisible cache. All accesses (cacheable, non-cacheable, and Device types) are checked against the SLC and SF. The SLC cannot be cleaned and invalidated (flushed) by software using Arm architecture set/way operations. Software specific to CMN-600 would instead be required to flush the SLC, as described in this TRM. Invisible SLC support eliminates the requirement to perform SLC flushes for software context switches from cacheable to non-cacheable.
- Supports up to two memory-region-based SN targets and one, three, or six SN-F address hashing

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4.2 HN-F configurable options

The HN-F can be configured in several ways.

The HN-F has the following configurable parameters:

- SLC size of 0KB, 128KB, 256KB, 512KB, 1MB, 2MB, 3MB, or 4MB
- SF size of 512KB, 1MB, 2MB, 4MB, or 8MB
- 32, or 64 POCQ entries
- One-cycle, two-cycle, or three-cycle Tag RAM arrays. For a given configuration, both SLC Tag and SF Tag have the same latency.
- Two-cycle or three-cycle Data RAMs, data, and SF array RAMs. All Data RAMs have the same latency.

The HN-F has the following fixed parameters:

- HN-F CHI interface data-VC (DAT) width of 256 bits

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4.3 Basic operation

CMN-600 system level cache is a distributed, mostly exclusive last-level cache.

The SLC is optimized to eliminate redundancy for private data lines from the RN-F, and enables redundancy, or pseudo-inclusion, when a sharing pattern is detected between RN-F clusters. CMN-600 SLC also acts as DRAM cache for I/O coherent agents, that is, RN-Is, by enabling RN-Is to allocate or not allocate, based on the usage model.

The SF works with the SLC to track coherent lines that are present in the RN-F caches. The SF is fully inclusive of all the lines present in the RN-F caches. SF eviction invalidates the lines from RN-F caches to maintain this inclusion.

Normally, a particular coherent cache line is present only in the system level cache or SF except when the line is shared between RN-F clusters. In the shared case, the line can be present in both the SLC and the SF.

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4.4 Cache maintenance operations

CMN-600 uses several CHI *Cache Maintenance Operation*s (CMOs).

The following operations are supported:

- CleanInvalid.
- CleanShared.
- MakeInvalid.
- CleanSharedPersist.

These operations always look up the SLC and the SF, and take the following actions:

- Clean and invalidate the line if present in the SLC.
- If the CMO is Snoopable, the HN-F sends a snoop to the RN-F post SF lookup if necessary.
- If the cache line is modified in the SLC or in the cache of the RN-Fs, the HN-F initiates a memory controller WriteBack if necessary.

Note

If the CMO is MakeInvalid, there is no WriteBack to the memory controller.

The SF does not track RN-F coherence while the HN-F is in NOSFSLC state. Therefore, the RN-F caches must be flushed before transitioning from NOSFSLC to SFONLY, HAM, or FAM states.

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4.5 Cacheable and Non-cacheable exclusives

The HN-F supports PoC monitor functionality for Cacheable and Snoopable exclusive operations from the RN-Fs.

The Cacheable and Snoopable exclusive transactions are:

- ReadShared.
- ReadClean.
- CleanUnique.
- ReadNotSharedDirty.

The HN-F also supports system monitor functionality for Non-cacheable exclusive support. For more information about exclusives, see the *Arm® AMBA® 5 CHI Architecture Specification*.

Note

Each HN-F in CMN-600 can support tracking of up to 64 logical processors for exclusive operations. The system programmer must ensure that there are no more than 64 logical processors capable of concurrently sending exclusive operations.

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4.6 TrustZone technology support

The HN-F supports TrustZone technology by treating the Non-secure bit from a request as part of the address.

TrustZone enables the HN-F to treat Secure and Non-secure as two different areas of the memory space:

- The NS bit is stored in the SLC and SF tags.
- Snoops also propagate the NS bit as part of the message.
- Any request to the memory controller also propagates the NS bit.

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4.7 Snoop connectivity and control

Each HN-F can send three types of snoop.

The available types of snoop request are:

- Directed, to one RN-F.
- Multicast, to more than one but not all.
- Broadcast, to all RN-Fs.

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4.8 QoS features

The HN-F protocol queue (POCQ) is a key shared system resource that communicates with the memory controller for external memory access.

The HN-F provides QoS capabilities in support of the following traffic classes:

- Real-time or pseudo-real-time traffic that requires a maximum bounded latency at potentially fixed bandwidth.
- Latency-sensitive traffic, traditionally from a processor device.

CMN-600 uses QoS values to designate these traffic classes. Every request to the HN-F has a 4-bit QoS value that is associated with it, with a higher number indicating a higher priority. The four QoS classes are:

- Highest priority (known as HighHigh).
- High priority.
- Medium priority.
- Low priority.

This section contains the following subsections:

- *4.8.1 QoS decoding* on page 4-1094.
- *4.8.2 QoS class and POCQ resource availability* on page 4-1094.

4.8.1 QoS decoding

QoS decoding takes place inside the HN-F.

The QoS decoding is as follows:

- The CHI interface supports a 4-bit QoS value.
- The 4-bit QoS has 16 possible values. For the QoS ranges and class values in HN-F, refer to *Table 2-12 QoS classes in HN-F* on page 2-74.
- QoS mapping is fixed, and is shown in the qos_band register.

The POCQ is logically partitioned to service different QoS class traffic. The HN-F also uses the priorities in the table to arbitrate for the following:

- Memory controller request selection in the POCQ control block.
- Data return selection logic, that is, a CompData to a requester.
- Protocol credits that are sent to an RN-F or RN-I following a protocol-layer retry.

4.8.2 QoS class and POCQ resource availability

The POCQ buffers are shared resources for all QoS classes.

The higher the QoS class, the higher the occupancy availability. For example, the *HighHigh* (HH) QoS class can use all the POCQ entries except for the dedicated SF pool.

The following figure shows the availability of POCQ resources for various QoS levels, using a particular QoS pool that is shared between multiple QoS classes.

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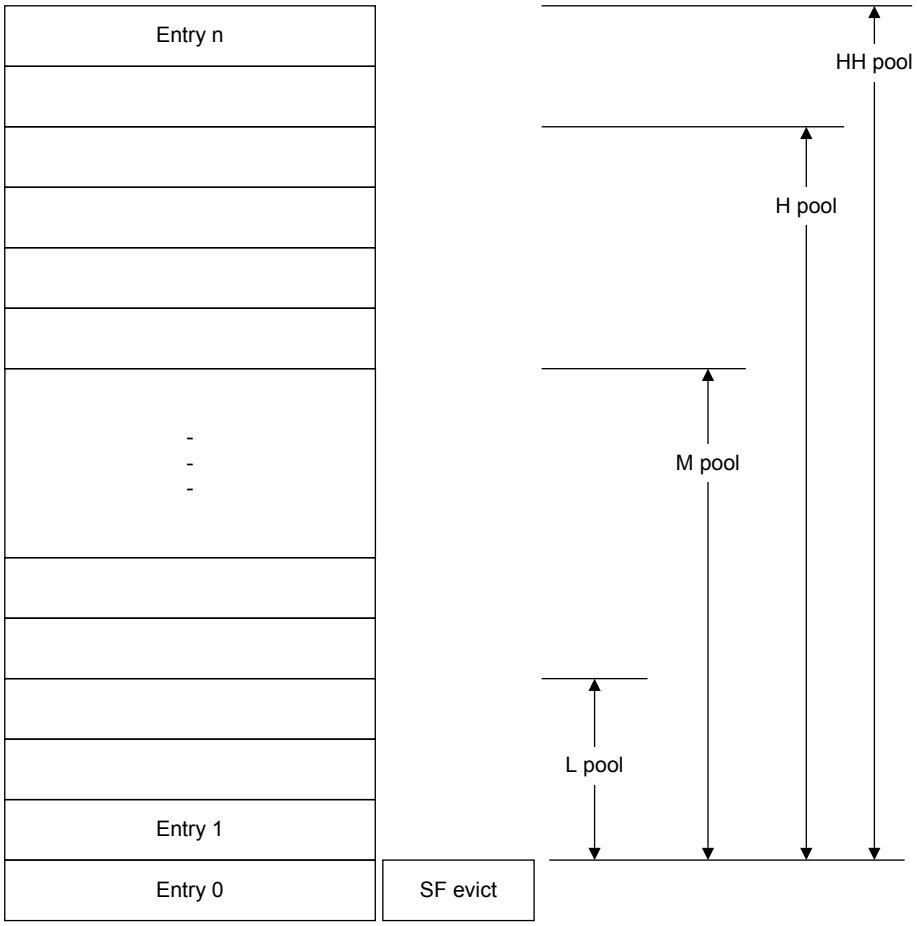

Figure 4-1 POCQ availability and QoS classes

The QoS pools are:

hh_pool Available for HH class.

h_pool Available for H class and HH class.

m_pool Available for M class, H class, and HH class.

l_pool Available for all classes.

seq SF evictions only.

This scheme enables a higher-priority QoS class to have more POCQ resources for transaction processing, and prevents a lower-priority QoS from using all the POCQ. The level of POCQ availability decreases for the lower QoS classes.

QoS pool distribution of the POCQ is software-configurable using the qos_reservation register.

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4.9 Hardware-based cache flush engine

CMN-600 contains a hardware-based cache flush engine. The flush engine, flush sequence, write-back modes, and the SF and SLC Caches also form part of the hardware-based cache flush process.

This section contains the following subsections:

4.9.1 Address-Based Flush (ABF) configuration registers

These registers are used to set the lower and upper range addresses of the *Address-Based Flush* (ABF) configuration registers per HN-F instance. They also indicate when a flush starts and finishes.

The ABF configuration registers per HN-F instance are:

por_hnf_abf_lo_addr The ABF lower range address.

por_hnf_abf_hi_addr The ABF upper range address.

por_hnf_abf_pr This configuration register is the ABF Policy Register. This register triggers a flush start and indicates the flush operation type.

por_hnf_abf_sr ABF Status Register. This register indicates the flush is complete and other status information.

4.9.2 CMN-600 flush engine

The CMN-600 flush engine ensures all cache lines are flushed and indicates the process has completed.

The flush engine ensures that all cache lines in the lower and upper range are flushed from the CMN-600 SF and SLC. When all cache lines within this range are flushed, a Status Register bit is set indicating that the flush engine has completed. If enabled, an interrupt (**INTREQPPU**) is then sent.

Note

Interrupt indication and complete bit in Status Registers are set regardless of normal completion or abort condition. Error bits in the Status Register are checked to determine if the Flush request completed normally or was aborted.

4.9.3 Flush engine sequence

The CMN-600 flush enine sequence flushes the CMN-600 SFs and the CMN-600 SLC.

1. Flush CMN-600 SFs. This operation flushes the lines in the lower-level caches, lower-level write-backs go to memory and are not allocated to the CMN-600 SLC.
2. Flush the CMN-600 SLC.
3. On completion of the flush:
   a. The HN-F sets the status bit when the flush is complete for that HN-F. If there are error conditions, they are also set in the Status Register. The Status Register is cleared when next ABF request starts.
   b. The HN-F sends a completion message to the global Power/Clock/Reset unit, and an OPTIONAL **INTREQPPU** is asserted when all HN-F instances have completed the flush.

Flush engine sequence and ABF requests

ABF requests are processed in parallel to other ongoing requests from RNs.

However, if an ABF request and another ongoing request target the same address, no ordering or coherency guarantee is provided. Power management transition requests have higher precedence than

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ABF requests. An ABF request is only supported when the Power management state is in FAM, HAM, or SFONLY mode and the retention state is IDLE or RETENTION (not transitionary). While ABF is in progress, any update to the *Power Policy Register* (PWPR) causes ABF state machine to abort and the Power management request proceeds.

4.9.4 Flush engine write-back modes

There are several CMN-600 flush engine write-back modes to memory. You can configure the write-back modes to memory.

By default, the flush engine writes back any modified data to memory before invalidating the cache line from internal caches. Two more configuration modes are provided for user flexibility. In total, the three modes are:

CleanInvalid Write back and invalidate (default).

MakeInvalid In this mode, modified data is not written back to memory. You can configure this mode if necessary.

CleanShare In this mode, modified data is written back to memory but clean data remain in internal caches. You can configure this mode if necessary.

If *On Chip Memory* (OCM) is enabled and the address range overlaps with the ABF range, OCM behavior supersedes ABF. For SLC, this condition means that for CleanInvalid and CleanShare modes, no action would be taken. For MakeInvalid, there would be no difference in behavior regardless of whether the address is in the OCM range or not. For SF flush, the behavior is the same between an OCM address match and not.

Write-backs and On Chip memory

If *On Chip Memory* is enabled, these write-back behaviors occur between the *Address Based Flush* (ABF) range and *On Chip Memory* (OCM).

If *On Chip Memory* is enabled and the address range overlaps with the ABF range, OCM behavior supersedes ABF. For SLC, this condition means that for CleanInvalid and CleanShare modes, no action would be taken. For MakeInvalid, there would be no difference in behavior regardless of whether the address is in the OCM range or not. For SF flush, the behavior is the same between an OCM address match and not.

4.9.5 SF and SLC caches

The CMN-600 SF and SLC cache operations for the erite-back modes and their relevant states in ABF mode.

The following tables provide a summary of SF and SLC caches for all three modes.

Table 4-1 SF Cache operation

SF state	Hit		Miss	
ABF mode	**SNP type to RN-F**	**Change SF state?**	**SNP to RN-F**	**Change SF state?**
CleanInvalid	CleanInvalid	Yes	N/A	No
MakeInvalid	MakeInvalid	Yes	N/A	No
CleanShared	CleanShared	Yes*	N/A	No

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Table 4-2 SLC Cache operation

SLC state		Modified		Exclusive or Shared		Invalid	
ABF mode	**OCM match?**	**Evict line?**	**Change L3 state? (Final state)**	**Evict line?**	**Change L3 state? (Final state)**	**Evict line?**	**Change L3 state? (Final state)**
CleanInvalid	No	Yes	Yes (I)	No	Yes (I)	No	No (I)
	Yes	No	No (M)	No	No (ES)	No	No (I)
MakeInvalid	No	No	Yes (I)	No	Yes (I)	No	No (I)
	Yes	No	Yes (I)	No	Yes (I)	No	No (I)
CleanShared	No	Yes	Yes (E)	No	No (ES)	No	No (I)
	Yes	No	No (M)	No	No (ES)	No	No (I)

Note

The following assumptions are made:

- To ensure coherency and ordering is maintained, RNs must not access a cache line (within flush range) while ABF is in progress.
- Address ranges and trigger must be programmed for each HN-F in the SCG.
- Do not change ABF-related configuration register bits when trigger bit (abf_enable) is set, until the status register indicates flush is done (abf_complete).
- HN-F must be in one of the three operational modes (FAM, HAM, SFONLY). When Flush starts, any update to the PWPR causes ABF to abort.
- SF must be enabled. If SF is disabled, flush engine aborts with error status.
- When ABF completes, check the Status Register to ensure ABF completed without any errors. If ABF aborted for any reasons, it would be indicated in the Status Register.

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4.10 DataSource handling

CMN-600 populates the DataSource field of a CompData response to specify the source of the data.

DataSource information can be used:

- To determine the usefulness of a PrefetchTgt (Memory controller prefetch) transaction.
- To profile and debug software to evaluate and optimize data sharing patterns.

Table 4-3 DataSource encodings

Source of data	Message	Encoding
HN-I	Default (Non-memory source)	`0b0000`
RN-F	Peer processor cache within local cluster	`0b0001`
RN-F	Local cluster cache	`0b0010`
HN-F	*System Level Cache* (SLC)	`0b0011`
RN-F	Peer cluster cache	`0b0100`
Remote chip	Remote chip caches	`0b0101`
SN-F or SBSX	PrefetchTgt was useful.	`0b0110`
SN-F or SBSX	PrefetchTgt was not useful.	`0b0111`

CMN-600 drives the DataSource value only when the source of the data is either HN-F or HN-I. For other data sources, CMN-600 acts as a conduit.

The encoding that is used by CMN-600 to indicate a data source is the same as the suggested value in the *Arm® AMBA® 5 CHI Architecture Specification*. Any deviation from the specified encodings might result in unexpected behavior.

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4.11 Software configurable memory region locking

The HN-F supports variable size memory regions that can be locked in the system level cache with way reservation.

These variable size memory regions ensure that locked lines are not evicted from the SLC. Any access to those lines is guaranteed to hit in the SLC. The variable memory region is calculated as a factor of the total SLC size and number of ways that are locked. For example, consider an SLC that is built with 16 ways. In this case, way locking of 1, 2, 4, 8 or 12 yields 1/16, 2/16, 4/16, 8/16 or 12/16 of the SLC size respectively.

Software uses the following mechanism to program the HN-F configuration registers to enable region locking:

- The hnf_slc_lock_ways register specifies the total number of locked HN-F system level cache ways. This register can have a value of 1, 2, 4, 8, or 12.
- The following region base registers specify the base address of the region that is using locked ways:
  - hnf_slc_lock_base0 register
  - hnf_slc_lock_base1 register
  - hnf_slc_lock_base2 register
  - hnf_slc_lock_base3 register
- A combination of the total SLC size, hnf_slc_lock_ways register, and the hnf_slc_lock_base0 register to hnf_slc_lock_base3 register defines the following:
  - The total amount of cache that is locked, calculated as follows:

$$\frac{\text{Total SLC size x Number of locked ways}}{16}$$

Figure 4-2 Total cache locked equation

  - Ways are locked beginning with way 0 and then in ascending order
  - The number of valid regions and exactly which regions are valid and included in the HN-F way allocation. This definition therefore indicates which of the hnf_slc_lock_base0 to hnf_slc_lock_base3 registers are valid and included in the HN-F way allocation.
  - The exact location, size, and alignment requirement of each region
- The region alignment is identical to the region size, for example:
  - A 0.5MB region is aligned to any 0.5MB boundary
  - A 4MB region is aligned to any 4MB boundary
- The size and alignment requirement is enforced in hardware, to prevent any errors in software
- Regions can be disjointed or contiguous, to create a larger single region
- All valid regions use all locked ways. There is no application-level way segregation.
- The HN-F must be in the FAM power state. Memory Region Locking is not supported in other CMN-600 power states

Note

The locked regions do not comprehend Secure as opposed to Non-secure memory regions, so if aliasing is performed between Secure and Non-secure regions, overlocking can occur.

The following tables specify various combinations of region size and the number of locked ways that software must program. Software can program these values using the hnf_slc_lock_ways register and the hnf_slc_lock_base0 register to hnf_slc_lock_base3 register.

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Table 4-4 SLC Region Lock sizes

SLC size	Number of locked ways	Total locked region size	Locked ways	Number of ways per region	Region 0	Region 1	Region 2	Region 3
8MB	1	0.5MB	0	1	0.5MB	-	-	-
8MB	2	1MB	0-1	1, 1	0.5MB	0.5MB	-	-
8MB	4	2MB	0-3	1, 1, 1, 1	0.5MB	0.5MB	0.5MB	0.5MB
8MB	8	4MB	0-7	2, 2, 2, 2	1MB	1MB	1MB	1MB
8MB	12	6MB	0-11	2, 2, 4, 4	1MB	1MB	2MB	2MB

Table 4-5 Settings for hnf_slc_lock_baseX

Region size	Valid bits
0.5MB	[PA_WIDTH-1:19]
1MB	[PA_WIDTH-1:20]
2MB	[PA_WIDTH-1:21]
4MB	[PA_WIDTH-1:22]
8MB	[PA_WIDTH-1:23]

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4.12 Software-configurable On-Chip Memory

The CMN-600 HN-F supports software configurable *On-Chip Memory* (OCM) which allows for the creation of systems without physical DDR memory. It also allows a system to use SLC as scratchpad memory.

In OCM mode, the HN-F does not send requests to the SN-F. To enable OCM, the following requirements must be met:

- The HN-F must be in the FAM power state. Other CMN-600 power states are not supported in OCM mode.
- All OCM ways must be same across all HN-Fs in a system cache group.
- OCM mode must be enabled before any non-config accesses are sent to HN-F.

In OCM mode, the following CMOs terminate in the SLC:

- CleanInvalid and CleanShared CMOs terminate in the SLC without invalidation or performing a WriteBack to the SN-F.
- MakeInvalid invalidates the cache line in SLC, and can be used to invalidate the OCM region.

OCM mode can be enabled by programming the hnf_ocm_en bit in the por_hnf_cfg_ctl register. If the hnf_ocm_allways_en bit is set to 1, then all transactions targeting the HN-Fs have OCM behavior. The OCM region must be contiguous and aligned to the total SLC size of the configuration when the hnf_ocm_allways_en is set to 1. If the hnf_ocm_allways_en bit is 0, region locking registers define the OCM regions. For more information about these region locking registers, see *4.11 Software configurable memory region locking* on page 4-1100.

Note

Region locking registers do not explicitly control Secure and Non-secure memory regions. Therefore combined Secure and Non-secure memory regions should not exceed the total SLC size that is locked for OCM.

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4.13 CMO propagation from HN-F to SN-F/SBSX

CMN-600 supports propagation of CMO and PCMO requests for a given cache line to the memory controller.

This feature ensures that the cache line has been written to the memory controller and any copies in the CMN-600 system have been removed. Conditional CMO and PCMO propagation to the memory controller also supports external DRAM caches. This feature can be enabled or disabled in each HN-F's por_hnf_sam_sn_properties register bits corresponding to each SN-F. For SBSX with AXI4 slave memory device, CMO and PCMO propagation must be disabled in HN-F.

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4.14 Source-based SLC cache partitioning

HN-F supports a feature to lock SLC ways for requesting nodes RN-F, RN-I, and RN-D.

This feature is an extension of the address-based way locking but the locked ways are based on the requestors instead of the programmed address. CMN-600 supports programming of the number of ways that can be locked, RN devices for which these ways are locked and allocation policies in each HN-F. With this feature enabled, the locked SLC ways are only available to the programmed RNs for any new cache line allocations.

Source-based way locking feature can be enabled by programming the por_hnf_rn_region_lock.rn_region_lock_en bit to 1 in each HN-F instance. The requesting nodes, for which these ways are to be locked must also be explicitly enabled in the por_hnf_rn*region_vec registers. The requesting nodes are individually identified using the logical IDs. CMN-600 has three RN types: RN-F, RN-I, and RN-D. Each requesting node type has different registers and is uniquely identified in a CMN-600 system using logical IDs. The number of ways that are locked are programmed in the por_hnf_slc_lock_ways.ways field.

The region locking feature has two allocation modes:

- Allocating new cache lines for matching RNs only in the locked ways. By doing so, the matching RNs are restricted to allocate to the locked partition only. This mode can be enabled by setting por_hnf_rn_region_lock.rn_pick_locked_ways_only bit to 1.
- Allocating new cache lines for matching RNs to one of the locked or unlocked ways. This mode is the default behavior. In this mode, the locked ways are restricted only to the matching RNs but the unlocked ways are accessible by all the RNs.

Source-based SLC cache partitioning is supported only when *Enhanced LRU* (eLRU) mode is used.

——— **Note** ———

The HN-F must be in the FAM power state. Source-based cache partitioning is not supported in other CMN-600 power states.

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4.15 Way-based SLC cache partitioning

Each SLC cache instance can be partitioned into different regions. This partitioning allows each requesting node (RN-F, RN-I, RN-D) to allocate in one or more regions, each consisting of four consecutive ways.

Each region group has configuration registers that indicate which of the logical RN-F/RN-I/RN-D masters can allocate to the corresponding group of SLC ways. By default, all RNs can allocate all 16 ways, as the following tables show.

Table 4-6 Logical RN-F ID requesting node

Register	Address offset	Ways reserved	Default	Logical RN-F ID								
				63	62	61	60	----	3	2	1	0
por_hnf_slcway_partition0_rnf_vec	0xC48	[3:0]	{64'{1'b1}}									
por_hnf_slcway_partition1_rnf_vec	0xC50	[7:4]	{64'{1'b1}}									
por_hnf_slcway_partition2_rnf_vec	0xC58	[11:8]	{64'{1'b1}}									
por_hnf_slcway_partition3_rnf_vec	0xC60	[15:12]	{64'{1'b1}}									

Table 4-7 Logical RN-I ID requesting node

Register	Address offset	Ways reserved	Default	Logical RN-I ID								
				31	30	29	28	----	3	2	1	0
por_hnf_slcway_partition0_rni_vec	0xC68	[3:0]	{32'{1'b1}}									
por_hnf_slcway_partition1_rni_vec	0xC70	[7:4]	{32'{1'b1}}									
por_hnf_slcway_partition2_rni_vec	0xC78	[11:8]	{32'{1'b1}}									
por_hnf_slcway_partition3_rni_vec	0xC80	[15:12]	{32'{1'b1}}									

Table 4-8 Logical RN-D ID requesting node

Register	Address offset	Ways reserved	Default	Logical RN-D ID								
				31	30	29	28	----	3	2	1	0
por_hnf_slcway_partition0_rnd_vec	0xC88	[3:0]	{32'{1'b1}}									
por_hnf_slcway_partition1_rnd_vec	0xC90	[7:4]	{32'{1'b1}}									
por_hnf_slcway_partition2_rnd_vec	0xC98	[11:8]	{32'{1'b1}}									
por_hnf_slcway_partition3_rnd_vec	0xCA0	[15:12]	{32'{1'b1}}									

The registers in these tables are used to mask the ways that are available for an RN to allocate to at all times. A value of:

`0b1` Indicates that the corresponding Logical RN ID can allocate in this region.

`0b0` Indicates that the corresponding Logical RN ID cannot allocate to this region.

To enable the way reservation only to a subset of RNs, the mask in the preceding registers must be programmed as the following example shows:

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Example 4-1 Reserve ways 0-3 for RN-F {0-3}

1. Write `64'h000000000000000F` to por_hnf_slcway_partition0_rnf_vec. This operation enables logical RN-F IDs 0, 1, 2, and 3 to allocate to ways 0-3. All other RN-F IDs (4-63) cannot allocate to these ways.
2. Write `32'h0` to por_hnf_slcway_partition0_rni_vec. This operation disables all 32 RN-Is from allocating to ways 0-3.
3. Write `32'h0` to por_hnf_slcway_partition0_rnd_vec. This operation disables all 32 RN-Ds from allocating to ways 0-3.

Note

The following conditions apply to this example:

- This feature cannot be used if region-based locking, source-based locking, or OCM is enabled.
- The region registers can be changed at runtime.
- When the way partitioning scheme is not being used, the preceding registers must be returned to the default values.
- Each RN should be configured to allocate to at least one partition. Setting the bit for a given RN to 0 in all partition registers defaults it to allocating in any partition.
- RN-I and RN-D each support a maximum logical ID of 32 in the partition mask register. In CML configurations, care must be taken to assign LDID to remote RN-I and RN-Ds above the local RN-I and RN-D logical IDs. This requirement ensures that SLC partitioning is honored correctly across all RN-Is and RN-Ds.

Way-based SLC cache partitioning is supported only when *Enhanced LRU* (eLRU) mode is used.

Note

The HN-F must be in the FAM power state. Cache partitioning is not supported in other CMN-600 power states.

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4.16 Error reporting and software-configured error injection

HN-F detects and reports several types of errors to the error block.

HN-F supports the following types of errors:

Correctable Errors
For example, single-bit ECC error detection and correction in the SLC Tag RAM, SF Tag RAM, and SLC Data RAM

Deferred Errors
For example, double-bit ECC error detection in SLC Tag RAM and double-bit ECC error detection in SLC Data RAM

Uncorrectable Errors
For example, double-bit ECC errors in the SLC Tag RAMs

If the DATACHECK_EN parameter is enabled, HN-F can also support Data parity error detection in the SLC Data RAM. These errors are logged as Deferred Errors.

For logging and reporting all error types, HN-F follows the procedures described in *2.14 Reliability, Availability, and Serviceability* on page 2-83.

For information regarding the error source, see the ERRSRC field of *por_hnf_errmisc* on page 3-373.

4.16.1 Software-configurable error injection

The HN-F supports software-configurable error injection and reporting. This feature enables testing of the software error handler routine for SLC double-bit ECC data errors.

The HN-F configuration register for a particular logical thread enables configurable error injection and reporting.

Any Cacheable read for which the HN-F is the source of the data is defined as a system cache hit. If error injection and reporting are enabled, any system cache hit drives the slave error from the system cache pipe and a fault interrupt through the RAS control block for that read. This functionality emulates a double-bit ECC error in the SLC data RAM but does not pollute the SLC data RAM through the fill path.

Note

This mechanism is designed to mimic SLC data ECC errors for SLC hits. SLC misses do not drive any errors or error interrupts. If enabled, this mechanism causes only an error to be logged and optionally an interrupt to be generated. Error injection on SLC hits does not alter the Resp*, Poison, or Data fields in the DAT flit that is returned to the RN.

For more information about configuring error injection, see *por_hnf_err_inj* on page 3-375.

4.16.2 Software-configurable parity error injection

The HN-F supports software-configurable parity error injection.

This feature enables testing of the software error handler routine for parity error. For more information about enabling this feature, see *por_hnf_byte_par_err_inj* on page 3-376. This register specifies the byte lane from 0-31 in which a parity error is introduced. The memory data is uncorrupted with such injection, but the Data Check field of the DAT flit that is returned to an RN is altered.

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Chapter 5
Debug trace and PMU

This chapter describes the *Debug Trace* (DT) and *Performance Monitoring Unit* (PMU) features.

It contains the following sections:

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5.1 Debug trace system overview

CMN-600 provides at--speed self-hosted *Debug Trace* (DT) capabilities.

The CMN-600 DT capabilities include:

- Watchpoint-initiated and trace-tag-initiated transaction tracing
- Globally synchronized cycle counters for precise tracing
- CHI trace tag generation
- CoreSight™ ATB trace streaming
- Access to trace data through configuration registers
- Cross trigger support
- Secure debug support
- Event-based interrupts

The CMN-600 DT system consists of a set of *Debug Trace Controllers* (DTCs) and *Debug Trace Monitors* (DTMs) distributed across the interconnect. DTCs are located inside HN-Ds and HN-Ts while DTMs are located inside XPs.

All DTCs, including the master DTC, have an ATB interface and the following signals:

- **DBGWATCHTRIGREQ**
- **DBGWATCHTRIGACK**
- **INTREQPMU**

The following signals are only present in the master DTC:

- **NIDEN**
- **SPNIDEN**
- **PMUSNAPSHOTREQ**
- **PMUSNAPSHOTACK**

——— **Note** ———

NIDEN and **SPNIDEN** are propagated from the master DTC to all DTMs. When asserted, they must remain asserted for at least 72 clock cycles. Likewise, when deasserted, they must remain deasserted for at least 72 clock cycles. This requirement ensures that all internal CMN-600 components transit into their debug and trace states correctly.

———————————

The following figure shows an example DT system with two DTC domains.

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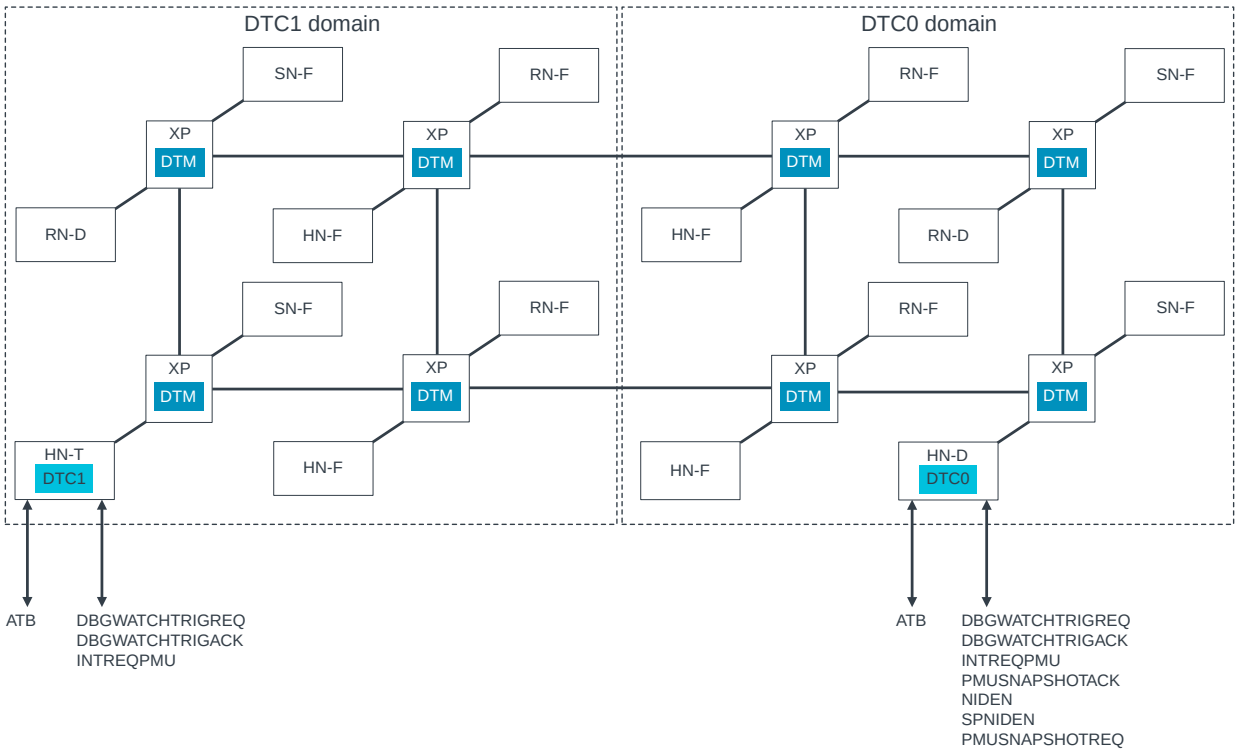

Figure 5-1 Example DT system with two DTC domains

Note

We recommend one DTC domain per 16 XPs.

Each DTC is associated with a set of DTMs to form an exclusive DTC domain. When enabled, DTMs within a DTC domain collect trace data and transmit it to the associated DTC. The number of HN-T nodes in the mesh determines the number of DTC domains.

In a DT system comprising multiple DTCs, the DTC that is located inside the HN-D is designated as the master DTC or DTC0. You assign DTMs to DTCs by configuring XP parameters within Socrates System Builder.

Each DTC domain must be built using contiguous XPs.

The DT system implements the following functions:

- Monitoring of CHI flits at XP device ports using four sets of *WatchPoints* (WPs) in each DTM
- Flit trace generation and storage at each DTM with control register access to trace packets
- Trace tag generation
- Debug trigger signaling and trace packet streaming over the ATB at each DTC
- Internal event-based cross trigger generation and broadcast to all DTMs
- Globally synchronized cycle counters

This section contains the following subsections:

- *5.1.1 DTM watchpoint* on page 5-1110.
- *5.1.2 DTM FIFO buffer* on page 5-1114.
- *5.1.3 Read mode* on page 5-1117.
- *5.1.4 DTC* on page 5-1117.
- *5.1.5 ATB packets* on page 5-1118.

5.1.1 DTM watchpoint

A DTM has four WPs that monitor flit uploads and downloads at XP device ports.

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WPs monitor flits by matching on a subset of flit fields that you specify using a pair of val and mask registers. The following figure shows the WP comparator and the registers that control this functionality.

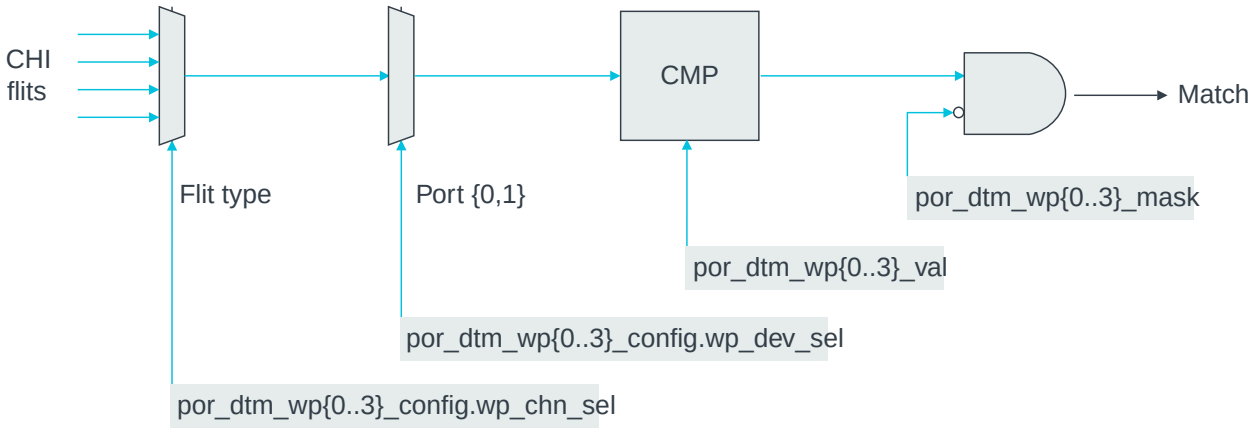

Figure 5-2 DTM WP comparator

A WP can be configured to monitor flits from one of two XP device ports and one of fourCHI channels:

- REQ
- RSP
- SNP
- DAT

In addition, you can configure the WP to perform one or more of the following tasks on detecting a flit match:

- Set trace tag bit on the flit
- Generate flit trace
- Generate cross trigger to DTC
- Generate debug trigger to DTC
- Increment PMU counters

Note

You can combine two WPs within a group for complex matching. For example, you can combine WP0 and WP1, just as you can combine WP2 and WP3.

The four DTM WPs are assigned to flit uploads and downloads according to the following groups:

- WP0 and WP1 are assigned to flit uploads
- WP2 and WP3 are assigned to flit downloads

WP match value and mask register

The WP flit matching criterion is specified using a 64-bit match value register dtm_wpN_val and a 64-b mask register dtm_wpN_mask, where N=0, 1, 2, or 3. These registers permit matching up to 64-bits of the flit.

The value to be matched is written in the `dtm_wpN_val` register. Bits that must be masked off in the match comparison are specified in the `dtm_wpN_mask` register by writing a `1'b1` in the corresponding bit positions.

The CHI flits fields are divided into two match groups: a primary match group, and a secondary match group. The following tables specify the flit fields that belong to each of the groups for the different CHI channels. The RSP and DAT channels have only a primary match group while REQ and SNP channels have both primary and secondary match groups.

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Flit matching from two different match groups requires two WPs to be combined. For example, if both the Opcode and Address fields of flits uploaded on the REQ channel are to be matched, then WP0 and WP1 must be combined with the Opcode match specified in WP0 and the Address match specified in WP1, or conversely. Furthermore, if both Opcode and Address fields of flits downloaded on the REQ channel must match, then WP2 and WP3 must be combined in a similar manner.

The following table contains the REQ channel width and bit ranges for the primary match group.

Table 5-1 REQ channel: primary match group

Field	Width	Bit range
SRCID and TGTID	11	[10:0]
STASHNID and RETURNNID	11	[21:11]
STASHNIDVALID/ENDIAN	1	[22]
RETURNTXNID/{3'b0, STASHLPIDVALID, STASHLPID[3:0]}	8	[30:23]
OPCODE	6	[36:31]
SIZE	3	[39:37]
NS	1	[40]
ALLOWRETRY	1	[41]
ORDER	2	[43:42]
PCRDTYPE	4	[47:44]
LPID	5	[52:48]
EXPCOMPACK	1	[53]
TRACETAG	1	[54]
RSVDC	8	[62:55]

The following table contains the REQ channel width and bit ranges for the secondary match group.

Table 5-2 REQ channel: secondary match group

Field	Width	Bit range
QOS	4	[3:0]
ADDR	48	[51:4]
LIKELYSHARED	1	[52]
MEMATTR	4	[56:53]
SNPATTR	1	[57]
EXCL and SNOOPME	1	[58]
TRACETAG	1	[59]

The following table contains the RSP channel width and bit ranges for the primary match group.

Table 5-3 RSP channel: primary match group

Field	Width	Bit range
QOS	4	[3:0]
SRCID and TGTID	11	[14:4]
OPCODE	4	[18:15]

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Table 5-3 RSP channel: primary match group (continued)

Field	Width	Bit range
RESPERR	2	[20:19]
RESP	3	[23:21]
FWDSTATE and STASH	3	[26:24]
DBID	8	[34:27]
PCRDTYPE	4	[38:35]
TRACETAG	1	[39]
DEVEVENT	2	[41:40]

The following table contains the SNP channel width and bit ranges for the primary match group.

Table 5-4 SNP channel: primary match group

Field	Width	Bit range
SRCID	11	[10:0]
FWDTXNID / {3'b0, STASHLPIDVALID, STASHLPID[3:0]} and VMIDEXT	8	[18:11]
OPCODE	5	[23:19]
NS	1	[24]
DONOTGOTOSD	1	[25]
RETTOSRC	1	[26]
TRACETAG	1	[27]
ADDR[35:0]	36	[63:28]

The following table contains the SNP channel width and bit ranges for the secondary match group.

Table 5-5 SNP channel: secondary match group

Field	Width	Bit range
SRCID	11	[10:0]
FWDTXNID {3'b0, STASHLPIDVALID, STASHLPID[3:0]} and VMIDEXT	8	[18:11]
OPCODE	5	[23:19]
NS	1	[24]
DONOTGOTOSD	1	[25]
RETTOSRC	1	[26]
TRACETAG	1	[27]
QOS	4	[31:28]
ADDR[44:13]	32	[63:32]

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The following table contains the DAT channel width and bit ranges for the primary match group.

Table 5-6 DAT channel: primary match group

Field	Width	Bit range
QOS	4	[3:0]
SRC and TGTID	11	[14:4]
HOMENID	11	[25:15]
OPCODE	3	[28:26]
RESPERR	2	[30:29]
RESP	3	[33:31]
FWDSTATE and STASH	3	[36:34]
DBID	8	[44:37]
CCID	2	[46:45]
DATAID	2	[48:47]
TRACETAG	1	[49]
POISON	1	[50]
CHUNKV	2	[52:51]
DEVEVENT	2	[54:53]
RSVDC	8	[62:55]

Note

chunkv[1:0] denotes whether the upper or lower 128-bits of data are valid.

5.1.2 DTM FIFO buffer

Traces captured by the DTM are stored in a four-entry DTM FIFO buffer. Each entry is 144-bits wide.

Entries are allocated to all enabled WPs as required. Trace data from WPs are packed based on the trace data format and stored within each entry to efficiently use the limited buffer storage. Therefore, an entry might contain trace data from multiple flits captured at different times.

As each FIFO entry is filled, trace data from that entry is sent to the DTC for streaming out through the ATB interface.

Trace data format

CMN-600 supports several trace data formats.

The 3-bit packet type encoding in the DTM WP configuration register, por_dtm_wp{0..3}_config.wp_pkt_type, specifies the trace data format. The following table provides the supported trace data formats and their packet type encodings.

Table 5-7 Trace data formats

Packet type	Trace data format	Size	Max traces per FIFO entry
`000`	TXNID[7:0]	8-bits	18
`001`	{`2'b00`, OPCODE[5:0],TXNID[7:0]}	16-bits	9
`010`	{TGTID[10:0], SRCID[10:0], OPCODE[5:0],TXNID[7:0]}	36-bits	4

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Table 5-7 Trace data formats (continued)

Packet type	Trace data format		Size	Max traces per FIFO entry
011	Reserved		-	-
100	Control Flit (see the following tables for field descriptions)	REQ	141-bits	1
		RSP	61-bits	
		SNP	96-bits	
		DAT	83-bits	
101	Reserved		-	-
110	Reserved		-	-
111	Reserved		-	-

Trace data is packed into a DTM FIFO buffer entry which means the higher-order bytes contain older trace data. For example, if the trace data format is set to TXNID (type 0) and three TXNIDs (trace data) are received in the order `0x01`, followed by `0x02`, followed by `0x03`, then the trace FIFO entry is set to:

- `0000_0000_0000_0000_0000_0000_0000_0001_0203`

The following tables describe the control flit formats for various flit channels beginning with REQ control flit information.

Table 5-8 REQ control flit

Field	Width	Bit range
QOS	4	3:0
TGTID	11	14:4
SRCID	11	25:15
TXNID	8	33:26
STASHNID and RETURNNID	11	44:34
STASHNIDVALID and ENDIAN	1	45:45
RETURNTXNID / {`3'b0`, STASHLPIDVALID, STASHLPID[3:0]}	8	53:46
OPCODE	6	59:54
SIZE	3	62:60
NS	1	63:63
LIKELYSHARED	1	64:64
ALLOWRETRY	1	65:65
ORDER	2	67:66
PCRDTYPE	4	71:68
MEMATTR	4	75:72
SNPATTR	1	76:76
LPID	5	81:77
EXCL and SNOOPME	1	82:82
EXPCOMPACK	1	83:83
TRACETAG	1	84:84
ADDR	48	132:85

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Table 5-8 REQ control flit (continued)

Field	Width	Bit range
RSVDC	8	140:133
Total	141	-

The following table contains RSP control flit information.

Table 5-9 RSP control flit

Field	Width	Bit range
QOS	4	3:0
TGTID	11	14:4
SRCID	11	25:15
TXNID	8	33:26
OPCODE	4	37:34
RESPERR	2	39:38
RESP	3	42:40
FWDSTATE and STASH	3	45:43
DBID	8	53:46
PCRDTYPE	4	57:54
TRACETAG	1	58:58
DEVEVENT	2	60:59
Total	61	-

The following table contains SNP control flit information. See also *6.11 DEVEVENT* on page 6-1160 for more DEVEVENT information.

Table 5-10 SNP control flit

Field	Width	Bit range
QOS	4	3:0
SRCID	11	14:4
TXNID	8	22:15
FWDNID	11	33:23
FWDTXNID / {`3'b0`, STASHLPIDVALID, STASHLPID[3:0]} / VMIDEXT	8	41:34
OPCODE	5	46:42
NS	1	47:47
DONOTGOTOSD	1	48:48
RETTOSRC	1	49:49
TRACETAG	1	50:50
ADDR	45	95:51
Total	96	-

The following table contains DAT control flit information.

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Table 5-11 DAT control flit

Field	Width	Bit range
QOS	4	3:0
TGTID	11	14:4
SRCID	11	25:15
TXNID	8	33:26
HOMENID	11	44:34
OPCODE	3	47:45
RESPERR	2	49:48
RESP	3	52:50
FWDSTATE and STASH	3	55:53
DBID	8	63:56
CCID	2	65:64
DATAID	2	67:66
TRACETAG	1	68:68
POISON	4	72:69
CHUNKV	2	74:73
DEVEVENT	2	76:75
RSVDC	8	84:77
Total	85	-

See also *6.11 DEVEVENT* on page 6-1160 for more DEVEVENT information.

——— **Note** ———

chunkv[1:0] denotes whether the upper or lower 128-bits of data are valid.

———————————

5.1.3 Read mode

Read mode provides an alternate way to access trace data that is stored in the DTM trace FIFO buffer, through configuration register access.

Each entry in the FIFO buffer is mapped to three 64-bit configuration registers, dtm_fifo_entry{0..3}_X, where X = 0, 1, or 2.

To enable read mode, set the trace_no_atb bit in the por_dtm_control register. Setting this bit clears all FIFO entries and resets the por_dtm_fifo_entry_ready register.

In this mode, each FIFO entry is allocated to the corresponding WP. For example, por_dtm_fifo_entry0_{0..2} is allocated to WP0 and por_dtm_fifo_entry1_{0..2} is allocated to WP1.

The availability of WP trace data for each FIFO entry is reflected in the corresponding bit in the por_dtm_fifo_entry_ready register. When a FIFO entry is full, the corresponding status bit is set, indicating that the trace data is ready to be read. Subsequent writes into that FIFO entry are disabled until the status bit is cleared. A write of 1 clears the status bit and enables the corresponding FIFO entry to capture subsequent trace data.

5.1.4 DTC

DTCs control DTMs.

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The main features of the DTC are:

- Trace packing, generation, and streaming through ATB interface
- Time stamping of traces
- Global synchronized cycle counters in all units (16-bit)
- ATB flush of DTM and DTC
- Watchpoint trigger event-based interrupt
- Eight sets of performance counters (32-bit) with shadow registers, which are paired with one or more DTM local counters
- PMU snapshot of DTM and DTC.
- PMU overflow interrupt.

5.1.5 ATB packets

Each DTC has an ATB interface and generates ATB packets to send downstream through this interface. There are different varieties of ATB packets which are used for different functions.

Each DTC aggregates flit trace data from the DTMs into the DTC trace FIFO, packetizes them, and sends them out on its ATB interface. The DTCs also send other control and debug packets through this interface. There are various packet formats that are used on the ATB interface, which are described in the following sections:

- *Trace data packet format* on page 5-1118
- *Alignment sync packet format* on page 5-1119
- *Time stamp packet format* on page 5-1119
- *Cycle counting packet format* on page 5-1119
- *Trace stream example* on page 5-1120

Trace data packet format

Trace data packet contains a 4B header and a payload of variable size.

The following figure shows the packet header.

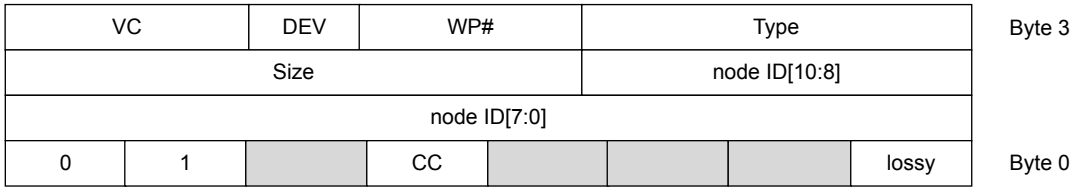

Figure 5-3 Trace data packet header

The packet header contains the following fields:

VC CHI channel

`00`	REQ
`01`	RSP
`10`	SNP
`11`	DAT

DEV Device port number (0 or 1)

WP# Watchpoint number that captured the trace (0-3)

Type Packet format type

Size Payload size, which is specified as (number of bytes – 1)

NodeID CHI node ID, shifted right by 3 bits reflecting the (X,Y) coordinates of the XP where the trace was captured

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CC Cycle counter. When set, this field indicates that the packet after the payload includes a 2B cycle count.

The following key points must be observed:

- For packet type `100`, the leading zeros in upper-order bytes of the trace data payload are compressed and not transmitted. The payload Size field in the trace packet header is adjusted accordingly. For example, trace data = `0000_0000_0000_0000_0000_0000_0000_0001_0203` is sent as `01_0203`, with Size = 2 (indicating 3B transferred).
- The WP field selection for match might be different from the type of payload that is generated from the matching. When WPs are combined, the lower watchpoint number is specified as the WP# in the trace packet header.
- Trace data is of variable length. The expected number of bytes, not including the header, is (Size + 1). With the cycle counter, another 2B are included at the end of the trace data.
- Whenever the previous packets cannot be transmitted in full, a lossy bit is asserted for the immediate next packet. A separate lossy bit is maintained for each of the watchpoints.

Alignment sync packet format

The alignment sync delimits trace start.

The alignment sync packet is 16B long and comprises 9B of zeros followed by `0x80`.

The alignment sync packet is the first packet that is sent after tracing is enabled. Also, you can configure the DTC to send the alignment sync packet periodically by programming the por_dt_trace_control register.

Time stamp packet format

The time stamp packet carries the SoC timer information. The time stamp is used to align the sequence of trace events across the SoC.

The time stamp packet is sent opportunistically under the following circumstances when the DTC FIFO has enough space to accommodate the time stamp packet:

- After each alignment sync packet is sent
- When flush is complete
- Periodically based on the setting of the timestamp_period field of the por_dt_trace_control register and only when trace packets have been sent after the last time stamp packet

The following figure shows the time stamp packet format.

Figure 5-4 Time stamp packet

The time stamp packet contains the following fields:

TS# 3-bit encoding of the size of time stamp that is specified as (number of bytes − 1)

CC When set, indicates that a 2B cycle count is included in the packet after the payload

Cycle counting packet format

Trace packets include an OPTIONAL attached cycle counter.

Each watchpoint includes a configuration bit. The logical operator AND is used on the configuration bit and global cycle count enable. The following figure shows a typical cycle counting scenario.

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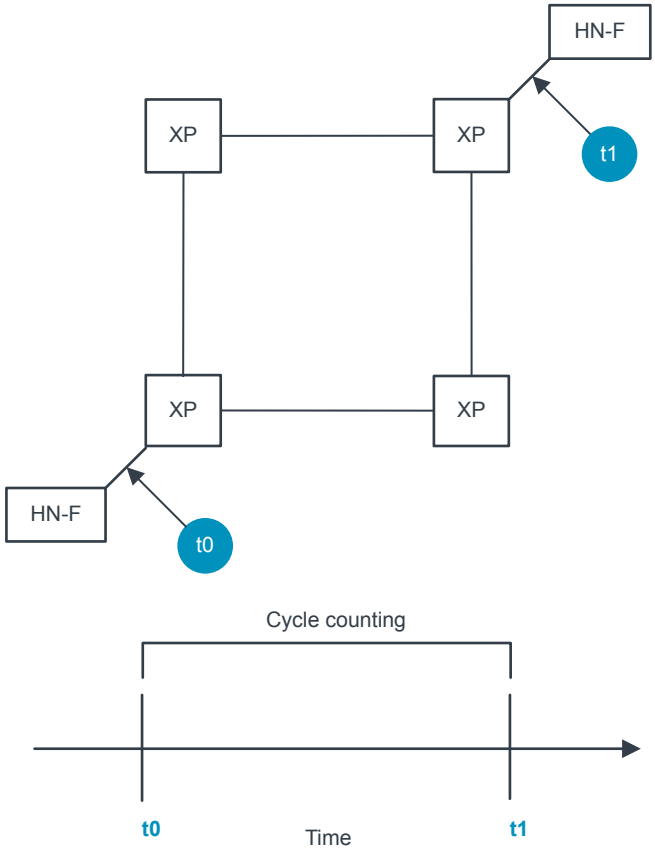

Figure 5-5 Cycle counting

The cycle counter payload is 2B and the CC bit in the trace packet header indicates the cycle counter payload. Cycle counters across the interconnect are turned on and off synchronously. This feature ensures that all of them have the same time stamp value.

Trace stream example

DTCs send out trace data on the ATB bus as a trace stream.

The following figure shows an example trace stream. It consists of:

- 4B trace packet header
- <*M*>B trace data
- 2B cycle count
- 1B time stamp header
- <*N*>B time stamp
- 2B cycle count

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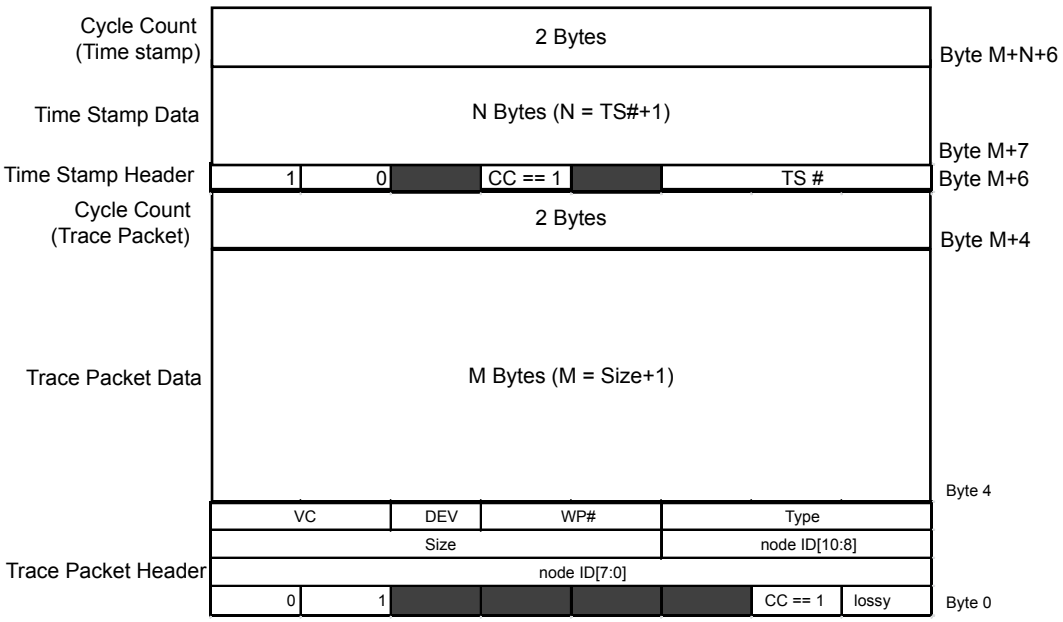

Figure 5-6 Trace stream

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5.2 DT programming

You must follow several programming sequences to set up DTM watchpoints and DTC correctly.

This section contains the following subsections:

5.2.1 Program DTM watchpoint

Use this procedure to program watchpoint N, where N=0..3.

Procedure

1. Program the intended watchpoint matching fields by writing the appropriate values into the por_dtm_wpN_val and por_dtm_wpN_mask registers.

   For example, source ID, target ID and opcode are possible matching fields.
2. Program the WP settings in the following register fields to select the device port and flit CHI channel:
   - wp_dev_sel field of the por_dtm_wpN_config register
   - wp_chn_sel field of the por_dtm_wpN_config register
3. Program the wp_grp field of the por_dtm_wpN_config register to select primary or secondary watchpoint group.
4. Write 1 to the wp_combine field of the port_dtm_wpN_config register if two watchpoints must be combined.

   ———— **Note** ————

   The wp_combine field is present in WP0 and WP2 only.

   ————————————
5. Program the following register fields if trace packets are to be generated from this watchpoint:
   a. Program the wp_pkt_type field of the por_dtm_wpN_config register.
   b. Write 1 to the wp_pkt_gen field of the por_dtm_wpN_config register.
6. Write 1 to the wp_ctrig_en field of the por_dtm_wpN_config register if a cross trigger must be set up from this watchpoint.
7. Program the wp_dbgtrig_en field of the por_dtm_wpN_config register if a debug watchpoint trigger must be set up from this watchpoint.
8. Set the wp_cc_en field of the por_dtm_wpN_config = 1 if a cycle count is required in the trace packet.
9. Write 1 to the trace_tag_enable field of the por_dtm_control register if a debug watchpoint trace tag must be generated.
10. Write 1 to the dtm_enable field of the por_dtm_control register to enable the WP.

5.2.2 Program DTC

Use this procedure to set up the CMN-600 debug trace control functionality.

The **NIDEN** input signal must be asserted for any trace and PMU operations. Before trace and PMU operations can occur, you must first program and enable watchpoint functions in the DTMs.
The following registers and register bits are present only in the main DTC (DTC0):

- por_dt_secure_access register
- dt_en field of the por_dt_dtc_ctl register
- wait_for_trigger field of the por_dt_dtc_ctl register
- cc_start field of the por_dt_dtc_ctl register
- pmu_en field of the por_dt_pmcr register
- por_dt_pmsrr register

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- ss_cfg_active field of the por_dt_pmssr register
- ss_pin_active field of the por_dt_pmssr register

Procedure

1. Write 1 to the dbgtrigger_en field of the por_dt_dtc_ctl register if DBGWATCHTRIG must be generated for DTM debug watchpoint trigger.
2. Write 1 to the atbtrigger_en field of the por_dt_dtc_ctl register if ATB trigger must be generated for DTM debug watchpoint trigger.
3. Write 1 to the cc_enable field of the por_dt_trace_control register to enable cycle count.
4. Write 0 to the dt_wait_for_trigger field of the por_dt_dtc_ctl register if no cross trigger is required.
5. Write 1 to the dt_en field of the por_dt_dtc_ctl register.

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5.3 DT usage examples

To help you use the CMN-600 DT features, we describe some example use cases of the DT system and example programming for those use cases.

For more information, see the following sections:

- *5.3.1 Flit tracing* on page 5-1124
- *5.3.2 Trace tag* on page 5-1125
- *5.3.3 Debug watch trigger events* on page 5-1127
- *5.3.4 Cross trigger* on page 5-1127

This section contains the following subsections:

- *5.3.1 Flit tracing* on page 5-1124.
- *5.3.2 Trace tag* on page 5-1125.
- *5.3.3 Debug watch trigger events* on page 5-1127.
- *5.3.4 Cross trigger* on page 5-1127.

5.3.1 Flit tracing

CMN-600 can trace individual flits at device interfaces at each XP.

You can program DTM WPs to monitor flit uploads and downloads at each of the two XP device ports on any of the four CHI channels:

- REQ
- RSP
- SNP
- DAT

You can use a set of value and mask registers to define a subset of flit fields that are then used for matching at the WP.

On a match, WPs capture and store flit fields into trace buffers so that they can be used for debug. The generated trace can then be streamed out on the ATB interface or accessed using a control register interface.

For more information about the format of the value and mask registers, and the format of trace packets, see *WP match value and mask register* on page 5-1111 and *Trace data format* on page 5-1114.

Flit tracing example

CMN-600 can trace individual flits at device interfaces at each XP.

For more information, refer to *5.2.1 Program DTM watchpoint* on page 5-1122.

This section shows an example of setting up a simple trace of REQ flits. The example corresponds to a ReadShared transaction to address=X initiated by RNF2 and sending out the trace packets on the ATB bus.

To monitor REQ flits uploaded from RNF2, set up watchpoints (WPs) inside XP connected to RNF2. The Opcode and Address fields are mapped to the primary and secondary match registers respectively. Therefore, you must set up two WPs, one to monitor the Opcode and the other to monitor the Address.

To set up these WPs:

1. Program WP0 (upload WP) to monitor REQ.Opcode:
    a. Set dtm_wp0_val/mask registers to match on Opcode=ReadShared
    b. Set dtm_wp0_config to:
        a. Select upload device port, wp_dev_sel=RNF2_port
        b. Select flit channel, wp_chn_sel=REQ
        c. Match format group to primary for Opcode match wp_grp= 0

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   d. Set combined mode to gang-up WP0 and WP1, wp_combine = 1
   e. Enable REQ flit trace packet generation, set wp_pkt_type and wp_pkt_gen = 1
2. Program WP1, upload WP, to monitor REQ.Address as follows:
   a. Set dtm_wp1_val/mask registers to match on Address = X
   b. Set dtm_wp1_config to:
      a. Select upload device port, wp_dev_sel = RNF2_port
      b. Select Flit channel, wp_chn_sel = REQ
      c. Match format group to secondary for Address match, wp_grp = 1

   Note

   In combined mode, use WP0 config settings to enable trace generation.
3. To enable trace generation in the WP, set dtm_control.trace_tag_enable = 1
4. Set dtm_control.dtm_enable = 1
5. Program por_dt_traceid.traceid according to the *Arm® CoreSight™ Architecture Specification*. The supported range of values is `0x01-0x6F`
6. Program por_dt_dtc_ctl to enable tracing, dt_en = 1

5.3.2 Trace tag

CMN-600 can generate trace tags at the device interfaces and propagate them to destination devices.

This feature enables a set of flits corresponding to a specific transaction or set of transactions that match a specific criterion to be tagged for tracing.

For example, using the trace tag mechanism, flits from all four CHI channels can be monitored:
- REQ
- RSP
- SNP
- DAT

An example of a monitored transaction is a memory read transaction to a specific address, which is then tagged for tracing.

Trace tag generation

A trace tag is generated either internally by an XP or externally by an RN-F or SN-F device. The generated trace tag is reflected in the TRACETAG field of the uploaded flit.

Inside the XP, DTM WPs generate the trace tag by matching on flits uploaded at the corresponding XP device port. The DTM WPs can be programmed to match on a flit on any of the four CHI channels: REQ, RSP, DAT, and SNP.

The WP generates a trace tag when there is a match and the trace_tag_enable field of the por_dtm_control register is set to 1.

You can program DTM WPs to match on a flit on any CHI channel and on any device port. However, for debug, it is most useful to program WPs to match on REQ flits uploaded at the RN and HN-F device ports. We recommend this programming because REQ flits are the starting flits that originate new transactions. When tagged, subsequent RSP, SNP, and DAT flits that relate to the same transaction carry the trace tag.

If the following conditions are all true, the XP does not generate the trace tag:
- Flit transfer takes place from one device port to the other device port, within the same XP.
- The flit destination device is not an HN.
- The flit transfer to its destination occurs one cycle after the XP receives it.

Trace tag propagation

All CMN-600 devices forward on the trace tag, when asserted, from a received flit corresponding to a transaction to all subsequent flits associated with that transaction.

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The HN-F also propagates the trace tag from the source transaction to spawned transactions such as SLC evictions and SF back invalidations.

Using the logical operator OR, the trace tag that is generated inside the XP is combined with the TRACETAG field of the received flit. The resultant value is then sent in the TRACETAG field of the flit transmitted to the destination device.

Trace tag trace packet generation

When a watchpoint is enabled for trace packet generation through wp_pkt_gen, there are several interactions. Any flit with the TRACETAG field asserted on the channel (which wp_chn_sel selects), for the device (which wp_dev_sel has selected), generates a trace packet type which wp_pkt_type selects.

This trace packet is generated whenever TRACETAG is asserted in a flit; a watchpoint match, determined by wp_val and wp_mask, is not required.

Trace tag example programming

This example programming outlines a trace tag scenario-based trace generation with synchronized cycle counts.

For more information about watchpoint programming, see *5.2.1 Program DTM watchpoint on page 5-1122*.

This example programming sets up a simple trace of REQ flits. The example corresponds to a ReadShared transaction to address = X. RN-F 2 initiates the transaction in the mesh and the WP sends trace packets out on the ATB bus.

To monitor REQ flits uploaded from RN-F 2, set up WPs inside the XP that RN-F 2 is connected to. For REQ flits, the Opcode and Address fields are mapped to the primary and secondary match registers respectively. Therefore, you must set up two WPs, one to monitor the Opcode and the other to monitor the Address.

To set up these WPs:

1. Program WP0, upload WP to monitor REQ.Opcode:
   a. Set por_dtm_wp0_val and por_dtm_wp0_mask registers to match on Opcode = ReadShared
   b. Set por_dtm_wp0_config to:
      a. Select upload device port, wp_dev_sel = RN-F 2 port
      b. Select flit channel, wp_chn_sel = REQ
      c. Match format group to primary for Opcode match, wp_grp = 0
      d. Set combined mode to gang-up WP0 and WP1, wp_combine = 1
      e. Enable REQ flit trace packet generation, set wp_pkt_type and wp_pkt_gen = 1
2. Program WP1, upload WP, to monitor REQ.Address:
   a. Set por_dtm_wp1_val and por_dtm_wp1_mask registers to match on Address = X
   b. Set por_dtm_wp1_config to:
      a. Select upload device port, wp_dev_sel = RN-F 2 port
      b. Select flit channel, wp_chn_sel = REQ
      c. Match format group to secondary for Address match, wp_grp = 1

   Note

   In combined mode, use WP0 config settings to enable trace generation.

3. To enable trace tag generation in the WP, set dtm_control.trace_tag_enable = 1
4. Set dtm_control.dtm_enable = 1
5. Program por_dt_traceid.traceid according to the *Arm® CoreSight™ Architecture Specification*. The supported range of values is `0x01-0x6F`.
6. Program por_dt_dtc_ctl to enable tracing, dt_en = 1

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5.3.3 Debug watch trigger events

DTM WPs can be programmed to match on specific flits and generate a debug watch trigger event to the DTC.

You can program the DTC to signal the debug watch trigger event in one or both of the following ways:

- Signal a debug watch trigger interrupt on the **DBGWATCHTRIGREQ/DBGWATCHTRIGACK** interface

  ——— **Note** ———

  This interface is based on a four-phase handshake protocol.

  ———————————

- Signal an ATB trace trigger with ATID `0x7D` on the ATB interface

In a system with multiple DTCs, each DTC has its own ATB interface on which it signals ATB trace triggers from DTMs within its DTC domain. Multiple DTCs also have their own **DBGWATCHTRIGREQ** / **DBGWATCHTRIGACK** interfaces on which they signal debug watch trace interrupts.

5.3.4 Cross trigger

CMN-600 can trigger DTMs based on specific events occurring elsewhere in the system.

By default, DTMs start monitoring and tracing flits without waiting for another event. The cross trigger feature allows flit monitoring and tracing to be delayed until after the events of interest are observed in the system.

The cross trigger event is set up in two steps:

1. Set up DTM WPs to monitor flits and generate traces
2. Other DTM WPs (in the same XP or different XPs) are set up to generate a cross trigger on specific events to the DTC. The DTC is programmed to trigger the DTMs in step 1.

Cross trigger example programming

CMN-600 can trigger DTMs based on specific events occurring elsewhere in the system.

For more information, refer to *5.2.1 Program DTM watchpoint* on page 5-1122.

This example uses trace DAT flits corresponding to a ReadShared transaction to address-X that originated at RN-F 2. There have also been 10 WriteNoSnoops uploaded to the HN-D.

1. Set WP at RN-F 2 upload port to monitor REQ flits (refer to step 1 in *5.3.4 Cross trigger* on page 5-1127).
2. Set WP or WPs at all DAT download ports to generate DAT flit traces (refer to step 2 in *5.3.4 Cross trigger* on page 5-1127).
3. Set up WP at HN-D upload port to monitor WriteNoSnoop flits.
   a. Program WP0 (upload WP) to monitor and enable cross trigger REQ.Opcode:
      a. Set por_dtm_wp0_val and por_dtm_wp0_mask registers to match on Opcode = WriteNoSnoop.
      b. Set por_dtm_wp0_config to:
         a. Select upload device port (wp_dev_sel = HN-D port).
         b. Flit channel (wp_chn_sel = REQ).
         c. Match format group to primary for Opcode match (wp_grp = 0).
         d. Enable cross trigger (wp_ctrig_en = 1).
   b. Enable WP.
      - Set the dtm_enable field of the por_dtm_control register = 1.
4. Set up counter in DTC to count ten trigger events from step 3.
   - Program por_dt_dtc_ctl as follows:
     1. Set cross trigger count (cross_trigger_count = 9).
     2. Enable waiting for HN-D WP trigger event (dt_wait_for_trigger = 1).
     3. Enable DTC (dt_en = 1).

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Sample profile

CMN-600 supports the Armv8.2 sample extension.

WPs can be programmed to monitor channel, opcode, and related PM items. A Sample Interval Counter Register (PMSICR) counts down with each match. When the counter reaches zero, the trace tag of the next matched transaction is asserted. At the same time, the counter is reloaded with the programmed value from the PMSIRR register, and the next count down cycle begins.

There is only one set of PMSCIR and PMSIRR registers per XP, as only one outstanding transaction is expected. PMSICR is 24 bits, and the lower 8 bits of PMSIRR are zero.

In general, Secure transactions are allowed to be tagged and traced with the secure_debug_disable field of the por_dt_secure_access register. When this bit is set, Secure registers are read with Non-secure access.

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5.4 PMU system overview

CMN-600 includes *Performance Monitoring Unit* (PMU) capabilities.

The PMU offers the following features:

- Local and global performance counters with shadow registers
- PMU snapshot across all internal CMN-600 devices

The PMU consists of local performance counters in the DTMs and global performance counters in the DTCs. The following figure shows this structure of local and global performance counters.

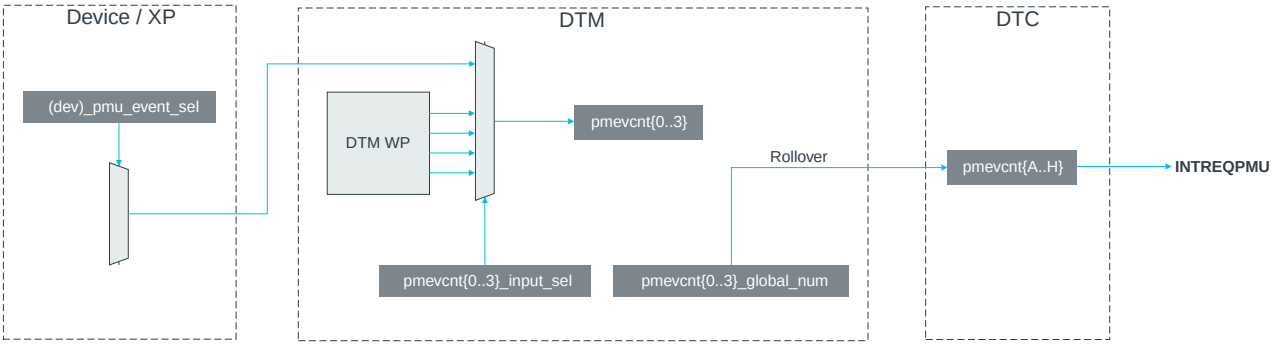

Figure 5-7 PMU local and global performance counters

The PMU system performs the following tasks:

- Selects PMU event from XP, the local watchpoint, and the devices on XP device ports
- Operates four local PMU counters (4 × 16b)
- Operates eight global PMU counters (8 × 32b) associated with the local counters
- Snapshot
- Overflow interrupt from global PMU counters

The PMU counter value can be copied over into the shadow registers when there is either:

- A request of snapshot through input pin **PMUSNAPSHOTREQ**
- A write into the ss_req field of the por_dt_pmsrr register within the DTC

On receiving a snapshot request, a DTC sends a snapshot request to all DTMs. Multiple snapshot requests are collapsed into a single request. On receiving PMU snapshot packets from all DTMs, rollover information is updated at the global counters, and the counter value is copied to the shadow registers.

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5.5 PMU system programming

You must follow specific programming sequences to set up the PMU, PMU snapshot, and PMU interrupt functionality correctly.

This section contains the following subsections:

5.5.1 Set up PMU counters

Use this procedure to set up the PMU counters correctly.

Procedure

1. Ensure that the **NIDEN** input is asserted for any trace and PMU operations.
2. Program (dev)_pmu_event_sel register in the devices or XP.
3. Program the pmevcnt{0..3}_input_sel fields of the por_dtm_pmu_config register to select PMU event counter inputs.

   The input can be from one of the following:
   - A watchpoint.
   - Selected events from the devices or XP, depending on step 2.
4. Program the following por_dtm_pmu_config register fields to select the paired top global PMU counters:
   - pmevcnt_paired
   - pmevcnt{0..3}_global_num
5. Program the pmevcnt{01, 23}_combined fields of the por_dtm_pmu_config for any combined local PMU counters.
6. Write 1 to the pmu_en field of the por_dtm_pmu_config register.

   Note

   To activate CXLA PMU function, program the en_cxla_pmucmd_prop field of the associated por_cxg_ra_cfg_ctl register to 1.
7. Write 1 to the dtm_enable field of the por_dtm_control register.
8. Program the cntcfg field of the por_dt_pmcr register to pair the 32-bit global counters to make a 64-bit counter.
9. Write 1 to the dt_en field of the por_dt_dtc_ctl register.
10. Write 1 to the ovfl_intr_en field of the por_dt_pmcr register to enable interrupts on **INTREQPMU** on any global counter overflow.
11. Write 1 to the pmu_en field of the por_dt_pmcr register to start PMU operation.

5.5.2 Program PMU snapshot

Use this procedure to set up the PMU snapshot functionality.

For a system with multiple DTCs, the sub-DTC maintains snapshot status for the DTM within its own domain.

Prerequisites

The NIDEN input must be asserted for any trace and PMU operation.

Procedure

1. Program PMU counters as described in *5.5.1 Set up PMU counters* on page 5-1130.

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2. Write 1 to the ss_req field of the por_dt_pmsrr register.

   This action causes the DTC to send a PMU snapshot instruction. On receiving this instruction, the DTM sends PMU snapshot packets to the DTC.

The DTC updates the ss_status field of the por_dt_pmssr register after receiving PMU snapshot packets. Software can poll this register field to check if the snapshot process is complete.

5.5.3 Program PMU counter overflow interrupt

Use this procedure to set up the PMU counter overflow interrupt.

Prerequisites

The NIDEN input must be asserted for any trace and PMU operation.

Procedure

1. Program PMU counters as described in *5.5.1 Set up PMU counters* on page 5-1130.
2. Write 1 to the ovfl_intr_en field of the por_dt_pmcr register.
   Results: Overflow of any PMU counter causes **INTREQPMU** to assert.
3. Write 1 to the ovfl_intr_en field in the all other por_dt_pmcr registers if your system has multiple DTCs.
4. Poll the pmovsr[7:0] field of the por_dt_pmovsr register when **INTREQPMU** is asserted to see which global counter causes the interrupt.

   For multiple DTCs, all por_dt_pmovsr registers must be polled.
5. Write 1 to the corresponding bit in the pmovsr_clr[7:0] field of the por_dt_pmovsr_clr register to clear **INTREQPMU**.

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5.6 Secure debug support

The **SPNIDEN** input and the value of the secure_debug_disable field of the por_dt_secure_access register control the Secure debug state.

Secure debug is enabled when **SPNIDEN** is asserted, or when the secure_debug_disable bit of the por_dt_secure_access register is set to 0. The default value of this bit is 0.

When Secure debug is enabled, all events can be counted and all flits can be traced.

When Secure debug is disabled, all events with UNKNOWN Secure state are not counted and all flits with UNKNOWN Secure state are not traced.

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Chapter 6
Performance optimization and monitoring

This chapter describes performance optimization techniques for use by system integrators, and the *Performance Monitoring Unit* (PMU).

It contains the following sections:

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6.1 Performance optimization guidelines

There are some restrictions when optimizing CMN-600.

To obtain maximum performance from CMN-600, the system integrator must be aware of the following information:

RN-I

When request ordering is not required, transaction requests must be dispatched with non-overlapping IDs to ensure optimal bandwidth operation. Large Burst transactions, that is, transactions larger than 64B, must be split into 64B or smaller Burst transactions. In addition, set **AxSIZE** to the AXI bus width of the RN-I to fully utilize the available bandwidth.

For example, if the AXI bus width is:

128b Set **AxSIZE** = 4 (16B)

256b Set **AxSIZE** = 5 (32B)

Read or write requests to different parts of the same cache line must be combined into a single cache line request. For example, multiple (partial) WriteUnique transactions must be combined into a single WriteUnique or a single WriteLineUnique transaction. In the resultant transaction, all bytes in the cache line must be written.

Based on the transaction attributes, RN-I can enforce more ordering on transactions, targeting device memory downstream of HN-I, affecting the overall achievable bandwidth.

HN-F

High temporal locality of address usage in transactions can cause same-address dependencies to occur for transactions with addresses to overlapping cache lines. This condition results in higher latency because of serialization delays between these transactions. CMN-600 is microarchitected to avoid hot spotting in the HN-F partitions or in the memory controllers. However, this condition is unavoidable in cases of temporally local same-address usage.

HN-I

Stream of interleaved reads and writes targeting the same peripheral downstream of HN-I results in higher latencies on these transactions. It also could result in serialization delays between these reads and writes. Arm recommends that read and write transactions are not interleaved when targeting the same peripheral.

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6.2 About the Performance Monitoring Unit

CMN-600 provides access to various performance events. Some of these events are unique to and originate in a specific CMN-600 component. Some events are available by using watchpoints in the *Debug Watchpoint Module* (DWM) in the XP where the component is located.

This chapter describes the performance events and the relevant use cases for most of those events. See *Chapter 5 Debug trace and PMU* on page 5-1108 for information about the infrastructure and logic that enable general utility of the performance monitor events.

The following table shows the PMU events.

Table 6-1 PMU events

Component	NS[a]	Event	Description
HN-D	Refer to *6.7 DN performance events* on page 6-1156 for event summary details.		
HN-I	No	PMU_HNI_TXDATFLITV	Transmitted data flits. Available through the DWM.
	No	PMU_HNI_RXDATFLITV	Received data flits. Available through the DWM.
	Yes	PMU_HNI_RXREQFLITV	Received requests. Available through the DWM.
	Yes	PMU_HNI_RXREQ_REQORDER	Received ReqOrder requests. Available through the DWM.
SBSX	No	PMU_SBSX_TXDATFLITV	Transmitted data flits. Available through the DWM.
	No	PMU_SBSX_RXDATFLITV	Received data flits. Available through the DWM.
	Yes	PMU_SBSX_RXREQFLITV	Received requests. Available through the DWM.
HN-F	Yes	PMU_HN_CACHE_MISS	Total cache misses
	Yes	PMU_HNL3_SF_CACHE_ACCESS	Total number of cache accesses
	Yes	PMU_HN_CACHE_FILL	Total allocations in HN SLC cache
	Yes	PMU_HN_POCQ_RETRY	Total number of requests that have been retried
	Yes	PMU_HN_POCQ_REQS_RECVD	Total number of requests that the HN received
	Yes	PMU_HN_SF_HIT	Total number of SF hits
	Yes	PMU_HN_SF_EVICTIONS	Total number of SF evictions
	Yes	PMU_HN_L3_EVICTION	Number of SLC evictions
	Yes	PMU_HN_L3_FILL_INVALID_WAY	Number of SLC fills to an invalid way
	Yes	PMU_HN_MC_RETRIES	Number of requests receiving retry response from the memory controller
	Yes	PMU_HN_MC_REQS	Total number of requests that are sent to the memory controller
	Yes	PMU_HN_QOS_HH_RETRY	Number of times HN-F protocol retried a QoS 15 (highest) class request

[a] Can the event be determined to be Secure or Non-secure? If No, the event is considered to be Secure, irrespective of Secure or Non-secure attributes associated with the event.

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Table 6-1 PMU events (continued)

Component	NS[a]	Event	Description
RN-I, RN-D	No	PMU_RNI_RDATABEATS_P0	S0 RDataBeats
	No	PMU_RNI_RDATABEATS_P1	S1 RDataBeats
	No	PMU_RNI_RDATABEATS_P2	S2 RDataBeats
	Yes	PMU_RNI_RXDATFLITV	**RXDAT** flits received
	Yes	PMU_RNI_TXDATFLITV	**TXDAT** flits sent
	Yes	PMU_RNI_TXREQFLITV	Total **TXREQ** flits sent
	Yes	PMU_RNI_TXREQFLITV_RETRIED	Retried **TXREQ** flits sent
	No	PMU_RNI_RRTFULL	Read request tracker full
	No	PMU_RNI_WRTFULL	Write request tracker
	Yes	PMU_RNI_TXREQFLITV_REPLAYED	Replayed **TXREQ** flits
CXHA	Yes	HA_REQ_TRK_OCC	Request tracker occupancy
	Yes	HA_RD_DAT_BUFF_OCC [b]	Read data buffer occupancy
	Yes	HA_RSP_DATA_BYPASS_BUF_OCC	CCIX response data bypass buffer occupancy
	Yes	HA_WR_DAT_BUFF_OCC[b]	Write data buffer occupancy
	Yes	HA_SNP_TRK_BUF_OCC	Snoop tracker occupancy
	Yes	HA_SNP_DAT_SINK_BUF_OCC	Snoop data sink buffer occupancy
	Yes	HA_SNP_HZD_BUF_OCC	Snoop hazard buffer occupancy
	Yes	HA_RD_DAT_BYPASS	Read data bypass taken
	Yes	HA_SNP_PCRD_STALLS_LNK0[b]	Snoop request available but no SNP Pcrd to send over CCIX per LinkEnd for Link 0
	Yes	HA_SNP_PCRD_STALLS_LNK1[b]	Snoop request available but no SNP Pcrd to send over CCIX per LinkEnd for Link 1
	Yes	HA_SNP_PCRD_STALLS_LNK2[b]	Snoop request available but no SNP Pcrd to send over CCIX per LinkEnd for Link 2
	Yes	HA_CHI_RSP_UPLOAD_STALLS	Local HA upload stalls to CHI because of contention with RA
	Yes	HA_CHI_DAT_UPLOAD_STALLS	Local HA upload stalls to CHI because of contention with RA

[a] Can the event be determined to be Secure or Non-secure? If No, the event is considered to be Secure, irrespective of Secure or Non-secure attributes associated with the event.
[b] If applications use only Non-secure transactions, then NS counting is correct. If a mix of Secure and Non-secure is used, then use Secure Debug such as assert **SPNIDEN**.

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Table 6-1 PMU events (continued)

Component	NS[a]	Event	Description
CXLA	No	LA_RX_TLP_LINK0	RX TLPs on Link 0
	No	LA_RX_TLP_LINK1	RX TLPs on Link 1
	No	LA_RX_TLP_LINK2	RX TLPs on Link 2
	No	LA_TX_TLP_LINK0	TX TLPs on Link 0
	No	LA_TX_TLP_LINK1	TX TLPs on Link 1
	No	LA_TX_TLP_LINK2	TX TLPs on Link 2
	No	LA_RX_CXS_LINK0	RX CXS on Link 0
	No	LA_RX_CXS_LINK1	RX CXS on Link 1
	No	LA_RX_CXS_LINK2	RX CXS on Link 2
	No	LA_TX_CXS_LINK0	TX CXS on Link 0
	No	LA_TX_CXS_LINK1	TX CXS on Link 1
	No	LA_TX_CXS_LINK2	TX CXS on Link 2
	No	LA_RX_TLP_AVG_SIZE	Average RX TLP size in DWs
	No	LA_TX_TLP_AVG_SIZE	Average TX TLP size in DWs
	No	LA_RX_TLP_AVG_CCIX_MSGS	Average RX TLP size in CCIX messages
	No	LA_TX_TLP_AVG_CCIX_MSGS	Average TX TLP size in CCIX messages
	No	LA_RX_CXS_AVG_SIZE	Average size of RX CXS in DWs within a beat
	No	LA_TX_CXS_AVG_SIZE	Average size of TX CXS in DWs within a beat
	No	LA_TX_CXS_LCRD_BACKPRESSURE	TX CXS link credit backpressure from PHY
	No	LA_RX_TLPBUF_FULL_STALL	RX TLP buffer full and backpressured
	No	LA_TX_TLPBUF_FULL_STALL	TX TLP buffer full and backpressured
	No	LA_RX_AVG_TLP_LAT	Average latency to process an RX TLP
	No	LA_TX_AVG_TLP_LAT	Average latency to form a TX TLP

[a] Can the event be determined to be Secure or Non-secure? If No, the event is considered to be Secure, irrespective of Secure or Non-secure attributes associated with the event.

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Table 6-1 PMU events (continued)

Component	NS[a]	Event	Description
CXRA	Yes	RA_REQ_TRK_OCC	Request tracker occupancy
	Yes	RA_SNP_TRK_OCC	Snoop tracker occupancy
	Yes	RA_RD_DAT_BUF_OCC	Read data buffer occupancy [b]
	Yes	RA_WR_DAT_BUF_OCC	Write data buffer occupancy [b]
	Yes	RA_SNP_SINK_BUF_OCC	Snoop sink buffer occupancy [b]
	Yes	RA_SNP_BCASTS	Snoop broadcasts
	Yes	RA_REQ_CHAINS	Number of request chains formed larger than one
	Yes	RA_REQ_CHAIN_AVG_LEN	Average size of request chains, only for chain sizes larger than one
	Yes	RA_CHI_RSP_UPLOAD_STALLS	Local RA upload stalls to CHI because of contention with HA [b]
	Yes	RA_CHI_DAT_UPLOAD_STALLS	Local RA upload stalls to CHI because of contention with HA
	Yes	RA_DAT_PCRD_STALLS_LNK0	Memory Data Request available, but no DAT Pcrd to send over CCIX per LinkEnd 0 [b]
	Yes	RA_DAT_PCRD_STALLS_LNK1	Memory Data Request available, but no DAT Pcrd to send over CCIX per LinkEnd 1 [b]
	Yes	RA_DAT_PCRD_STALLS_LNK2	Memory Data Request available, but no DAT Pcrd to send over CCIX per LinkEnd 2 [b]
	Yes	RA_REQ_PCRD_STALLS_LNK0	Memory Data Request available but no Req Pcrd to send over CCIX per LinkEnd 0 [b]
	Yes	RA_REQ_PCRD_STALLS_LNK1	Memory Data Request available but no Req Pcrd to send over CCIX per LinkEnd 1 [b]
	Yes	RA_REQ_PCRD_STALLS_LNK2	Memory Data Request available but no Req Pcrd to send over CCIX per LinkEnd 2 [b]

6.2.1 Cycle counter

The cycle counter is used to track time.

You can reset this counter to initiate the time interval over which you want to capture the events.

PMU_CYCLE_COUNTER Cycle counter.

GCLK0 clocks the cycle counter. Therefore, the cycle counter is not incremented during periods of HCG when the clocks are stopped.

[a] Can the event be determined to be Secure or Non-secure? If No, the event is considered to be Secure, irrespective of Secure or Non-secure attributes associated with the event.

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6.3 HN-F performance events

The HN-F performance analysis counters are used to monitor cache behavior.

For a particular cache, the cache miss or hit rate is used to measure the capacity of the cache, and the location for certain applications. To measure the cache miss rate, the performance monitor counters count the number of instances of cache accesses and cache misses.

This section contains the following subsections:

6.3.1 Cache performance

Cache performance events are required to calculate the cache miss rate and the cache allocation.

The following sections describe the cache performance events.

Cache miss rate

The cache events that are required to calculate the cache miss rate are:

PMU_HN_CACHE_MISS_EVENT	Counts the total cache misses. A miss results from a first-time lookup and is high priority.
PMU_HNSLC_SF_CACHE_ACCESS_EVENT	The total number of cache accesses. An access is first-time and high priority.

Note

The performance counter architecture enables only four HNs to collect the cache miss rate. However, because of the CMN-600 microarchitecture, the cache miss rate that is measured at one HN-F is a good proxy for the cache miss rate of the remaining HN-Fs.

Calculate the cache miss rate as follows:

$$\text{Cache miss rate (\%)} = \frac{\text{Total cache misses}}{\text{Total cache accesses}} \times 100$$

Figure 6-1 Cache miss rate

Certain request types can cause multiple cache accesses:

- Lookup.
- Tag update.
- Victim selection.
- Cache fill.

Event counting is therefore limited to first time accesses only. For example, for a ReadUnique transaction that leads to an SLC hit, PMU_HNSLC_SF_CACHE_ACCESS_EVENT is only counted the first-time cache lookup is performed. The tag update is not counted as a cache access. Similarly, for WriteBack or Write*Unique transactions with an SLC allocate hint, only the first instance of an SLC lookup is counted as an access and hit or miss. The eventual victim selection and cache fill are not counted as further accesses.

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Cache allocations

The cache allocation event counts the number of times an HN-F SLC cache is allocated. It provides an approximate cache usage for this particular application over a specific time slice. This event does not check whether the application has any hot sets.

PMU_HN_CACHE_FILL_EVENT Counts all cache line allocations to SLC cache.

All cache line writes, that is, Write*Unique, WriteBack, and Evictions that are allocated in SLC cache, are counted towards this event.

6.3.2 HN-F counters

Applications can bottleneck on one or more HN-Fs because they frequently target an address or a stream of addresses.

The following POCQ occupancy and request retry events are used to monitor possible performance loss in the system:

PMU_HN_POCQ_RETRY_EVENT The total number of requests that have been retried.

PMU_HN_POCQ_REQS_RECVD_EVENT The total number of requests that the HN-F receives.

Requests that cannot be queued in the POCQ, because of lack of credits, are retried. The HN-F responds with a RetryAck response, and the request waits for a static credit. This wait period indicates whether a lack of credits is causing the bottlenecks, and also shows if the latency of requests is very high.

Calculate the message retry rate as follows:

$$\text{HN-F message retry rate (\%)} = \frac{\text{HN-F total messages retried}}{\text{HN-F total messages received}} \times 100$$

Figure 6-2 HN-F message retry rate

6.3.3 SF events

There are three snoop events that can be counted.

The following sections describe the SF performance events.

SF miss rate

This event measures the amount of memory controller traffic that is generated. It can also be used to measure the efficiency of the SF.

PMU_HN_SF_HIT_EVENT Measures the number of SF hits.

Calculate the SF hit rate as follows:

$$\text{Snoop filter hit rate (\%)} = \frac{\text{Total snoop filter hits}}{\text{Total SLC lookups}} \times 100$$

Figure 6-3 SF hit rate

SF accesses are only counted for first-time lookups, and not for the victim selection accesses or SF fills. Because the SLC lookup and SF lookups are parallel, the SLC lookups can be used to calculate the SF hit rate.

SF evictions

This event measures the frequency of SF evictions.

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PMU_HN_SF_EVICTIONS_EVENT Measures the number of SF evictions when cache invalidations are initiated.

Snoops sent and received with hit rate

These events measure the amount of shared data across clusters for a specific application, using snoop hits or misses.

PMU_HN_SNOOPS_SENT_EVENT Number of snoops sent. Does not differentiate between broadcast or directed snoops.

PMU_HN_SNOOPS_BROADCAST_EVENT Number of snoop broadcasts sent.

Calculate the snoops sent and received rate as follows:

$$\text{Shared data (\%)} = \frac{\text{Total snoops broadcast}}{\text{Total snoops sent}} \times 100$$

Figure 6-4 Sent and received snoops rate

The number of broadcast and total snoops measures the shared data invalidations.

6.3.4 System-wide events

The memory controller request retries determine whether the memory controller is the bottleneck in the system, which can cause higher request latencies.

The following events can be counted:

PMU_HN_MC_RETRIES_EVENT Number of requests that are retried to the memory controller.

PMU_HN_MC_REQS_EVENT Total number of requests that are sent to the memory controller.

Calculate the retry rate for requests to the memory controller as follows:

$$\text{MC message retry rate (\%)} = \frac{\text{MC total messages retried}}{\text{MC total messages received}} \times 100$$

Figure 6-5 MC message retry rate

6.3.5 Quality of Service

Requests with a HighHigh QoS must be allocated and processed from the POCQ with the highest priority compared to High, Medium, and Low QoS requests.

If the HighHigh requests are retried too frequently, there could be a bottleneck at a particular HN-F, or the POCQ reservation for HighHigh requests requires adjustment.

PMU_HN_QOS_HH_RETRY How often a HighHigh request is retried.

6.3.6 HN-F PMU event summary

The following table shows a summary of the HN-F PMU events.

Table 6-2 HN-F events

Number	Name	Description
1	PMU_HN_CACHE_MISS_EVENT	Counts total cache misses in first lookup result (high priority).
2	PMU_HNSLC_SF_CACHE_ACCESS_EVENT	Counts number of cache accesses in first access (high priority).
3	PMU_HN_CACHE_FILL_EVENT	Counts total allocations in HN SLC (all cache line allocations to SLC).

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Table 6-2 HN-F events (continued)

Number	Name	Description
4	PMU_HN_POCQ_RETRY_EVENT	Counts number of retried requests.
5	PMU_HN_POCQ_REQS_RECVD_EVENT	Counts number of requests that HN receives.
6	PMU_HN_SF_HIT_EVENT	Counts number of SF hits.
7	PMU_HN_SF_EVICTIONS_EVENT	Counts number of SF eviction cache invalidations initiated.
8	PMU_HN_DIR_SNOOPS_SENT_EVENT	Counts number of directed snoops sent (not including SF back invalidation).
9	PMU_HN_BRD_SNOOPS_SENTEVENT	Counts number of multicast snoops sent (not including SF back invalidation).
10	PMU_HN_SLC_EVICTION_EVENT	Counts number of SLC evictions (dirty only).
11	PMU_HN_SLC_FILL_INVALID_WAY_EVENT	Counts number of SLC fills to an invalid way.
12	PMU_HN_MC_RETRIES_EVENT	Counts number of retried transactions by the MC.
13	PMU_HN_MC_REQS_EVENT	Counts number of requests that are sent to MC.
14	PMU_HN_QOS_HH_RETRY_EVENT	Counts number of times a HighHigh priority request is protocol-retried at the HN-F.
15	PMU_HNF_POCQ_OCCUPANCY_EVENT	Counts the POCQ occupancy in HN-F. Occupancy filtering is programmed in pmu_occup1_id.
16	PMU_HN_POCQ_ADDRHAZ_EVENT	Counts number of POCQ address hazards on allocation.
17	PMU_HN_POCQ_ATOMICS_ADDRHAZ_EVENT	Counts number of POCQ address hazards on allocation for atomic operations.
18	PMU_HN_LD_ST_SWP_ADQ_FULL_EVENT	Counts number of times ADQ is full for Ld/St/SWP type atomic operations while POCQ has pending operations.
19	PMU_HN_CMP_ADQ_FULL_EVENT	Counts number of times ADQ is full for CMP type atomic operations while POCQ has pending operations.
20	PMU_HN_TXDAT_STALL_EVENT	Counts number of times HN-F has a pending TXDAT flit but no credits to upload.
21	PMU_HN_TXRSP_STALL_EVENT	Counts number of times HN-F has a pending TXRSP flit but no credits to upload.
22	PMU_HN_SEQ_FULL_EVENT	Counts number of times requests are replayed in SLC pipe due to SEQ being full.
23	PMU_HN_SEQ_HIT_EVENT	Counts number of times a request in SLC hit a pending SF eviction in SEQ.
24	PMU_HN_SNP_SENT_EVENT	Counts number of snoops sent including directed, multicast, and SF back invalidation.
25	PMU_HN_SFBI_DIR_SNP_SENT_EVENT	Counts number of times directed snoops were sent due to SF back invalidation.
26	PMU_HN_SFBI_BRD_SNP_SENT_EVENT	Counts number of times multicast snoops were sent due to SF back invalidation.
27	PMU_HN_SNP_SENT_UNTRK_EVENT	Counts number of times snoops were sent due to untracked RNFs.
28	PMU_HN_INTV_DIRTY_EVENT	Counts number of times SF back invalidation resulted in dirty line intervention from the RN.

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Table 6-2 HN-F events (continued)

Number	Name	Description
29	PMU_HN_STASH_SNP_SENT_EVENT	Counts number of times stash snoops were sent.
30	PMU_HN_STASH_DATA_PULL_EVENT	Counts number of times stash snoops resulted in data pull from the RN.
31	PMU_HN_SNP_FWDED_EVENT	Counts number of times data forward snoops were sent.

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6.4 RN-I performance events

External devices connect at an RN-I bridge.

This section contains the following subsections:

6.4.1 Bandwidth at RN-I bridges

External devices connect at an RN-I bridge.

The following events measure bandwidth at the RN-I bridges:

Requested read bandwidth at RN-I bridges

External devices connect to CMN-600 at an RN-I bridge.

To monitor the behavior of the system, the following events measure the read bandwidth at each RN-I bridge:

RDataBeats_Port0 Number of RData beats, **RVALID** and **RREADY**, dispatched on port 0. This is a measure of the read bandwidth.

RDataBeats_Port1 Number of RData beats, **RVALID** and **RREADY**, dispatched on port 1. This is a measure of the read bandwidth.

RDataBeats_Port2 Number of RData beats, **RVALID** and **RREADY**, dispatched on port 2. This is a measure of the read bandwidth.

Because CMOs are sent through the read channel, their responses are included in these events.

Calculate the read bandwidth as follows:

$$\text{Read bandwidth} = \frac{\text{Number RDataBeats\_Port}n \times \text{AXIDataBeatSize}}{\text{Cycles}} \times \text{Frequency}$$

Where AXIDataBeatSize is the number of bytes for each AXI beat. In most cases, this is the same size as the AXI bus.

Actual read bandwidth on interconnect

RXDATFLITV measures the bandwidth that an RN-I bridge sends to the interconnect.

This event counts the number of received data flit requests that the bridge receives through the data channel. Therefore, this event measure the actual bandwidth that an RN-I bridge sends to the interconnect, and not the useful bandwidth the external devices can use.

RXDATFLITV Number of **RXDAT** flits received. This event is a measure of the true read data bandwidth. It excludes CMOs, because CMO completions return to the RN-I through the response channel, but includes replayed requests.

This event includes the replayed requests because of the read data buffer decoupled scheme.

Calculate the actual read bandwidth as follows:

$$\text{Actual read bandwidth} = \frac{\text{RXDATFLITV} \times \text{DataFlitSize}}{\text{Cycles}} \times \text{Frequency}$$

Figure 6-6 Actual read bandwidth

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Write bandwidth at RN-I bridges

TXDATFLITV monitors the number of data flits that the RN-I bridge sends out.

In a similar way to the read actual bandwidth event, this event monitors the number of data flits that the RN-I bridge sends out. Therefore, this event measures the actual write bandwidth that is sent to the interconnect:

TXDATFLITV Number of **TXDAT** flits dispatched. This event is a measure of the write bandwidth.

Calculate the write bandwidth as follows:

$$\text{Actual write bandwidth} = \frac{\text{TXDATFLITV x DataFlitSize}}{\text{Cycles}} \text{ x Frequency}$$

Figure 6-7 Actual write bandwidth

6.4.2 Bottleneck analysis at RN-I bridges

CMN-600 provides events that observe the locations where the nodes or bridges are full, which can cause delays in the rest of the system.

This feature enables you to monitor the current bottlenecks in the system, and checks multiple events in the RN-Is, HN-Fs, and memory controllers. In the RN-I bridges, the events monitor the following:

- The number of times the bridge is forced to retry because of the lack of dynamic credits.
- The number of times the read and write tracker is full and therefore cannot accept new requests in the system. This condition can cause delays in the AXI masters.
- The number of read request replays, because of decoupling of the read request buffers and read data buffers in the RN-I system.

Request retry rate at RN-I bridges

TXREQFLITV_RETRIED monitors the efficiency of using dynamic credits in the system.

It does this task by measuring the request retry rate:

TXREQFLITV_RETRIED Number of retried **TXREQ** flits dispatched. This event is a measure of the retry rate.

Calculate the request retry rate as follows:

$$\text{Retry rate} = \frac{\text{TXREQFLITV\_RETRIED}}{\text{TXREQFLITV\_TOTAL}}$$

Figure 6-8 Retry rate

Read and write delays at RN-I bridges

To monitor the delays for both reads and writes, CMN-600 enables you to monitor how full the read and write trackers are in the RN-I bridges.

When one of the trackers is full, the bridge cannot accept new requests from the AXI master. This condition delays the I/O devices that connect to the AXI master.

There are two measures that, together, can help you to isolate the source of bottlenecks in the system. These measures are: how full the trackers are, and the read and write bandwidth from the RN-I bridge to the interconnect. For example, consider the following situations:

- The read tracker of a specific RN-I bridge is full but the effective read bandwidth from the bridge is not close to the maximum expected. In this case, the interconnect cannot keep up with the read traffic from the specific device.
- The bandwidth is close to maximum, the I/O device can send requests to the maximum of its port bandwidth. In this case, the tracker is full for this reason.

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You can also use the measure of how full the trackers are with AXI PMUs to monitor delays to the AXI masters.

The following events monitor the read and write trackers:

RRT_OCCUPANCY All entries in the read request tracker are occupied. This event is a measure of oversubscription in the read request tracker.

WRT_OCCUPANCY All entries in the write request tracker are occupied. This event is a measure of oversubscription in the write request tracker.

——— **Note** ———

For CMN-600 when the NUM_RD_REQ parameter for an RN-I or RN-D node is configured to 128 or 256, the read tracker is divided into slices of 64 entries each. An ACE-Lite request is allocated into a particular read tracker slice according to:

- A hash of the ARID value of the request
- Which of the three ACE-Lite slave interfaces receives the request

Therefore, in these configurations, the maximum number of outstanding same-ARID requests from the same ACE-Lite slave interface is 64.

The RRT_OCCUPANCY event covers the total occupancy of all read tracker slices.

———————————

6.4.3 RN-I PMU event summary

There are 16 RN-I PMU events.

The following table shows a summary of the RN-I PMU events.

Table 6-3 RN-I PMU event summary

Number	Name	Description
1	PMU_RNI_RDATABEATS_P0	Number of RData beats, **RVALID** and **RREADY**, dispatched on port 0. This event measures the read bandwidth, including CMO responses.
2	PMU_RNI_RDATABEATS_P1	Number of RData beats, **RVALID** and **RREADY**, dispatched on port 1. This event measures the read bandwidth, including CMO responses.
3	PMU_RNI_RDATABEATS_P2	Number of RData beats, **RVALID** and **RREADY**, dispatched on port 2. This event measures the read bandwidth, including CMO responses.
4	PMU_RNI_RXDATFLITV	Number of **RXDAT** flits received. This event measures the true read data bandwidth, excluding CMOs.
5	PMU_RNI_TXDATFLITV	Number of **TXDAT** flits dispatched. This event measures the write bandwidth.
6	PMU_RNI_TXREQFLITV	Number of **TXREQ** flits dispatched. This event measures the total request bandwidth.
7	PMU_RNI_TXREQFLITV_RETRIED	Number of retried **TXREQ** flits dispatched. This event measures the retry rate.
8	PMU_RNI_RRT_OCCUPANCY	All entries in the read request tracker are occupied. This event measures oversubscription in the read request tracker.
9	PMU_RNI_WRT_OCCUPANCY	All entries in the write request tracker are occupied. This event measures oversubscription in the write request tracker.
10	PMU_RNI_TXREQFLITV_REPLAYED	Number of replayed **TXREQ** flits. This event measures the replay rate.
11	PMU_RNI_WRCANCEL_SENT	Number of write data cancels sent. This event measures the write cancel rate.
12	PMU_RNI_WDATABEAT_P0	Number of WData beats, **WVALID** and **WREADY**, dispatched on port 0. This event measures write bandwidth on AXI port 0.

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Table 6-3 RN-I PMU event summary (continued)

Number	Name	Description
13	PMU_RNI_WDATABEAT_P1	Number of WData beats, **WVALID** and **WREADY**, dispatched on port 1. This event measures the write bandwidth on AXI port 1.
14	PMU_RNI_WDATABEAT_P2	Number of WData beats, **WVALID** and **WREADY**, dispatched on port 2. This event measures the write bandwidth on AXI port 2.
15	PMU_RNI_RRTALLOC	Number of allocations in the read request tracker. This event measures the read transaction count.
16	PMU_RNI_WRTALLOC	Number of allocations in the write request tracker. This event measures the write transaction count.
17	PMU_RNI_RDB_UNORD	Number of cycles for which Read Data Buffer state machine is in Unordered Mode.
18	PMU_RNI_RDB_REPLAY	Number of cycles for which Read Data Buffer state machine is in Replay mode.
19	PMU_RNI_RDB_HYBRID	Number of cycles for which Read Data Buffer state machine is in hybrid mode. Hybrid mode is where there is a mix of ordered and unordered traffic.
20	PMU_RNI_RDB_ORD	Number of cycles for which Read Data Buffer state machine is in ordered Mode.

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6.5 SBSX performance events

This section contains SBSX performance event information.

This section contains the following subsections:

6.5.1 Bandwidth at SBSX bridges

This section contains SBSX bridge bandwidth information.

The following events are used to measure bandwidth at the SBSX bridges:

Read bandwidth on interconnect at SBSX bridges

This section contains information on read bandwidth on interconnect at SBSX bridges.

This event counts the number of received data flits at the SBSX and interconnect:

PMU_SBSX_RXDAT Number of RXDAT flits received at XP from SBSX. This event is a measure of the read data bandwidth.

Calculate the actual read bandwidth as follows:

$$\text{Actual read bandwidth} = \frac{\text{PMU\_SBSX\_RXDAT} \times \text{DataFlitSize}}{\text{Cycles}} \times \text{Frequency}$$

Figure 6-9 Actual read bandwidth

Note

This event is tracked in the DWM, not in the SBSX, and is defined from the XP's perspective.

Write bandwidth at SBSX bridges

This section contains information on write bandwidth at SBSX bridges.

In a similar way to the read actual bandwidth event, this event monitors the number of data flits that the SBSX receives. Therefore, this event measures the actual write bandwidth that is received from the interconnect:

PMU_SBSX_TXDAT Number of **TXDAT** flits dispatched from XP to SBSX. This event is a measure of the write bandwidth.

Calculate the write bandwidth as follows:

$$\text{Actual write bandwidth} = \frac{\text{PMU\_SBSX\_TXDAT} \times \text{DataFlitSize}}{\text{Cycles}} \times \text{Frequency}$$

Figure 6-10 Actual write bandwidth

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Note

This event is tracked in the DWM, not in the SBSX design. The event is defined from the perspective of the XP.

Total requested bandwidth at SBSX bridges

This section contains information on total requested bandwidth at SBSX bridges.

To improve efficiency when using PMU events and signals, this event combines the read and write bandwidth estimation in a single event. The PMU_SBSX_TXREQ_TOTAL event monitors the number of REQ flits that an SBSX bridge receives:

PMU_SBSX_TXREQ_TOTAL
Number of **TXREQ** flits dispatched from XP to SBSX. This event is a measure of the total request bandwidth.

Calculate the total bandwidth as follows:

$$\text{Total requested bandwidth} = \frac{\text{PMU\_SBSX\_TXREQ\_TOTAL} \times \text{DataFlitSize}}{\text{Cycles}} \times \text{Frequency}$$

Figure 6-11 Total requested bandwidth

Note

This event is tracked in the DWM, not in the SBSX design, and is defined from the perspective of the XP.

6.5.2 Bottleneck analysis at SBSX bridges

This section contains information on bottleneck analysis at SBSX bridges.

CMN-600 provides events that observe the locations where the nodes or bridges are full, which can cause delays in the rest of the system. This feature enables you to monitor the current bottlenecks in the system, and checks multiple events in all CMN-600 components. The events monitor the following:

- The number of times the bridge is forced to retry because of the lack of dynamic credits.
- The number of cycles the bridge is forced to stall due to backpressures on AXI or CHI interface.

The following events are used to measure bottlenecks at the SBSX bridges:
- *6.5 SBSX performance events* on page 6-1148.

Request retry rate at SBSX bridges

This section contains information on the request retry rate at SBSX bridges.

RXREQFLITV_RETRIED monitors the efficiency of using dynamic credits in the system. It does this task by measuring the request retry rate:

RXREQFLITV_RETRIED
Number of **RXREQ** flits dispatched. This event is a measure of the retry rate. Calculate the retry rate as follows:
Retry rate = RXREQFLITV_RETRIED / RXREQFLITV_TOTAL

Delays at SBSX bridges due to backpressure

To analyze the delays in SBSX bridges, CMN-600 enables you to monitor the source of backpressure.

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SBSX might have requests that are ready to be sent to the downstream AXI or ACE-Lite device. However, it cannot send them due to backpressure from the downstream device. In this situation, SBSX holds the request in the *Receive Request Tracker* (RRT). This condition results in the RRT getting full and so the SBSX bridge cannot accept any new requests from RNs impacting system performance.

The following table contains events that monitor such backpressure from the downstream AXI or ACE-Lite device:

Table 6-4 AXI or ACE-Lite downstream monitoring events

Events	Description
ARVALID_NO_ARREADY	Number of cycles the SBSX bridge is stalled due to backpressure on AR channel.
AWVALID_NO_AWREADY	Number of cycles the SBSX bridge is stalled due to backpressure on AW channel.
WVALID_NO_WREADY	Number of cycles the SBSX bridge is stalled due to backpressure on W channel.

If a mesh is congested with many DAT or RSP flits, it might not give link credits to SBSX in timely manner. This situation can cause DAT flits for Reads or RSP flits for Writes to be stalled in SBSX. The following table describes events monitor in such cases where SBSX bridge is not able to upload DAT/RSP flits on the mesh.

Table 6-5 CHI events monitor information

Events	Description
TXDATFLITV_NO_LINKCRD	Number of cycles the TXDAT flit in SBSX bridge is waiting for link credits.
TXRSPFLITV_NO_LINKCRD	Number of cycles the TXRSP flit in SBSX bridge is waiting for link credits.

Tracker occupancy analysis

To debug performance issues, more events are provided to measure occupancy of various trackers in SBSX. These trackers include the *Request Received Tracker* (RRT), *Request Dispatch Tracker* (RDT), and *Write Data Buffers* (WDB).

Read, Write, and CMO transactions occupy RRT before they are dispatched on the AXI interface. When Read/CMO transactions are dispatched on AXI, they move from RRT to RDT. Writes remain on RRT until the write response is obtained from AXI interface and then deallocated from RRT. Knowing the occupancy of RRT and RDT independently can inform you better about the bottleneck source. In the PMU event register description section, RRT is called request tracker, while RDT is called AXI pending tracker.

The following table contains tracker occupancy information.

Table 6-6 Tracker occupancy information

Events	Description
RRT_RD_OCCUPANCY_CNT_OVFL	Read request tracker occupancy count overflow
RRT_WR_OCCUPANCY_CNT_OVFL	Write request tracker occupancy count overflow
RRT_CMO_OCCUPANCY_CNT_OVFL	CMO request tracker occupancy count overflow
WDB_OCCUPANCY_CNT_OVFL	WDB occupancy count overflow
RDT_RD_OCCUPANCY_CNT_OVFL	Read AXI pending tracker occupancy count overflow
RDT_CMO_OCCUPANCY_CNT_OVFL	CMO AXI pending tracker occupancy count overflow

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6.5.3 SBSX PMU event summary

This section contains SBSX PMU event summary information.

For more information, see *por_sbsx_pmu_event_sel* on page 3-884.

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6.6 HN-I performance events

This section contains HN-I performance event information.

This section contains the following subsections:

6.6.1 Bandwidth at HN-I bridges

This section contains HN-I bridge bandwidth information.

The following events are used to measure bandwidth at the HN-I bridges:

Read bandwidth on interconnect at HN-I bridges

This section contains information on read bandwidth on interconnect at HN-I bridges.

This event counts the number of received data flits at the HN-I and interconnect:

PMU_HNI_RXDAT Number of **RXDAT** flits received at XP from HN-I. This event is a measure of the read data bandwidth.

Calculate the actual read bandwidth as follows:

$$\text{Actual read bandwidth} = \frac{\text{PMU\_HNI\_RXDAT} \times \text{DataFlitSize}}{\text{Cycles}} \times \text{Frequency}$$

Figure 6-12 Actual read bandwidth

Note

This event is tracked in the DWM, not in the HN-I design. The event is defined from the XP's perspective.

Write bandwidth at HN-I bridges

This section contains information on write bandwidth at HN-I bridges.

In a similar way to the read actual bandwidth event, this event monitors the number of data flits that the HN-I receives. Therefore this event measures the actual write bandwidth that is received from the interconnect:

PMU_HNI_TXDAT Number of **TXDAT** flits dispatched from XP to HN-I. This event is a measure of the write bandwidth.

Calculate the write bandwidth as follows:

$$\text{Actual write bandwidth} = \frac{\text{PMU\_HNI\_TXDAT} \times \text{DataFlitSize}}{\text{Cycles}} \times \text{Frequency}$$

Figure 6-13 Actual write bandwidth

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Note

This event is tracked in the DWM, not in the HN-I design. The event is defined from the perspective of the XP.

Total requested bandwidth at HN-I bridges

This section contains information on total requested bandwidth at HN-I bridges.

To improve efficiency when using PMU events and signals, this event combines the read and write bandwidth estimation in a single event. The PMU_HNI_TXREQ_TOTAL event monitors the number of REQ flits that an HN-I bridge receives:

PMU_HNI_TXREQ_TOTAL
Number of **TXREQ** flits dispatched from XP to HN-I. This event is a measure of the total request bandwidth.

Calculate the total bandwidth as follows:

$$\text{Total requested bandwidth} = \frac{\text{PMU\_HNI\_TXREQ} \times \text{DataFlitSize}}{\text{Cycles}} \times \text{Frequency}$$

Figure 6-14 Total requested bandwidth

Note

This event is tracked in the DWM, not in the HN-I design. The event is defined from the perspective of the XP.

6.6.2 Bottleneck analysis at HN-I bridges

This section contains information on bottleneck analysis at HN-I bridges.

Locations where the nodes or bridges are full can cause delays in the rest of the system. CMN-600 provides events that observe locations where the nodes or bridges are full. This feature enables you to monitor the current bottlenecks in the system, and checks multiple events in all CMN-600 components. The events monitor the following:

- The number of times the bridge is forced to retry because of the lack of dynamic credits.
- The number of times requests are serialized due to ordering requirements.
- The number of cycles the bridge is forced to stall due to backpressures.

The following events are used to measure bottlenecks at the HN-I bridges:

- *6.6 HN-I performance events* on page 6-1152.

Request retry rate at HN-I bridges

This section contains information on the request retry rate at HN-I bridges.

RXREQFLITV_RETRIED monitors the efficiency of using dynamic credits in the system. It does this task by measuring the request retry rate:

RXREQFLITV_RETRIED
Number of **RXREQ** flits dispatched. This event is a measure of the retry rate. Calculate the retry rate as follows:
Retry rate = RXREQFLITV_RETRIED / RXREQFLITV_TOTAL

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Delays at HN-I bridges because of ordering requirements

When requests are received at an HN-I, there are different ordering guarantees the HN-I bridge must maintain based on the source and attributes of the request.

The requests are sometimes serialized, indicating a lower than expected bandwidth at HN-I, as the following table shows.

Table 6-7 PCIe and non-PCIe RN request information

Request	Description
NONPCIE_SERIALIZED	Number of non-PCIe RN requests that are serialized.
PCIE_SERIALIZED	Number of PCIe RN requests that are serialized.

Delays at HN-I bridges because of backpressure

To analyze the delays in HN-I bridges, CMN-600 enables you to monitor the source of backpressure.

HN-I might have requests that are ready to be sent to AXI or ACE-Lite downstream. However, it cannot send them due to backpressure from AXI or ACE-Lite downstream. In this situation, HN-I holds the request in the RRT. As a result, the RRT gets full. Therefore, the HN-I bridge cannot accept any new requests from RNs, impacting system performance.

This table describes the events that monitor such backpressure from AXI or ACE-Lite downstream:

Table 6-8 AXI and ACE-Lite downstream events monitor information

Events	Description
ARVALID_NO_ARREADY	Number of cycles the HN-I bridge is stalled due to backpressure on AR channel.
AWVALID_NO_AWREADY	Number of cycles the HN-I bridge is stalled due to backpressure on AW channel.
WVALID_NO_WREADY	Number of cycles the HN-I bridge is stalled due to backpressure on W channel.

Even if the AXI or ACE-Lite downstream is ready to accept new requests, the HN-I bridge cannot send them downstream while the RDT is full. The lifetime of a request in the RDT depends on response latency from AXI or ACE-Lite downstream and backpressure on TXDAT channel.

This table describes the events that monitor cases where an HN-I bridge is unable to send new requests to AXI or ACE-Lite downstream:

Table 6-9 AXI and ACE-Lite downstream events monitor information (no new requests sent)

Events	Description
ARREADY_NO_ARVALID	Number of cycles the AR channel is waiting for new requests from HN-I bridge.
AWREADY_NO_AWVALID	Number of cycles the AW channel is waiting for new requests from HN-I bridge.

If the mesh is congested with many DAT flits, then there might be a delay before it gives link credits to HN-I. This delay results in the stalling of DAT flits for Reads in HN-I. This table describes events that monitor cases where an HN-I bridge is not able to upload a DAT flit on the mesh.

Table 6-10 CHI events monitor information

Events	Description
TXDATFLITV_NO_LINKCRD	Number of cycles the TXDAT flit in HN-I bridge is waiting for link credits.

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Tracker occupancy analysis in HN-I

To debug performance issues, more events are provided to measure occupancy of various trackers in HN-I such as RRT, RDT, and WDB.

Read and Write transactions occupy RRT before they are dispatched on the AXI interface. When Read and Write transactions are dispatched on AXI, they move from RRT to RDT. Reads and Writes remain on RDT until all the responses are obtained from the AXI interface. The transactions are then deallocated from RDT. Knowing the occupancy of RRT and RDT independently can inform you better about the bottleneck source. In the PMU event register description section, RRT is called request tracker while RDT is called AXI pending tracker.

The following table contains tracker occupancy information:

Table 6-11 Tracker occupancy information

Events	Description
RRT_RD_OCCUPANCY_CNT_OVFL	Read occupancy count overflow event in RRT
RRT_WR_OCCUPANCY_CNT_OVFL	Write occupancy count overflow event in RRT
RDT_RD_OCCUPANCY_CNT_OVFL	Read occupancy count overflow event in RDT
RDT_WR_OCCUPANCY_CNT_OVFL	Write occupancy count overflow event in RDT
WDB_OCCUPANCY_CNT_OVFL	WDB occupancy count overflow event

6.6.3 HN-I PMU event summary

This section contains HN-I PMU event summary information.

Refer to *por_hni_pmu_event_sel* on page 3-601 for more information.

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6.7 DN performance events

This section contains DN performance event information.

The following table shows a summary of the DN PMU events.

Table 6-12 DN PMU event summary

Number	Name	Description
1	PMU_DN_RXREQ_DVMOP	Number of DVMOP requests received. This number includes all the subtypes and includes TLB invalidate, branch predictor invalidate, instruction cache (physical and virtual) invalidate.
2	PMU_DN_RXREQ_DVMSYNC	Number of DVM sync requests received
3	PMU_DN_RXREQ_DVMOP_VMID_FILTERED	Number of incoming DVMOP requests that are subject to VMID-based filtering. This number is a measure of the effectiveness of VMID-based filtering and potential reduction in DVM snoops.
4	PMU_DN_RXREQ_RETRIED	Number of incoming requests that are retried. This number is a measure of the retry rate.
5	PMU_DN_TRK_OCCUPANCY	Counts the tracker occupancy in DN

The pmu_occup1_id field in the por_dn_pmu_event_sel register is used to program the occupancy counter for specific operations types. The following table summarizes the options.

Table 6-13 Field values for pmu_occup1_id

pmu_occup1_id values	Description
`0b0000`	All
`0b0001`	DVM Ops
`0b0010`	DVM Syncs

Note

In HN-D, DN PMU events can be accessed only when the corresponding HN-I PMU select is 0 (NONE).

DN events can be accessed through the HN-D. The por_dn_pmu_event_sel register outputs on corresponding TXPMU output only if por_hni_pmu_event_sel bits [5], [13], [21], and [29] are set to 0. Otherwise the value on the HN-I PMU is available.

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6.8 CXG performance events

This section contains CXG performance event information.

The XP considers CXRH as a single node when selecting PMU events. The PMU events for CXRA and CXHA share the four possible PMU counters for that port in the XP. Therefore a total of four events can be counted simultaneously from CXRA+CXHA. The CXHA events have "priority" over the CXRA events. If an event selection (0, 1, 2, 3) in por_cxg_ha_pmu_event_sel is nonzero (is not CXHA_PMU_EVENT_NULL), then the event selected in por_cxg_ha_pmu_event_sel is sent to the XP. If an event selection (0, 1, 2, 3) in por_cxg_ha_pmu_event_sel is zero (is CXHA_PMU_EVENT_NULL), then the event selected in por_cxg_ra_pmu_event_sel is sent to the XP.

The CXLA contains its own PMU event counters. As with XP PMU counters, you can pair CXLA PMU event counters with the global counters in a DTC. Configure the CXLA PMU event counters in por_cxla_pmuevcnt.

Note

To enable CXLA PMU functionality, you must configure por_cxla_pmu_config.pmu_en and por_cxg_ra_cfg_ctl.en_cxla_pmucmd_prop to 1'b1. Also configure the usual DT and PMU enables.

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6.9 XP PMU event summary

This section contains XP PMU event summary information.

Each of the XP PMU events is associated with:

- One of six XP ports - East, West, North, South, device port0 or device port1.
- One of four CHI channels - REQ, RSP, SNP, or DAT.

You can specify up to four XP PMU events using the por_mxp_pmu_event_sel register. For more information about this register, see *por_mxp_pmu_event_sel* on page 3-642.

The following table shows a summary of the XP PMU events.

Table 6-14 XP PMU event summary

Number	Name	Description
1	PMU_XP_TXFLIT_VALID	Number of flits transmitted on a specified port and CHI channel. This number is a measure of the flit transfer bandwidth from an XP. **Note** On device ports, this event also includes link flit transfers.
2	PMU_XP_TXFLIT_STALL	Number of cycles when a flit is stalled at an XP waiting for link credits at a specified port and CHI channel. This number is a measure of the flit traffic congestion on the mesh and at the flit download ports.
3	PMU_XP_PARTIAL_DAT_FLIT_VALID	Number of times when a partial DAT flit is uploaded on to the mesh from an RN-F_CHIA port. Partial DAT flit transmission occurs when XP is not able to combine two 128-bit DAT flits and send them over the 256-bit DAT channel. This scenario can happen under 2 circumstances: 1. Only one 128-bit DAT flit is received within a transmission time window 2. Two 128-bit DAT flits are received but they are not two halves of a single 256-bit word

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6.10 Occupancy and lifetime measurement using PMU events

CMN-600 has PMU events to measure the average occupancy of a tracker and measure the average lifetime of the requests in that tracker.

This event is implemented for many of the trackers in CMN-600 units (HN-F, RN-I, RN-D, HN-I, and others). The following formula measures the average occupancy and lifetime and can be applied to all the trackers where this event is supported:

Occupancy measurement

The formula to measure the occupancy is:

$$\text{Average Occupancy (entries)} = \frac{\text{PMU\_OCCUPANCY\_EVENT} << 12}{\text{PMU\_CYCLE\_COUNTER}}$$

Figure 6-15 Average occupancy

For example, for RN-I RRT average occupancy, the formula is:

$$\text{Average RRT Occupancy (entries)} = \frac{\text{PMU\_RNI\_RRT\_OCCUPANCY\_EVENT} << 12}{\text{PMU\_CYCLE\_COUNTER}}$$

Figure 6-16 Average RRT occupancy

Lifetime measurement

If a tracker supports lifetime event, the formula to measure the lifetime is:

$$\text{Average Lifetime (cycles)} = \frac{\text{PMU\_OCCUPANCY\_EVENT} << 12}{\text{PMU\_NUM\_TRACKER\_ALLOCATIONS}}$$

Figure 6-17 Average lifetime

For example, for RN-I RRT average lifetime, the formula is:

$$\text{Average Lifetime (cycles)} = \frac{\text{PMU\_RNI\_RRT\_OCCUPANCY} << 12}{\text{PMU\_RNI\_RRTALLOC}}$$

Figure 6-18 Average RRT lifetime

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6.11 DEVEVENT

CMN-600 HN-Fs support device-specific events that are collectively called DEVEVENT. These events are sent along with the completion of a transaction.

The completion of a transaction can be a data response (DAT) or completion response (RSP). These events contain information regarding the transaction encountering an SLC hit or miss. The events also include information about snoops sent to resolve coherency actions. You can measure these events using watchpoints on the XP that the RN-F is connected to. Refer to *5.1.1 DTM watchpoint* on page 5-1110 for watchpoint usage.

The following table describes the DEVEVENT encodings from HN-F.

Table 6-15 DEVEVENT encodings from HN-F

Encoding	Description
`2'b00`	Line missed in SLC and no snoops sent
`2'b01`	Line missed in SLC and directed snoop sent
`2'b10`	Line missed in SLC and broadcast snoops sent
`2'b11`	Line hit in SLC and no snoops sent

Other CMN-600 device responses have the default `2’b00` encoding as the DEVEVENT value.

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Appendix A
Signal descriptions

This appendix describes the CMN-600 I/O signals.

It contains the following sections:

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A.1 About the signal descriptions

CMN-600 signals are composed of a base name along with identifiers that indicate unique product configuration.

Because there are multiple identical interfaces in CMN-600, in many cases the signal names described in this appendix are only root names. The actual signal name includes a port-specific identifier suffix. The system configuration determines which of the signals described in this appendix CMN-600 uses in a particular system.

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A.2 Clock and reset signals

The following table shows the CMN-600 clock and reset signals.

Table A-1 CMN-600 clock and reset signals

Signal	Type	Description	Connection information
GCLK0	Input	Primary CMN-600 clock input	Connect to global clock for CMN-600
nSRESET	Input	CMN-600 reset, active-LOW	Connect to global reset for CMN-600

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A.3 Clock management signals

The following table shows the clock management Q-Channel signals.

Table A-2 Clock management Q-Channel signals

Signal	Type	Description	Connection information
QACTIVE_CLKCTL	Output	Indication that CMN-600 is active, and that the *External Clock Controller* (ExtCC) must not make a request for CMN-600 to prepare to stop the clocks	Connect to external clock controller
QREQn_CLKCTL	Input	Request from the ExtCC for the CMN-600 to prepare to stop the clocks, active-LOW	Connect to external clock controller or tie HIGH if unused
QACCEPTn_CLKCTL	Output	Positive acknowledgment after receiving **QREQn** assertion indicating that CMN-600 has completed preparation to stop the clocks and that the ExtCC can stop the clocks, active-LOW	Connect to external clock controller
QDENY_CLKCTL	Output	Negative acknowledgment after receiving **QREQn** assertion indicating that CMN-600 has refused the request from the ExtCC to prepare to stop the clocks	

Table A-3 Clock management signals

Signal	Type	Description	Connection information
QACTIVE_CGLCLKCTL	Output	Indication that the CGL side of CMN-600 is active. It also indicates that the *External Clock Controller* (ExtCC) must not request CMN-600 and the corresponding CXG device to prepare to stop the clock CLK_CGL.	OR with QACTIVE_CGLCLKCTL (CXLA) and connect to external clock controller
QREQn_CGLCLKCTL	Input	Request from the ExtCC for the CMN-600 to prepare to stop the clock CLK_CGL, active-LOW	Connect to external clock controller or tie HIGH if unused
QACCEPTn_CGLCLKCTL	Output	Positive acknowledgment after receiving **QREQn** assertion indicating that CMN-600 has completed preparation to stop the clock CLK_CGL and that the ExtCC can stop the clock CLK_CGL, active-LOW	Connect to external clock controller
QDENY_CGLCLKCTL	Output	Negative acknowledgment after receiving **QREQn** assertion indicating that CMN-600has refused the request from the ExtCC to prepare to stop the clock CLK_CGL	

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A.4 Power management signals

This section contains information on power management signals.

The following table shows the power management signals for the logic power domain.

Table A-4 Power management signals for logic power domain

Signal	Type	Description	Connection information
PREQ_LOGIC	Input	Indicates a request for a power state transition	Connect to external power management controller or tie LOW if unused
PSTATE_LOGIC[4:0]	Input	The power state to which a transition is requested [c]	Connect to external power management controller or tie to `5'b01000` if unused
PACCEPT_LOGIC	Output	Indicates acknowledgment of the power state transition and completion of the power state transition within the CMN-600	Connect to external power management controller
PDENY_LOGIC	Output	Indicates denial of the power state transition	
PACTIVE_LOGIC	Output	Hint that indicates activity across the CMN-600. When LOW, indicates the possibility of entering static retention or the OFF state.	

Note

If **PACTIVE_LOGIC** is asserted, the system cannot be powered down.

[c] If *MultiCycle Path* (MCP), the MCP duration must be ≤8 cycles to the last flop to receive this signal. The MCP duration is a requirement for implementation.

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A.5 Interrupt and event signals

The following table shows the interrupt and event signals.

——— **Note** ———

All signal names in this section are only a root name indicated as **RootName**. CMN-600 interfaces use **RootName** within a more fully specified signal name as follows:

CMN-600 interface signal name == **RootName_NID#**, where # represents the node ID corresponding to the specific interface.

———————————

Table A-5 Interrupt and event signals

Signal	Type	Description	Connection information
INTREQPPU	Output	Power state transition complete	Connect to external interrupt control logic or Generic Interrupt Controller
INTREQPMU_NID<x>	Output	PMU count overflow interrupt. NID indicates node ID where <x> represents the NodeID number for that HN-D or DTC or HN-T or DTC.	
INTREQERRNS	Output	Non-secure error handling interrupt	
INTREQERRS	Output	Secure error handling interrupt	
INTREQFAULTNS	Output	Non-secure fault handling interrupt	
INTREQFAULTS	Output	Secure fault handling interrupt	

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A.6 Configuration input signals

The following table shows the configuration input signals.

All of these signals must be stable at least ten cycles before deassertion of reset and must remain stable throughout the operation of the CMN-600. Signal stability must remain until the following reset assertion or power down, if any.

Table A-6 General configuration input signals

Signal	Type	Description	Connection information
CFGM_PERIPHBASE[47:26]	Input	Base address [47:26] of the CMN-600 configuration register space	Tie as required for system memory map
GICD_DESTID[15:0]	Input	A4S logical ID of GICD connection	Tie as required for CML GICD communication

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A.7 Device population signals

The following table shows the RN-D ACE-Lite+DVM device population signals.

These signals are present only when CMN-600 has been configured to include the relevant RN-D bridge.

Table A-7 RN-D ACE-Lite+DVM device population signals

Signal	Type	Description	Connection information
ACCHANNELEN_S0_NID<x>	Input	Indicates that the RN-D bridge at NodeID <x> is populated and AMBA slave port 0 for NodeID <x> is of type ACE-Lite+DVM. Also, the RN-D bridge at NodeID <x> includes a device which responds to DVM messages on the AC channel. **0** DVM-capable device is not populated **1** DVM-capable device is populated.	Tie as required for system configuration
ACCHANNELEN_S1_NID<x>	Input	Indicates that the RN-D bridge at NodeID <x> is populated and AMBA slave port 1 for NodeID <x> is of type ACE-Lite+DVM. The RN-D bridge at NodeID <x> also includes a device which responds to DVM messages on the AC channel. **0** DVM-capable device is not populated **1** DVM-capable device is populated	
ACCHANNELEN_S2_NID<x>	Input	Indicates that the RN-I bridge at NodeID <x> is populated and AMBA slave port 2 for NodeID <x> is of type ACE-Lite+DVM. The RN-I bridge at NodeID <x> also includes a device which responds to DVM messages on the AC channel. **0** DVM-capable device is not populated **1** DVM-capable device is populated	

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A.8 CHI interface signals

CMN-600 uses channels that form an inbound and outbound CHI interface for each device using signals that form each channel in a specific interface.

The *Arm® AMBA® 5 CHI Architecture Specification* defines four channels:

- *Request* (REQ)
- *Response* (RSP)
- *Snoop* (SNP)
- *Data* (DAT)

Note

All signal names in this section are only a root name, **RootName**. CMN-600 interfaces use **RootName** within a more fully specified signal name, see the following example:

- CMN-600 interface signal name == **RootName_NID#**, where # is the node ID corresponding to the specific interface.

This section contains the following subsections:

- *A.8.1 Per-device interface definition* on page Appx-A-1169.
- *A.8.2 Per-channel interface signals* on page Appx-A-1170.
- *A.8.3 Non-channel-specific interface signals* on page Appx-A-1173.

A.8.1 Per-device interface definition

Each CHI device included in a CMN-600 system has distinct functionality, and the requirements and configuration of its respective CHI interfaces differ.

The requirements and configuration for the CHI interfaces are as follows:

External RN-F interface

The RN-F interface consists of a request channel, snoop channel, and two response channels, one in each direction, as the following figure shows

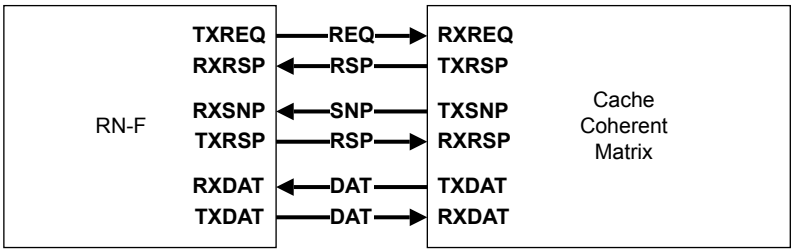

Figure A-1 External RN-F interface

It also has two data channels, one in each direction, for data transfers. CMN-600 receives request messages from the RN-F and sends responses to it. In addition, CMN-600 sends snoop messages to the RN-F and receives snoop response messages.

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External SN-F interface

The SN-F interface consists of a request channel and a response channel as the following figure shows.

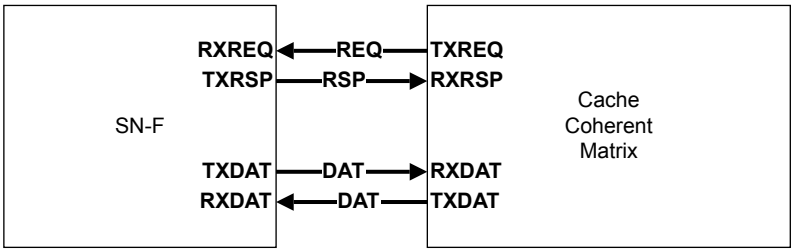

Figure A-2 External SN-F interface

It also has two data channels, one in each direction, for data transfers. The SN-F receives request messages from CMN-600 and returns response messages.

A.8.2 Per-channel interface signals

For communication between devices, each channel includes a *Transmit* (TX) and a *Receive* (RX) port, with various interface signals traveling from TX to RX.

Note

Connection of CHI interfaces between two devices requires cross-coupling of the **TX*** and **RX*** signals between the two devices, as required by the CHI architecture.

The following table shows the Transmit Request channel signals.

Note

The value of n is configuration-dependent.

Table A-8 Transmit Request channel signals

Signal	Type	Description	Connection information
TXREQFLITPEND	Output	Transmit Request Early Flit Valid hint	Connect to **RXREQFLITPEND** of the corresponding CHI device, if populated
TXREQFLITV	Output	Transmit Request Flit Valid	Connect to **RXREQFLITV** of the corresponding CHI device, if populated
TXREQFLIT[n:0]	Output	Transmit Request Flit	Connect to **RXREQFLIT** of the corresponding CHI device, if populated
TXREQLCRDV	Input	Transmit Request channel link layer credit	Connect to **RXREQLCRDV** of the corresponding CHI device, if populated. Otherwise tie LOW.

The following table shows the Transmit Response channel signals.

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Table A-9 Transmit Response channel signals

Signal	Type	Description	Connection information
TXRSPFLITPEND	Output	Transmit Response Early Flit Valid hint	Connect to **RXRSPFLITPEND** of the corresponding CHI device, if populated
TXRSPFLITV	Output	Transmit Response Flit Valid	Connect to **RXRSPFLITV** of the corresponding CHI device, if populated
TXRSPFLIT[n:0][d]	Output	Transmit Response Flit	Connect to **RXRSPFLIT** of the corresponding CHI device, if populated
TXRSPLCRDV	Input	Transmit Response channel link layer credit	Connect to **RXRSPLCRDV** of the corresponding CHI device, if populated. Otherwise tie LOW.

The following table shows the Transmit Snoop channel signals.

Table A-10 Transmit Snoop channel signals

Signal	Type	Description	Connection information
TXSNPFLITPEND	Output	Transmit Snoop Early Flit Valid hint	Connect to **RXSNPFLITPEND** of the corresponding CHI device, if populated
TXSNPFLITV	Output	Transmit Snoop Flit Valid	Connect to **RXSNPFLITV** of the corresponding CHI device, if populated
TXSNPFLIT[n:0][e]	Output	Transmit Snoop Flit	Connect to **RXSNPFLIT** of the corresponding CHI device, if populated
TXSNPLCRDV	Input	Transmit Snoop channel link layer credit	Connect to **RXSNPLCRDV** of the corresponding CHI device, if populated. Otherwise tie LOW.

The following table shows the Transmit Data channel signals.

Table A-11 Transmit Data channel signals

Signal	Type	Description	Connection information
TXDATFLITPEND	Output	Transmit Data Early Flit Valid hint	Connect to **RXDATFLITPEND** of the corresponding CHI device, if populated
TXDATFLITV	Output	Transmit Data Flit Valid	Connect to **RXDATFLITV** of the corresponding CHI device, if populated
TXDATFLIT[n:0][f]	Output	Transmit Data Flit	Connect to **RXDATFLIT** of the corresponding CHI device, if populated
TXDATLCRDV	Input	Transmit Data channel link layer credit	Connect to **RXDATLCRDV** of the corresponding CHI device, if populated. Otherwise tie LOW.

The following table shows the Receive Request channel signals.

[d] The value of n is configuration-dependent.
[e] The value of n is configuration-dependent.
[f] The value of n is configuration-dependent.

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Table A-12 Receive Request channel signals

Signal	Type	Description	Connection information
RXREQFLITPEND	Input	Receive Request Early Flit Valid hint	Connect to **TXREQFLITPEND** of the corresponding CHI device, if populated. Otherwise tie LOW.
RXREQFLITV	Input	Receive Request Flit Valid	Connect to **TXREQFLITV** of the corresponding processor, if populated. Otherwise tie LOW.
RXREQFLIT[n:0][g]	Input	Receive Request Flit	Connect to **TXREQFLIT** of the corresponding CHI device, if populated. Otherwise tie LOW.
RXREQLCRDV	Output	Receive Request channel link layer credit	Connect to **TXREQLCRDV** of the corresponding CHI device, if populated

The following table shows the Receive Response channel signals.

Table A-13 Receive Response channel signals

Signal	Type	Description	Connection information
RXRSPFLITPEND	Input	Receive Response Early Flit Valid hint	Connect to **TXRSPFLITPEND** of the corresponding CHI device, if populated. Otherwise tie LOW.
RXRSPFLITV	Input	Receive Response Flit Valid	Connect to **TXRSPFLITV** of the corresponding processor, if populated. Otherwise tie LOW.
RXRSPFLIT[n:0][h]	Input	Receive Response Flit	Connect to **TXRSPFLIT** of the corresponding CHI device, if populated. Otherwise tie LOW.
RXRSPLCRDV	Output	Receive Response channel link layer credit	Connect to **TXRSPLCRDV** of the corresponding CHI device, if populated

The following table shows the Receive Snoop channel signals.

Table A-14 Receive Snoop channel signals

Signal	Type	Description	Connection information
RXSNPFLITPEND	Input	Receive Snoop Early Flit Valid hint	Connect to **TXSNPFLITPEND** of the corresponding CHI device, if populated. Otherwise tie LOW.
RXSNPFLITV	Input	Receive Snoop Flit Valid	Connect to **TXSNPFLITV** of the corresponding processor, if populated. Otherwise tie LOW.
RXSNPFLIT[n:0][i]	Input	Receive Snoop Flit	Connect to **TXSNPFLIT** of the corresponding CHI device, if populated. Otherwise tie LOW.
RXSNPLCRDV	Output	Receive Snoop channel link layer credit	Connect to **TXSNPLCRDV** of the corresponding CHI device, if populated

The following table shows the Receive Data channel signals.

g The value of n is configuration-dependent.
h The value of n is configuration-dependent.
i The value of n is configuration-dependent.

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Table A-15 Receive Data channel signals

Signal	Type	Description	Connection information
RXDATFLITPEND	Input	Receive Data Early Flit Valid hint	Connect to **TXDATFLITPEND** of the corresponding CHI device, if populated. Otherwise tie LOW.
RXDATFLITV	Input	Receive Data Flit Valid	Connect to **TXDATFLITV** of the corresponding processor, if populated. Otherwise tie LOW.
RXDATFLIT[n:0][j]	Input	Receive Data Flit	Connect to **TXDATFLIT** of the corresponding CHI device, if populated. Otherwise tie LOW.
RXDATLCRDV	Output	Receive Data channel link layer credit	Connect to **TXDATLCRDV** of the corresponding CHI device, if populated

A.8.3 Non-channel-specific interface signals

Every transmit and receive link layer interface includes extra signals that exist only at the interface level and are not channel specific.

The following table shows the LinkActive interface signals.

Table A-16 Receive LinkActive interface signals

Signal	Type	Description	Connection information
RXLINKACTIVEREQ	Input	Receive channel LinkActive request from adjacent transmitter device	Connect to **TXLINKACTIVEREQ** of the corresponding CHI device, if populated. Otherwise tie LOW.
RXLINKACTIVEACK	Output	Receive channel LinkActive acknowledgment to adjacent transmitter device	Connect to **TXLINKACTIVEACK** of the corresponding CHI device, if populated
TXLINKACTIVEREQ	Output	Transmit channel LinkActive request to adjacent receiver device	Connect to **RXLINKACTIVEREQ** of the corresponding CHI device, if populated
TXLINKACTIVEACK	Input	Transmit channel LinkActive acknowledgment from adjacent receiver device	Connect to **RXLINKACTIVEACK** of the corresponding CHI device, if populated. Otherwise tie LOW.

The following table shows the Sactive interface signals.

Table A-17 Sactive interface signals

Signal	Type	Description	Connection information
RXSACTIVE	Input	Indication from the adjacent CHI device that it has one or more outstanding protocol-layer transactions. **RXSACTIVE** must remain asserted throughout the lifetime of the transaction.	Connect to **TXSACTIVE** of the corresponding CHI device
TXSACTIVE	Output	Indication to the adjacent CHI device that CMN-600 has one or more outstanding protocol-layer transactions. **TXSACTIVE** remains asserted throughout the lifetime of the transaction.	Connect to **RXSACTIVE** of the corresponding CHI device

The following table shows the hardware coherency interface signals.

[j] The value of n is configuration-dependent.

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Table A-18 Hardware coherency interface signals

Signal	Type	Description	Connection information
SYSCOREQ	Input	Request to enter CHI coherence domain when asserted and to exit the CHI coherence domain when deasserted. **SYSCOREQ** and **SYSCOACK** implement a four-phase handshake protocol.	Connect to **SYSCOREQ** of corresponding CHI device, if populated. Otherwise tie LOW.
SYSCOACK	Output	Acknowledge CHI coherence domain entry and exit request	Connect to **SYSCOACK** of corresponding CHI device, if populated

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A.9 ACE-Lite and AXI Interface signals

CMN-600 interfaces use **RootName** signal name within a more fully specified convention.

Note

All signal names in this section consist of a root name, **RootName**. CMN-600 interfaces use **RootName** within a more fully specified signal name as follows:

- CMN-600 ACE-Lite and AXI interface signal name == **RootName_[S|M]<#a>_NID#b**, where:

  S|M Defines either a slave or master interface

  $\#_a$ Defines an OPTIONAL interface identifier for a node that can support multiple AMBA interfaces

  $\#_b$ Defines the node ID corresponding to the specific interface

Multi-bit signals append the bit-range identifier included in the **RootName** to the end of the full signal name.

This section contains the following subsections:

- *A.9.1 ACE-Lite-with-DVM slave interface signals* on page Appx-A-1175.
- *A.9.2 AXI and ACE-Lite master interface signals* on page Appx-A-1180.
- *A.9.3 A4S Signal list* on page Appx-A-1183.

A.9.1 ACE-Lite-with-DVM slave interface signals

This interface is present as the ACE-Lite-with-DVM slave port for an RN-D bridge. The signal descriptions show which signals specific to DVM functionality are not present in an ACE-Lite interface without DVM.

The following table shows the clock and power management signals.

Table A-19 Clock and power management signals

Signal	Type	Description	Connection information
ACLKEN_S	Input	AXI bus clock enable	Connect to clock enable logic. Tie HIGH if RN-I port is unused.
ACWAKEUP_S	Output	Indication that the interconnect is starting a transaction that is being sent to the DVM master (SMMU)	Connect to corresponding master device, if populated.
AWAKEUP_S	Input	Indication that the master is starting a transaction that is being sent to the interconnect	Connect to corresponding master device, if populated. Otherwise tie LOW.
RNID_SAM_STALL_DIS	Input	Disables RN SAM programming stall for specified RN	Tie HIGH if boot programming, including RN SAM, is done through this RN-I port. Otherwise, tie LOW.
SYSCOREQ_S	Input	Request to enter DVM domain when asserted and to exit the DVM domain when deasserted. SYSCOREQ and SYSCOACK implement a four-phase handshake protocol.	Connect to corresponding master device. Tie LOW if master is not populated or does have port.
SYSCOACK_S	Output	Acknowledge for DVM domain entry and exit	Connect to corresponding master device, if populated

The following table shows the Write Address Channel signals.

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Table A-20 Write Address Channel signals

Signal	Type	Description	Connection information
AWREADY_S	Output	Write address ready	Connect to corresponding master device, if populated
AWVALID_S	Input	Write address valid	Connect to corresponding master device, if populated. Otherwise tie LOW.
AWID_S[10:0]	Input	Write address ID	
AWADDR_S[n:0][k]	Input	Write address	
AWLEN_S[7:0]	Input	Write Burst length	
AWSIZE_S[2:0]	Input	Write Burst size	
AWBURST_S[1:0]	Input	Write Burst type	
AWLOCK_S	Input	Write lock type	
AWCACHE_S[3:0]	Input	Write memory type	
AWUSER_S[n:0]	Input. Where n = (REQ_RSVDC_WIDTH-1).	User-defined signal	
AWPROT_S[2:0]	Input	Write protection type	
AWQOS_S[3:0]	Input	Write Quality of Service identifier	
AWSNOOP_S[3:0]	Input	Write transaction type	
AWDOMAIN_S[1:0]	Input	Write shareability domain	
AWATOP[5:0]	Input	Atomic Operation	Tie LOW
AWSTASHNID[10:0]	Input	Indicates the node identifier of the physical interface that is the target interface for the cache stash operation	Connect to corresponding master device, if populated. Otherwise tie LOW.
AWSTASHNIDEN	Input	When asserted, indicates that the AWSTASHNID signal is valid and must be used	Connect to corresponding master device, if populated. Otherwise tie LOW.
AWSTASHLPID[4:0]	Input	Indicates the logical processor subunit associated with the physical interface that is the target for the cache stash operation	Connect to corresponding master device, if populated. Otherwise tie LOW.
AWSTASHLPIDEN	Input	When asserted, indicates that the AWSTASHLPID signal is enabled and must be used	Connect to corresponding master device, if populated. Otherwise tie LOW.
AWTRACE	Input	Trace signal associated with the AW Write Address channel	Connect to corresponding master device, if populated. Otherwise tie LOW.

The following table shows the Write Data Channel signals.

[k] The value of n is configuration-dependent.

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Table A-21 Write Data Channel signals

Signal	Type	Description	Connection information
WREADY_S	Output	Write data ready	Connect to corresponding master device, if populated
WVALID_S	Input	Write data valid	Connect to corresponding master device, if populated. Otherwise tie LOW.
WDATA_S[n:0][1]	Input	Write data	Connect to corresponding master device, if populated. Otherwise tie LOW.
WSTRB_S[d:0] The value of d = (n/8 -1).	Input	Write byte lane strobes	Connect to corresponding master device, if populated. Otherwise tie LOW.
WLAST_S	Input	Write data last transfer indication	Connect to corresponding master device, if populated. Otherwise tie LOW.
WUSER_S[0]	Input	WDATACHK Valid	Connect to corresponding master device, if populated. Otherwise tie LOW.
WTRACE	Input	Trace signal associated with the Write Data channel	Connect to corresponding master device, if populated. Otherwise tie LOW.
WPOISON[p:0]	Input	Poison signal associated with the W Write Data channel	Connect to corresponding master device, if populated. Otherwise tie LOW.
WDATACHK[d:0] The value of d = (n/8 -1).	Input	Datacheck signal associated with the Write Data channel	Connect to corresponding master device, if populated. Otherwise tie LOW.

The following table shows the Write Response Channel signals.

Table A-22 Write Response Channel signals

Signal	Type	Description	Connection information
BREADY_S	Input	Write response ready	Connect to corresponding master device, if populated. Otherwise tie LOW.
BVALID_S	Output	Write response valid	Connect to corresponding master device, if populated
BID_S[10:0]	Output	Write response ID	
BRESP_S[1:0]	Output	Write response	
BUSER_S[3:0]	Output	User response signal	
BTRACE	Output	Trace signal associated with the Write Response channel	Connect to corresponding master device, if populated

The following table shows the Read Address Channel signals.

[1] The value of n is configuration-dependent.

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Table A-23 Read Address Channel signals

Signal	Type	Description	Connection information
ARREADY_S	Output	Read address ready	Connect to corresponding master device, if populated
ARVALID_S	Input	Read address valid	Connect to corresponding master device, if populated. Otherwise tie LOW.
ARID_S[10:0]	Input	Read address ID	
ARADDR_S[n:0][m]	Input	Read address	
ARLEN_S[7:0]	Input	Read Burst length	
ARSIZE_S[2:0]	Input	Read Burst size	
ARBURST_S[1:0]	Input	Read Burst type	
ARLOCK_S	Input	Read lock type	
ARCACHE_S[3:0]	Input	Read cache type	
ARUSER_S[n:0]	Input. Where n = (REQ_RSVDC_WIDTH-1).	User-defined signal	
ARPROT_S[2:0]	Input	Read protection type	
ARQOS_S[3:0]	Input	Read Quality of Service value	
ARSNOOP_S[3:0]	Input	Read transaction type	
ARDOMAIN_S[1:0]	Input	Read shareability domain	
ARTRACE	Input	Trace signal associated with the Read Address channel	Connect to corresponding master device, if populated. Otherwise tie LOW.

The following table shows the Read Data Channel signals.

Table A-24 Read Data Channel signals

Signal	Type	Description	Connection information
RREADY_S	Input	Read data ready	Connect to corresponding master device, if populated. Otherwise tie LOW.
RVALID_S	Output	Read data valid	Connect to corresponding master device, if populated
RID_S[10:0]	Output	Read data ID	Connect to corresponding master device, if populated
RDATA_S[n:0][n]	Output	Read data	Connect to corresponding master device, if populated
RRESP_S[1:0]	Output	Read data response	Connect to corresponding master device, if populated
RLAST_S	Output	Read data last transfer indication	Connect to corresponding master device, if populated

[m] The value of n is configuration-dependent.
[n] The value of n is configuration-dependent.

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Table A-24 Read Data Channel signals (continued)

Signal	Type	Description	Connection information
RUSER_S[0:0]	Output.	RDATACHK valid signal	Connect to corresponding master device, if populated
RTRACE	Output	Trace signal associated with the Read Data channel	Connect to corresponding master device, if populated
RPOISON[p-1]	Output	Poison signal associated with the Read Data channel	Connect to corresponding master device, if populated
RDATACHK[d:0] The value of d is d = (n/8 -1).	Output	Datacheck signal associated with the Read Data channel	Connect to corresponding master device, if populated

The following table shows the Snoop Address Channel signals. These signals are not included in an ACE-Lite interface without DVM.

Table A-25 Snoop Address Channel signals

Signal	Type	Description	Connection information
ACREADY_S	Input	Snoop address ready	Connect to corresponding master device, if populated. Otherwise tie LOW.
ACVALID_S	Output	Snoop address valid	Connect to corresponding master device, if populated
ACADDR_S[n:0][o]	Output	Snoop address	
ACSNOOP_S[3:0]	Output	Snoop transaction type	
ACPROT_S[2:0]	Output	Snoop protection type	
ACVMIDEXT[3:0]	Output	Snoop Address VMID Extension	
ACTRACE	Output	Snoop address trace	

The following table shows the Snoop Response Channel signals. These signals are not included in an ACE-Lite interface without DVM.

Table A-26 Snoop Response Channel signals

Signal	Type	Description	Connection information
CRREADY_S	Output	Snoop response ready	Connect to corresponding master device, if populated
CRVALID_S	Input	Snoop response valid	Connect to corresponding master device, if populated. Otherwise tie LOW.
CRRESP_S[4:0]	Input	Snoop response	
CRTRACE	Input	Snoop response trace	

Note

WUSER_S[0] acts as a WDATACHK valid signal when DATACHECK_EN parameter is enabled.

- If WUSER_S[0]=0, RNI and RND synthesizes the correct WDATACHK value before sending it on the CHI write request
- If WUSER_S[0]=1, RNI and RND uses the WDATACHK pin value to drive on the CHI write request

[o] The value of n is configuration-dependent.

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If the DATACHECK_EN parameter is not enabled, the WUSER_S[0] input is ignored.

Note

RUSER_S[0] acts as an RDATACHK valid signal. Since RNI and RND always drive RDATACHK value, RUSER_S[0] is set to 1 when DATACHECK_EN parameter is enabled.

If DATACHECK_EN parameter is not enabled, the RUSER_S[0] output is set to 0.

A.9.2 AXI and ACE-Lite master interface signals

HN-I and SBSX have an AXI and ACE-Lite master interface.

The following table shows the clock enable signal.

Table A-27 Clock enable signal

Signal	Type	Description	Connection information
ACLKEN_M	Input	AXI Master bus clock enable	Connect to clock-enable logic
AWAKEUP_M	Output	Indication that CMN-600 is starting an AXI transaction	Connect to corresponding slave device, if populated

The following table shows the Write Address Channel signals.

Table A-28 Write Address Channel signals

Signal	Type	Description	Connection information
AWREADY_M	Input	Write address ready	Connect to corresponding slave device, if populated. Otherwise tie LOW.
AWVALID_M	Output	Write address valid	Connect to corresponding slave device, if populated
AWID_M[10:0]	Output	Write address ID	
AWADDR_M[n:0][p]	Output	Write address	
AWLEN_M[7:0]	Output	Write Burst length	
AWSIZE_M[2:0]	Output	Write Burst size	
AWBURST_M[1:0]	Output	Write Burst type	
AWLOCK_M	Output	Write lock type	
AWCACHE_M[3:0]	Output	Write cache type	
AWUSER_M[n:0]	Output. Where n = (REQ_RSVDC_WIDTH-1).	User signal	
AWPROT_M[2:0]	Output	Write protection type	
AWQOS_M[3:0]	Output	Write Quality of Service value	
AWSNOOP_M[3:0]	Output	Shareable write transaction type	
AWDOMAIN_M[1:0]	Output	Write shareability domain	
AWTRACE_M	Output	-	

[p] The value of n is configuration-dependent.

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The following table shows the Write Data Channel signals.

Table A-29 Write Data Channel signals

Signal	Type	Description	Connection information
WREADY_M	Input	Write data ready	Connect to corresponding slave device, if populated. Otherwise tie LOW.
WVALID_M	Output	Write data valid	Connect to corresponding slave device, if populated
WDATA_M[n:0][q]	Output	Write data	Connect to corresponding slave device, if populated
WSTRB_M[n:0] [q]	Output	Write byte lane strobes	Connect to corresponding slave device, if populated
WLAST_M	Output	Write data last transfer indication	Connect to corresponding slave device, if populated
WUSER_M[0:0]	Output	WDATACHK valid signal	Connect to corresponding slave device, if populated
WPOISONM[p:0] The value of p = (n/64) - 1.	Output	Poison signal associated with the Write Data channel	Connect to corresponding master device, if populated. Otherwise tie LOW.
WDATACHKM[d:0] The value of d = (n/8 -1).	Output	Datacheck signal associated with the Write Data channel	Connect to corresponding master device, if populated. Otherwise tie LOW.
WTRACEM	Output	Trace signal associated with the Write Data channel	Connect to corresponding master device, if populated. Otherwise tie LOW.

The following table shows the Write Response Channel signals.

Table A-30 Write Response Channel signals

Signal	Type	Description	Connection information
BREADY_M	Output	Write response ready	Connect to corresponding slave device, if populated
BVALID_M	Input	Write response valid	Connect to corresponding slave device, if populated. Otherwise tie LOW.
BID_M[10:0]	Input	Write response ID	
BRESP_M[1:0]	Input	Write response	
BUSER_M[3:0]	Input	User signal	
BTRACEM	Input	-	

The following table shows the Read Address Channel signals.

[q] **WDATA** is configurable to 128-bits or 256-bits. **WSTRB** scales accordingly.
[r] The value of n is configuration-dependent.
[s] The value of n is configuration-dependent.

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Table A-31 Read Address Channel signals

Signal	Type	Description	Connection information
ARREADY_M	Input	Read address ready	Connect to corresponding slave device, if populated. Otherwise tie LOW.
ARVALID_M	Output	Read address valid	Connect to corresponding slave device, if populated
ARID_M[10:0]	Output	Read address ID	
ARADDR_M[n:0][t]	Output	Read address	
ARLEN_M[7:0]	Output	Read Burst length	
ARSIZE_M[2:0]	Output	Read Burst size	
ARBURST_M[1:0]	Output	Read Burst type	
ARLOCK_M	Output	Read lock type	
ARCACHE_M[3:0]	Output	Read cache type	
ARUSER_M[n:0]	Output, where n = (REQ_RSVDC_WIDTH-1).	User signal	
ARPROT_M[2:0]	Output	Read protection type	
ARQOS_M[3:0]	Output	Read Quality of Service value	
ARSNOOP_M[3:0]	Output	Shareable read transaction type	
ARDOMAIN_M[1:0]	Output	Read shareability domain	
ARTRACEM	Output	-	

The following table shows the Read Data Channel signals.

Table A-32 Read Data Channel signals

Signal	Type	Description	Connection information
RREADY_M	Output	Read data ready	Connect to corresponding slave device, if populated
RVALID_M	Input	Read data valid	Connect to corresponding slave device, if populated. Otherwise tie LOW.
RID_M[10:0]	Input	Read data ID	Connect to corresponding slave device, if populated. Otherwise tie LOW.
RDATA_M[127:0]/[255:0]	Input	Read data	Connect to corresponding slave device, if populated. Otherwise tie LOW.
RRESP_M[1:0]	Input	Read data response	Connect to corresponding slave device, if populated. Otherwise tie LOW.
RLAST_M	Input	Read data last transfer indication	Connect to corresponding slave device, if populated. Otherwise tie LOW.
RUSER_M[0:0]	Input	RDATACHK valid signal	Connect to corresponding slave device, if populated. Otherwise tie LOW.

[t] The value of n is configuration-dependent.

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Table A-32 Read Data Channel signals (continued)

Signal	Type	Description	Connection information
RPOISONM[p:0] The value of p = (n/64) - 1.	Input	Poison signal associated with the Read Data channel	Connect to corresponding master device, if populated
RDATACHKM[d:0] The value of d = (n/8 -1).	Input	Datacheck signal associated with the Read Data channel	Connect to corresponding master device, if populated
RTRACEM	Input	Trace signal associated with the Read Data channel	Connect to corresponding master device, if populated

Note

RUSER_M[0] acts as an RDATACHK valid signal when DATACHECK_EN parameter is enabled.

- If RUSER_M[0]=0, SBSX/HNI synthesizes the correct RDATACHK value before sending it on CHI read data response.
- If RUSER_M[0]=1, SBSX/HNI uses RDATACHK pin value to drive on CHI read data response.

If the DATACHECK_EN parameter is not enabled, RUSER_M[0] input is ignored.

Note

WUSER_M[0] acts as a WDATACHK valid signal. Since SBSX and HNI always drive the WDATACHK value, WUSER_M[0] is set to 1 when DATACHECK_EN parameter is enabled.

If DATACHECK_EN parameter is not enabled, the WUSER_M[0] output is driven to 0.

A.9.3 A4S Signal list

The A4S interface signals are listed in the following tables.

Table A-33 A4S Transmit signals

Signal	Type	Description	Connection information
TXA4STREADY	Input	**TXA4STREADY** indicates that the slave can accept a transfer in the current cycle	Connect from **RXA4STREADY** of the A4S slave, if populated. Otherwise tie LOW.
TXA4STVALID	Output	**TXA4STVALID** indicates that the master is driving a valid transfer. A transfer takes place when both **TXA4STVALID** and **TXA4STREADY** are asserted.	Connect to **RXA4STVALID** of the A4S slave, if populated
TXA4STDEST[7:0]	Output	8'b0	**TXA4STDEST** is always zero
TXA4STID[7:0]	Output	**TXA4STID** is the data stream identifier that indicates different streams of data	Connect to **RXA4STID** of the A4S slave, if populated
TXA4STDATA[63:0]	Output	**TXA4STDATA** is the primary payload that is used to provide the data that is passing across the interface	Connect to **RXA4STDATA** of the A4S slave, if populated
TXA4STSTRB[7:0]	Output	**TXA4STSTRB** is the byte qualifier that indicates whether the content of the associated byte of **TXA4STDATA** is processed as a data byte or a position byte	Connect to **RXA4STSTRB** of the A4S slave, if populated

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Table A-33 A4S Transmit signals (continued)

Signal	Type	Description	Connection information
TXA4STKEEP[7:0]	Output	**TXA4STKEEP** is the byte qualifier that indicates whether the content of the associated byte of **TDATA** is processed as part of the data stream. Associated bytes that have the **TKEEP** byte qualifier deasserted are null bytes and can be removed from the data stream.	Connect to **RXA4STKEEP** of the A4S slave, if populated
TXA4STLAST	Output	**TXA4STLAST** indicates the boundary of a packet	Connect to **RXA4STLAST** of the A4S slave, if populated

Table A-34 A4S Receive signals

Signal	Type	Description	Connection information
RXA4STREADY	Output	**RXA4STREADY** indicates that the slave can accept a transfer in the current cycle	Connect to **TXA4STREADY** of the A4S master, if populated
RXA4STVALID	Input	**RXA4STVALID** indicates that the master is driving a valid transfer. A transfer takes place when both **RXA4STVALID** and **RXA4STREADY** are asserted	Connect from **TXA4STVALID** of the A4S master, if populated, otherwise tie LOW
RXA4STDEST[7:0]	Input	**RXA4STDEST** provides routing information for the data stream	Connect from **TXA4STDEST** of the A4S master, if populated. Otherwise tie LOW.
RXA4STID[7:0]	Input	**RXA4STID** is the data stream identifier that indicates different streams of data	Connect from **TXA4STID** of the A4S master, if populated. Otherwise tie LOW.
RXA4STRI[7:0]	Input	**RXA4STRI** is the chip to chip routing information that indicates RXA ID of the other chip	Connect from **TXA4STRI** of the A4S master, if populated. Otherwise tie LOW.
RXA4STDATA[63:0]	Input	**RXA4STDATA** is the primary payload that is used to provide the data that is passing across the interface	Connect from **TXA4STDATA** of the A4S master, if populated. Otherwise tie LOW.
RXA4STSTRB[7:0]	Input	**RXA4STSTRB** is the byte qualifier that indicates whether the content of the associated byte of **RXA4STDATA** is processed as a data byte or a position byte	Connect from **TXA4STSTRB** of the A4S master, if populated. Otherwise tie LOW.
RXA4STKEEP[7:0]	Input	**RXA4STKEEP** is the byte qualifier that indicates whether the content of the associated byte of **TDATA** is processed as part of the data stream. Associated bytes that have the **TKEEP** byte qualifier deasserted are null bytes and are removed from the data stream.	Connect from **TXA4STKEEP** of the A4S master, if populated. Otherwise tie LOW.
RXA4STLAST	Input	**RXA4STLAST** indicates the boundary of a packet	Connect from **TXA4STLAST** of the A4S master, if populated. Otherwise tie LOW.

Table A-35 GICD_DESTID

Signal	Type	Description	Connection information
GICD_DESTID	Input	A4S logical ID of **GICD_DESTID** connection	Tie as required for CML GICD communication

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A.10 CGL interface signals

The following tables describe CMN-600 *CCIX Gateway Link* CGL interface signals.

CCIX Gateway Link (CGL) interface (Credited Micro-Architecture interface between RA, HA, and LA components)

The following tables contain CGL interface signals.

——— **Note** ———

All signal names in this section are only a root name indicated as **RootName**. CMN-600 interfaces use **RootName** within a more fully specified signal name, see the following example:

- CMN-600 interface signal name == **RootName_NID#**, where # represents the node ID corresponding to the specific interface.

———————————

The following table contains Transmit Memory Request interface signals.

——— **Note** ———

Values for ‘n’ and ‘m’ transmit signals ***REQDATFLIT** and ***SNPFLIT** are configuration dependent.

———————————

Table A-36 Transmit Memory Request interface signals

Signal	Type	Description	Connection information
TXCGLREQDATFLITPEND	Output	Transmit Memory Request Early Flit Valid hint.	Connect to **RXCGLREQDATFLITPEND** of the corresponding CXLA.
TXCGLREQDATFLITV	Output	Transmit Memory Request Flit Valid.	Connect to **RXCGLREQDATFLITV** of the corresponding CXLA.
TXCGLREQDATFLIT[n:0]	Output	Transmit Memory Request Flit.	Connect to **RXCGLREQDATFLIT** of the corresponding CXLA.
TXCGLREQDATLCRDV	Input	Transmit Memory Request channel link layer credit.	Connect to **RXCGLREQDATLCRDV** of the corresponding CXLA.

The following table contains Transmit Snoop Request interface signals.

Table A-37 Transmit Snoop Request interface signals

Signal	Type	Description	Connection information
TXCGLSNPFLITPEND	Output	Transmit Snoop Request Early Flit Valid hint.	Connect to **RXCGLSNPFLITPEND** of the corresponding CXLA.
TXCGLSNPFLITV	Output	Transmit Snoop Request Flit Valid.	Connect to **RXCGLSNPFLITV** of the corresponding CXLA.
TXCGLSNPFLIT[m:0]	Output	Transmit Snoop Request Flit.	Connect to **RXCGLSNPFLIT** of the corresponding CXLA.
TXCGLSNPLCRDV	Input	Transmit Snoop Request channel link layer credit.	Connect to **RXCGLSNPLCRDV** of the corresponding CXLA.

The following table contains Transmit Memory Response interface signals.

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Table A-38 Transmit Memory Response interface signals

Signal	Type	Description	Connection information
TXCGLREQRSPFLITPEND	Output	Transmit Memory Response Early Flit Valid hint.	Connect to **RXCGLREQRSPFLITPEND** of the corresponding CXLA.
TXCGLREQRSPFLITV	Output	Transmit Memory Response Flit Valid.	Connect to **RXCGLREQRSPFLITV** of the corresponding CXLA.
TXCGLREQRSPFLIT[34:0]	Output	Transmit Memory Response Flit.	Connect to **RXCGLREQRSPFLIT** of the corresponding CXLA.
TXCGLREQRSPLCRDV	Input	Transmit Memory Response channel link layer credit.	Connect to **RXCGLREQRSPLCRDV** of the corresponding CXLA.

The following table contains Transmit Snoop Response interface signals.

Table A-39 Transmit Snoop Response interface signals

Signal	Type	Description	Connection information
TXCGLSNPRSPFLITPEND	Output	Transmit Snoop Response Early Flit Valid hint.	Connect to **RXCGLSNPRSPFLITPEND** of the corresponding CXLA.
TXCGLSNPRSPFLITV	Output	Transmit Snoop Response Flit Valid.	Connect to **RXCGLSNPRSPFLITV** of the corresponding CXLA.
TXCGLSNPRSPFLIT[34:0]	Output	Transmit Snoop Response Flit.	Connect to **RXCGLSNPRSPFLIT** of the corresponding CXLA.
TXCGLSNPRSPLCRDV	Input	Transmit Snoop Response channel link layer credit.	Connect to **RXCGLSNPRSPLCRDV** of the corresponding CXLA.

The following table contains Transmit Snoop Data interface signals.

Table A-40 Transmit Snoop Data interface signals

Signal	Type	Description	Connection information
TXCGLSNPDATFLITPEND	Output	Transmit Snoop Data Early Flit Valid hint.	Connect to **RXCGLSNPDATFLITPEND** of the corresponding CXLA.
TXCGLSNPDATFLITV	Output	Transmit Snoop Data Flit Valid.	Connect to **RXCGLSNPDATFLITV** of the corresponding CXLA.
TXCGLSNPDATFLIT[556:0]	Output	Transmit Snoop Data Flit.	Connect to **RXCGLSNPDATFLIT** of the corresponding CXLA.
TXCGLSNPDATLCRDV	Input	Transmit Snoop Data channel link layer credit.	Connect to **RXCGLSNPDATLCRDV** of the corresponding CXLA.

The following table contains Transmit Memory Response interface signals.

Table A-41 Transmit Memory Response interface signals

Signal	Type	Description	Connection information
TXCGLRSPDATFLITPEND	Output	Transmit Memory Response Data Early Flit Valid hint.	Connect to **RXCGLRSPDATFLITPEND** of the corresponding CXLA.
TXCGLRSPDATFLITV	Output	Transmit Memory Response Data Flit Valid.	Connect to **RXCGLRSPDATFLITV** of the corresponding CXLA.

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Table A-41 Transmit Memory Response interface signals (continued)

Signal	Type	Description	Connection information
TXCGLRSPDATFLIT[556:0]	Output	Transmit Memory Response Data Flit.	Connect to **RXCGLRSPDATFLIT** of the corresponding CXLA.
TXCGLRSPDATLCRDV	Input	Transmit Memory Response Data channel link layer credit.	Connect to **RXCGLRSPDATLCRDV** of the corresponding CXLA.

The following table contains Transmit Protocol Credit interface signals.

Table A-42 Transmit Protocol Credit interface signals

Signal	Type	Description	Connection information
TXCGLPCRDFLITPEND	Output	Transmit Protocol Credit Early Flit Valid hint.	Connect to **RXCGLPCRDFLITPEND** of the corresponding CXLA.
TXCGLPCRDFLITV	Output	Transmit Protocol Credit Flit Valid.	Connect to **RXCGLPCRDFLITV** of the corresponding CXLA.
TXCGLPCRDFLIT[50:0]	Output	Transmit Protocol Credit Flit.	Connect to **RXCGLPCRDFLIT** of the corresponding CXLA.
TXCGLPCRDLCRDV	Input	Transmit Protocol Credit channel link layer credit.	Connect to **RXCGLPCRDLCRDV** of the corresponding CXLA.

The following table contains Receive Memory Request interface signals.

Note

Values for ‘n’ and/or ‘m’ receive signals ***REQDATFLIT** and ***SNPFLIT** are configuration dependent.

Table A-43 Receive Memory Request interface signals

Signal	Type	Description	Connection information
RXCGLREQDATFLITPEND	Input	Receive Memory Request Early Flit Valid hint.	Connect to **TXCGLREQDATFLITPEND** of the corresponding CXLA.
RXCGLREQDATFLITV	Input	Receive Memory Request Flit Valid.	Connect to **TXCGLREQDATFLITV** of the corresponding CXLA.
RXCGLREQDATFLIT[n:0]	Input	Receive Memory Request Flit.	Connect to **TXCGLREQDATFLIT** of the corresponding CXLA.
RXCGLREQDATLCRDV	Output	Receive Memory Request channel link layer credit.	Connect to **TXCGLREQDATLCRDV** of the corresponding CXLA.

The following table contains Receive Snoop Request interface signals.

Table A-44 Receive Snoop Request interface signals

Signal	Type	Description	Connection information
RXCGLSNPFLITPEND	Input	Receive Snoop Request Early Flit Valid hint.	Connect to **TXCGLSNPFLITPEND** of the corresponding CXLA.
RXCGLSNPFLITV	Input	Receive Snoop Request Flit Valid.	Connect to **TXCGLSNPFLITV** of the corresponding CXLA.

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Table A-44 Receive Snoop Request interface signals (continued)

Signal	Type	Description	Connection information
RXCGLSNPFLIT[m:0]	Input	Receive Snoop Request Flit.	Connect to **TXCGLSNPFLIT** of the corresponding CXLA.
RXCGLSNPLCRDV	Output	Receive Snoop Request channel link layer credit.	Connect to **TXCGLSNPLCRDV** of the corresponding CXLA.

The following table contains Receive Memory Response interface signals.

Table A-45 Receive Memory Response interface signals

Signal	Type	Description	Connection information
RXCGLREQRSPFLITPEND	Input	Receive Memory Response Early Flit Valid hint.	Connect to **TXCGLREQRSPFLITPEND** of the corresponding CXLA.
RXCGLREQRSPFLITV	Input	Receive Memory Response Flit Valid.	Connect to **TXCGLREQRSPFLITV** of the corresponding CXLA.
RXCGLREQRSPFLIT[34:0]	Input	Receive Memory Response Flit.	Connect to **TXCGLREQRSPFLIT** of the corresponding CXLA.
RXCGLREQRSPLCRDV	Output	Receive Memory Response channel link layer credit.	Connect to **TXCGLREQRSPLCRDV** of the corresponding CXLA.

The following table contains Receive Snoop Response interface signals.

Table A-46 Receive Snoop Response interface signals

Signal	Type	Description	Connection information
RXCGLSNPRSPFLITPEND	Input	Receive Snoop Response Early Flit Valid hint.	Connect to **TXCGLSNPRSPFLITPEND** of the corresponding CXLA.
RXCGLSNPRSPFLITV	Input	Receive Snoop Response Flit Valid.	Connect to **TXCGLSNPRSPFLITV** of the corresponding CXLA.
RXCGLSNPRSPFLIT[34:0]	Input	Receive Snoop Response Flit.	Connect to **TXCGLSNPRSPFLIT** of the corresponding CXLA.
RXCGLSNPRSPLCRDV	Output	Receive Snoop Response channel link layer credit.	Connect to **TXCGLSNPRSPLCRDV** of the corresponding CXLA.

The following table contains Receive Snoop Data interface signals.

Table A-47 Receive Snoop Data interface signals

Signal	Type	Description	Connection information
RXCGLSNPDATFLITPEND	Input	Receive Snoop Data Early Flit Valid hint.	Connect to **TXCGLSNPDATFLITPEND** of the corresponding CXLA.
RXCGLSNPDATFLITV	Input	Receive Snoop Data Flit Valid.	Connect to **TXCGLSNPDATFLITV** of the corresponding CXLA.

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Table A-47 Receive Snoop Data interface signals (continued)

Signal	Type	Description	Connection information
RXCGLSNPDATFLIT[556:0]	Input	Receive Snoop Data Flit.	Connect to **TXCGLSNPDATFLIT** of the corresponding CXLA.
RXCGLSNPDATLCRDV	Output	Receive Snoop Data channel link layer credit.	Connect to **TXCGLSNPDATLCRDV** of the corresponding CXLA.

The following table contains Receive Memory Response interface signals.

Table A-48 Receive Memory Response interface signals

Signal	Type	Description	Connection information
RXCGLRSPDATFLITPEND	Input	Receive Memory Response Data Early Flit Valid hint.	Connect to **TXCGLRSPDATFLITPEND** of the corresponding CXLA.
RXCGLRSPDATFLITV	Input	Receive Memory Response Data Flit Valid.	Connect to **TXCGLRSPDATFLITV** of the corresponding CXLA.
RXCGLRSPDATFLIT[556:0]	Input	Receive Memory Response Data Flit.	Connect to **TXCGLRSPDATFLIT** of the corresponding CXLA.
RXCGLRSPDATLCRDV	Output	Receive Memory Response Data channel link layer credit.	Connect to **TXCGLRSPDATLCRDV** of the corresponding CXLA.

The following table contains Receive Protocol Credit interface signals.

Table A-49 Receive Protocol Credit interface signals

Signal	Type	Description	Connection information
RXCGLPCRDFLITPEND	Input	Receive Protocol Credit Early Flit Valid hint.	Connect to **TXCGLPCRDFLITPEND** of the corresponding CXLA
RXCGLPCRDFLITV	Input	Receive Protocol Credit Flit Valid.	Connect to **TXCGLPCRDFLITV** of the corresponding CXLA.
RXCGLPCRDFLIT[50:0]	Input	Receive Protocol Credit Flit.	Connect to **TXCGLPCRDFLIT** of the corresponding CXLA.
RXCGLPCRDLCRDV	Output	Receive Protocol Credit channel link layer credit.	Connect to **TXCGLPCRDLCRDV** of the corresponding CXLA.

The following table contains Receive and Transmit channel LinkActive interface signals.

Table A-50 Receive and Transmit channel LinkActive interface signals

Signal	Type	Description	Connection information
RXCGLLINKACTIVEREQ	Input	Receive channel LinkActive request from CXLA.	Connect to **TXCGLLINKACTIVEREQ** of the corresponding CXLA.
RXCGLLINKACTIVEACK	Output	Receive channel LinkActive acknowledgement to CXLA.	Connect to **TXCGLLINKACTIVEACK** of the corresponding CXLA.

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Table A-50 Receive and Transmit channel LinkActive interface signals (continued)

Signal	Type	Description	Connection information
TXCGLLINKACTIVEREQ	Output	Transmit channel LinkActive request to CXLA.	Connect to **RXCGLLINKACTIVEREQ** of the corresponding CXLA.
TXCGLLINKACTIVEACK	Input	Transmit channel LinkActive acknowledgement from CXLA.	Connect to **RXCGLLINKACTIVEACK** of the corresponding CXLA.

The following table contains RXCGLSACTIVE and TXCGLSACTIVE interface signals.

Table A-51 RXCGLSACTIVE and TXCGLSACTIVE interface signals

Signal	Type	Description	Connection information
RXCGLSACTIVE	Input	Indication from CXLA that it has one or more outstanding protocol-layer transactions. RXSACTIVE must remain asserted throughout the lifetime of the transaction.	Connect to **TXCGLSACTIVE** of the corresponding CXLA.
TXCGLSACTIVE	Output	Indication to CXLA that CXRH has one or more outstanding protocol-layer transactions. TXSACTIVE remains asserted throughout the lifetime of the transaction.	Connect to **RXCGLSACTIVE** of the corresponding CXLA.

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A.11 Debug, trace, and PMU interface signals

CMN-600 includes signals that aid debugging.

The following table shows the debug, trace, and PMU interface signals.

Note

All signal names in this section are only a root name, indicated as **RootName**. The CMN-600 interfaces use **RootName** within a more fully specified signal name, see the following example:

- CMN-600 interface signal name == **RootName_NID#**, where # represents the node ID that corresponds to the specific interface.

Table A-52 Debug, trace, and PMU interface signals

Signal	Type	Description	Connection information
ATCLKEN_NID<x>	Input	ATB clock enable, where <x> is the NodeID number for that HN-D/DTC or HN-T/DTC	-
ATREADY_NID<x>	Input	ATB device ready **0** Not ready **1** Ready <x> is the NodeID number for that HN-D/DTC or HN-T/DTC	-
AFVALID_NID<x>	Input	FIFO flush request, where <x> is the NodeID number for that HN-D/DTC or HN-T/DTC	-
ATDATA[31:0]_NID<x>	Output	ATB data bus, where <x> is the NodeID number for that HN-D/DTC or HN-T/DTC	-
ATVALID_NID<x>	Output	ATB valid data **0** No valid data **1** Valid data <x> is the NodeID number for that HN-D/DTC or HN-T/DTC	-
ATBYTES[1:0]_NID<x>	Output	CoreSight ATB device data size 0b00 1B 0b01 2B 0b10 3B 0b11 4B <x> is the NodeID number for that HN-D/DTC or HN-T/DTC	-
AFREADY_NID<x>	Output	FIFO flush acknowledge **0** FIFO flush is not complete **1** FIFO flush is complete <x> is the NodeID number for that HN-D/DTC or HN-T/DTC	-

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Table A-52 Debug, trace, and PMU interface signals (continued)

Signal	Type	Description	Connection information
ATID[6:0]_NID<x>	Output	ATB trace source identification, where <x> is the NodeID number for that HN-D/DTC or HN-T/DTC	-
DBGWATCHTRIGREQ_NID<x>	Output	Trigger output from DEM indicating assertion of a DT event. **DBGWATCHTRIGREQ** is asynchronous-safe, and operates in a four-phase handshake with **DBGWATCHTRIGACK**. <x> is the NodeID number for that HN-D/DTC or HN-T/DTC.	Connect to external debug and trace control logic
DBGWATCHTRIGACK_NID<x>	Input	External acknowledgment of receipt of **DBGWATCHTRIGREQ**. **DBGWATCHTRIGACK** must be asynchronous-safe, and operates in a four-phase handshake with **DBGWATCHTRIGREQ**. <x> is the NodeID number for that HN-D/DTC or HN-T/DTC.	Connect to external debug and trace control logic, or tie LOW if **DBGWATCHTRIGREQ** is unused
PMUSNAPSHOTREQ	Input	External request that the live PMU counters are snapshot to the shadow registers.**PMUSNAPSHOTREQ** must be asynchronous-safe, and operates in a four-phase handshake with **PMUSNAPSHOTACK**.	Connect to external debug and trace control logic, or tie LOW if unused
PMUSNAPSHOTACK	Output	Indication that all live PMU counters have been copied to shadow registers and the contents can be read. **PMUSNAPSHOTACK** is asynchronous-safe, and operates in a four-phase handshake with **PMUSNAPSHOTREQ**.	Connect to external debug and trace control logic
NIDEN	Input	Global enable for all debug, trace, and PMU functionality **0** Disabled **1** Enabled	Tie or drive as appropriate to meet system security requirements
SPNIDEN	Input	Global enable for Secure debug, trace, and PMU capability. Only applicable when **NIDEN** is enabled. **0** Disabled **1** Enabled	
TSVALUEB[63:0]	Input	Global system timestamp value in binary format	Connect to external system timestamp counter output

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A.12 DFT and MBIST interface signals

CMN-600 includes signals that support DFT and MBIST capabilities.

The following table shows the DFT signals.

Table A-53 DFT signals

Signal	Type	Description	Connection information
DFTCLKBYPASS	Input	To follow the CMN-600 input clock, select the SLC RAM clock, where applicable for each clock region	Tie LOW if unused
DFTCLKDISABLE[3:0]	Input	Disable clock regions during scan shift	
DFTRAMHOLD	Input	Disable the RAM chip select during scan shift	
DFTMCPHOLD	Input	Assert to prevent HN-F multicycle RAMs from clocking during capture cycles	
DFTRSTDISABLE	Input	Disable internal synchronized reset during scan shift	
DFTCGEN	Input	Scan shift enable. **DFTCGEN** forces the clock grids on during scan shift	
DFTSCANMODE	Input	During functional mode, the HN-F SLC and SF RAM set address and write data inputs, and also satisfy RAM hold timing constraints using pipeline behavior. The set address and write data are only clocked and enabled the cycle before the RAMs are accessed. The cycle that the RAM clock asserts holds the set address and write data. The RAM hold constraints are not guaranteed during ATPG test. There is no guarantee because random data is shifted into the flops that control the set address and write data flop enables. As a result the set address and write data can change in the same cycle as a RAM access, violating the RAM hold constraints. These signal addresses hold constraints during ATPG test. It is used to force the RAM set address and write data flop enables LOW in the cycle that RAM clocks are enabled during ATPG test. The combination of the functional pipeline behavior and this override logic enable, holds MCPs for use on the RAM set address and write data inputs. This scenario occurs in both the implementation flow and during static timing analysis.	

The following table shows the MBIST signals.

Table A-54 MBIST signals

Signal	Type	Description	Connection information
nMBISTRESET	Input	Primary reset to enter MBIST. Must be HIGH during functional non-MBIST operation. Active-LOW.	Tie HIGH if unused
MBISTREQ	Input	SLC MBIST mode request	Tie LOW if unused

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A.13 RN SAM configuration interface signals

Signals that support RN SAM configuration are included in CMN-600.

The following table shows the RN SAM configuration interface signals.

——— **Note** ———

- All signal names in this section are only a root name indicated as **RootName**. CMN-600 interfaces use **RootName** within a more fully specified signal name. See the following example:
  — CMN-600 interface signal name == **RootName_NID#**, where # represents the node ID corresponding to the specific interface.

———————————

Table A-55 RN SAM configuration interface signals

Signal	Type	Description	Connection information
RXPUBFLITPEND	Input	Receive channel early flit valid hint	Connect to **TXPUBFLITPEND** of the corresponding CHI device, if populated. Otherwise, tie LOW.
RXPUBFLITV	Input	Receive channel flit valid	Connect to **TXPUBFLITV** of the corresponding CHI device, if populated. Otherwise, tie LOW.
RXPUBFLIT[34:0]	Input	Receive channel flit	Connect to **TXPUBFLIT[n:0]** of the corresponding CHI device, if populated. Otherwise, tie LOW.
RXPUBLINKFLIT	Input	Receive channel link flit	Connect to **TXPUBLINKFLIT** of the corresponding CHI device, if populated. Otherwise, tie LOW.
RXPUBLCRDV_RP1	Output	Receive channel link layer credit	Connect to **TXPUBLCRDV_RP1** of the corresponding CHI device, if populated.
RXPUBLINKACTIVEREQ	Input	Receive channel LinkActive request	Connect to **TXPUBLINKACTIVEREQ** of the corresponding CHI device, if populated. Otherwise, tie LOW.
RXPUBLINKACTIVEACK	Output	Receive channel LinkActive acknowledge	Connect to **TXPUBLINKACTIVEACK** of the corresponding CHI device, if populated
TXPUBFLITPEND	Output	Transmit channel flit valid	Connect to **RXPUBFLITPEND** of the corresponding CHI device, if populated
TXPUBFLITV	Output	Transmit channel early flit valid hint	Connect to **RXPUBFLITV** of the corresponding CHI device, if populated
TXPUBFLIT[34:0]	Output	Transmit channel flit	Connect to **RXPUBFLIT[34:0]** of the corresponding CHI device, if populated
TXPUBLINKFLIT	Output	Transmit channel link flit	Connect to **RXPUBLINKFLIT** of the corresponding CHI device, if populated
TXPUBLCRDV_RP1	Input	Transmit channel link layer credit	Connect to **RXPUBLCRDV_RP1** of the corresponding CHI device, if populated. Otherwise, tie LOW.
TXPUBLINKACTIVEREQ	Output	Transmit channel LinkActive request	Connect to **RXPUBLINKACTIVEREQ** of the corresponding CHI device, if populated
TXPUBLINKACTIVEACK	Input	Transmit channel LinkActive acknowledge	Connect to **RXPUBLINKACTIVEACK** of the corresponding CHI device, if populated. Otherwise, tie LOW.
TXPUBCFGACTIVE	Output	Transmit channel Configuration Active	Connect to **RXPUBCFGACTIVE** of the corresponding CHI device, if populated

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A.14 CXLA configuration interface signals

Signals that support CXLA configuration are included in CMN-600.

The following table shows the CXLA configuration interface signals.

——— **Note** ———

- All signal names in this section are only a root name indicated as **RootName**. CMN-600 interfaces use **RootName** within a more fully specified signal name. See the following example:
  — CMN-600 interface signal name == **RootName_NID#**, where # represents the node ID corresponding to the specific interface.

———————————

Table A-56 CXLA configuration interface signals

Signal	Type	Description	Connection information
RXPUBFLITPEND	Input	Receive channel early flit valid hint	Connect to **TXPUBFLITPEND** of the corresponding CXLA device, if populated. Otherwise, tie LOW.
RXPUBFLITV	Input	Receive channel flit valid	Connect to **TXPUBFLITV** of the corresponding CXLA device, if populated. Otherwise, tie LOW.
RXPUBFLIT[34:0]	Input	Receive channel flit	Connect to **TXPUBFLIT[n:0]** of the corresponding CXLA device, if populated. Otherwise, tie LOW.
RXPUBLINKFLIT	Input	Receive channel link flit	Connect to **TXPUBLINKFLIT** of the corresponding CXLA device, if populated. Otherwise, tie LOW.
RXPUBLCRDV_RP1	Output	Receive channel link layer credit	Connect to **TXPUBLCRDV_RP1** of the corresponding CXLA device, if populated.
RXPUBLINKACTIVEREQ	Input	Receive channel LinkActive request	Connect to **TXPUBLINKACTIVEREQ** of the corresponding CXLA device, if populated. Otherwise, tie LOW.
RXPUBLINKACTIVEACK	Output	Receive channel LinkActive acknowledge	Connect to **TXPUBLINKACTIVEACK** of the corresponding CXLA device, if populated
TXPUBFLITPEND	Output	Transmit channel flit valid	Connect to **RXPUBFLITPEND** of the corresponding CXLA device, if populated
TXPUBFLITV	Output	Transmit channel early flit valid hint	Connect to **RXPUBFLITV** of the corresponding CXLA device, if populated
TXPUBFLIT[34:0]	Output	Transmit channel flit	Connect to **RXPUBFLIT[34:0]** of the corresponding CXLA device, if populated
TXPUBLINKFLIT	Output	Transmit channel link flit	Connect to **RXPUBLINKFLIT** of the corresponding CXLA device, if populated
TXPUBLCRDV_RP1	Input	Transmit channel link layer credit	Connect to **RXPUBLCRDV_RP1** of the corresponding CXLA device if populated. Otherwise tie LOW.
TXPUBLINKACTIVEREQ	Output	Transmit channel LinkActive request	Connect to **RXPUBLINKACTIVEREQ** of the corresponding CXLA device, if populated
TXPUBLINKACTIVEACK	Input	Transmit channel LinkActive acknowledge	Connect to **RXPUBLINKACTIVEACK** of the corresponding CXLA device if populated. Otherwise tie LOW.
TXPUBCFGACTIVE	Output	Transmit channel, Configuration Active	Connect to **RXPUBCFGACTIVE** of the corresponding CXLA device, if populated

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A.15 Processor event interface signals

Signals that support processor event interface capabilities are included in CMN-600.

The following table shows the processor event interface signals.

Note

All signal names in this section are only a root name indicated as RootName. CMN-600 interfaces use RootName within a more fully specified signal name, **RootName_NID#**, where # represents the node ID corresponding to the specific interface.

Processor event interface signals are present at RN-F, RN-I, and RN-D node locations.

Table A-57 Processor event interface signals

Signal	Type	Description	Connection information
EVENTIREQ	Output	Event input request for processor wake up from WFE state. Remains asserted until EVENTIACK is asserted, and is not reasserted until EVENTIACK is LOW.	Connect to EVENTIREQ input of processor
EVENTIACK	Input	Event input request acknowledge. Must not be asserted until EVENTIREQ is HIGH, and then must remain asserted until after EVENTIREQ goes LOW.	Connect to EVENTIACK output of processor, or tie to EVENTIREQ output of CMN-600 if unused
EVENTOREQ	Input	Event output request for processor wake up, triggered by SEV instruction. Must only be asserted when EVENTOACK is LOW, and then must remain HIGH until after EVENTOACK goes HIGH.	Connect to EVENTOREQ output of processor, or tie LOW if unused
EVENTOACK	Output	Event output request acknowledge **EVENTOACK**is not asserted until EVENTOREQ is HIGH, and then remains asserted until after EVENTOREQ goes LOW.	Connect to EVENTOACK input of processor

The following table shows the CHI Issue A processor event interface signals.

Table A-58 CHI Issue A processor event interface signals

Signal	Type	Description	Connection information
EVENTIREQ	Output	Event input request for processor wake up from WFE state. Remains asserted until EVENTIACK is asserted, and is not reasserted until EVENTIACK is LOW.	Connect to CLREXMON_REQ input of the processor
EVENTIACK	Input	Event input request acknowledge. Must not be asserted until EVENTIREQ is HIGH, and then must remain asserted until after EVENTIREQ goes LOW.	Connect to CLREXMON_ACK output of processor, or tie to EVENTIREQ output of CMN-600 if unused
EVENTOREQ	Input	Event output request for processor wake up, triggered by SEV instruction. Must only be asserted when EVENTOACK is LOW, and then must remain HIGH until after EVENTOACK goes high.	See the following note, otherwise tie LOW
EVENTOACK	Output	Event output request acknowledge. Is not asserted until EVENTOREQ is HIGH, and then remains asserted until after EVENTOREQ goes LOW.	See the following note

Note

- The event handling logic external to CMN-600 must handle the EVENT_OUT from CHI Issue A processor. If system integration wants to connect the EVENT_OUT to CMN-600 EVENTOREQ or

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ENENTOACK, it is the responsibility of the integrator to design the necessary logic to stitch EVENT_OUT. This process is a multicycle pulse to the four-phase handshake pair considering the asynchronous domain crossing.

- Event handling logic external to CMN-600 can drive EVENT_IN of CHI Issue A processor.

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Appendix B
CXLA I/O signals

This appendix includes I/O signals that support CXLA configuration.

It contains the following section:

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B.1 CXLA interface signals

The following tables describe CMN-600 CXLA interface signals.

The following table contains global signals.

Table B-1 Global signals

Signal	Type	Description	Connection information
CLK_CGL	Input	CML *CCIX Gateway Link* (CGL) clock input	Connect to CGL clock for CXLA
nRESET_CGL	Input	CML CGL reset, active-LOW	Connect to CGL reset for CXLA
CLK_CXS	Input	CML CXS clock input	Connect to CXS clock for CXLA
nRESET_CXS	Input	CML CXS reset, active-LOW	Connect to CXS reset for CXLA
DFTCLKBYPASS	Input	See *A.12 DFT and MBIST interface signals* on page Appx-A-1193 for more DFT information	See *A.12 DFT and MBIST interface signals* on page Appx-A-1193 for more DFT information
DFTCLKDISABLE	Input		
DFTRSTDISABLE	Input		
DFTCGEN	Input		
DFTRAMHOLD	Input		
DFTMCPHOLD	Input		
QACTIVE_CXSCLKCTL	Output	Indication that the CXS side of CXLA is active and that the *External Clock Controller* (ExtCC) must not make a request for the corresponding CXLA to prepare to stop the clock CLK_CXS.	Connect to external clock controller
QACTIVE_CGLCLKCTL	Output (CXLA)	Indication that the CGL side of the CXRH is active and that the ExtCC must not make a request for the CMN-600 and corresponding CXLA to prepare to stop the clock CLK_CGL.	OR with QACTIVE_CGLCLKCTL CMN-600 and connect to external clock controller
QREQn_CXSCLKCTL	Input	Request from the ExtCC for the CXLA to prepare to stop the clock CLK_CXS, active-LOW	Connect to external clock controller or tie HIGH if unused
QACCEPTn_CXSCLKCTL	Output	Positive acknowledgment after receiving QREQn assertion indicating that the CXLA has completed preparation to stop the clock CLK_CXS and that the ExtCC can stop the clock CLK_CXS. Active-LOW.	Connect to external clock controller
QDENY_CXSCLKCTL	Output	Negative acknowledgment after receiving QREQn assertion indicating that the CXLA has refused the request from the ExtCC to prepare to stop the clock CLK_CXS.	Connect to external clock controller
PWR_QREQn_CXLA	Input	Indicates a request for a power state transition in CXLA. Active-LOW.	Connect to external power management controller or tie HIGH if unused.

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Table B-1 Global signals (continued)

Signal	Type	Description	Connection information
PWR_QACCEPTn_CXLA	Output	Indicates acknowledgment of the power state transition and completion of the power state transition within the CXLA. Active-LOW.	Connect to external power management controller.
PWR_QDENY_CXLA	Output	Indicates denial of the power state transition	Connect to external power management controller
PWR_QACTIVE_CXLA	Output	Hint that indicates activity across the CXLA. When LOW, indicates the possibility of entering the OFF state.	Connect to external power management controller
PCIE_BUS_NUM	Input	Requester ID of the corresponding PCIe IP	-

CCIX Gateway Link (CGL) interface (Credited Micro-Architecture interface between RA, HA, and LA components)

The following tables contain *CCIX Gateway Link* (CGL) interface signals.

The following table contains Transmit Memory Request interface signals.

Table B-2 Transmit Memory Request interface signals

Signal	Type	Description	Connection information
TXCGLREQDATFLITPEND	Output	Transmit Memory Request Early Flit Valid hint	Connect to RXCGLREQDATFLITPEND of the corresponding CXRH
TXCGLREQDATFLITV	Output	Transmit Memory Request Flit Valid	Connect to RXCGLREQDATFLITV of the corresponding CXRH
TXCGLREQDATFLIT[n:0]	Output	Transmit Memory Request Flit	Connect to RXCGLREQDATFLIT of the corresponding CXRH
TXCGLREQDATLCRDV	Input	Transmit Memory Request channel link layer credit	Connect to RXCGLREQDATLCRDV of the corresponding CXRH

The following table contains Transmit Snoop Request interface signals.

Table B-3 Transmit Snoop Request interface signals

Signal	Type	Description	Connection information
TXCGLSNPFLITPEND	Output	Transmit Snoop Request Early Flit Valid hint	Connect to RXCGLSNPFLITPEND of the corresponding CXRH
TXCGLSNPFLITV	Output	Transmit Snoop Request Flit Valid	Connect to RXCGLSNPFLITV of the corresponding CXRH
TXCGLSNPFLIT[m:0]	Output	Transmit Snoop Request Flit	Connect to RXCGLSNPFLIT of the corresponding CXRH
TXCGLSNPLCRDV	Input	Transmit Snoop Request channel link layer credit	Connect to RXCGLSNPLCRDV of the corresponding CXRH

The following table contains Transmit Memory Response interface signals.

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Table B-4 Transmit Memory Response interface signals

Signal	Type	Description	Connection information
TXCGLREQRSPFLITPEND	Output	Transmit Memory Response Early Flit Valid hint	Connect to RXCGLREQRSPFLITPEND of the corresponding CXRH
TXCGLREQRSPFLITV	Output	Transmit Memory Response Flit Valid	Connect to RXCGLREQRSPFLITV of the corresponding CXRH
TXCGLREQRSPFLIT[34:0]	Output	Transmit Memory Response Flit	Connect to RXCGLREQRSPFLIT of the corresponding CXRH
TXCGLREQRSPLCRDV	Input	Transmit Memory Response channel link layer credit	Connect to RXCGLREQRSPLCRDV of the corresponding CXRH

The following table contains Transmit Snoop Response interface signals.

Table B-5 Transmit Snoop Response interface signals

Signal	Type	Description	Connection information
TXCGLSNPRSPFLITPEND	Output	Transmit Snoop Response Early Flit Valid hint	Connect to RXCGLSNPRSPFLITPEND of the corresponding CXRH
TXCGLSNPRSPFLITV	Output	Transmit Snoop Response Flit Valid	Connect to RXCGLSNPRSPFLITV of the corresponding CXRH
TXCGLSNPRSPFLIT[34:0]	Output	Transmit Snoop Response Flit	Connect to RXCGLSNPRSPFLIT of the corresponding CXRH
TXCGLSNPRSPLCRDV	Input	Transmit Snoop Response channel link layer credit	Connect to RXCGLSNPRSPLCRDV of the corresponding CXRH

The following table contains Transmit Snoop Data interface signals.

Table B-6 Transmit Snoop Data interface signals

Signal	Type	Description	Connection information
TXCGLSNPDATFLITPEND	Output	Transmit Snoop Data Early Flit Valid hint	Connect to RXCGLSNPDATFLITPEND of the corresponding CXRH
TXCGLSNPDATFLITV	Output	Transmit Snoop Data Flit Valid	Connect to RXCGLSNPDATFLITV of the corresponding CXRH
TXCGLSNPDATFLIT[556:0]	Output	Transmit Snoop Data Flit	Connect to RXCGLSNPDATFLIT of the corresponding CXRH
TXCGLSNPDATLCRDV	Input	Transmit Snoop Data channel link layer credit	Connect to RXCGLSNPDATLCRDV of the corresponding CXRH

The following table contains Transmit Memory Response interface signals.

Table B-7 Transmit Memory Response interface signals

Signal	Type	Description	Connection information
TXCGLRSPDATFLITPEND	Output	Transmit Memory Response Data Early Flit Valid hint	Connect to RXCGLRSPDATFLITPEND of the corresponding CXRH
TXCGLRSPDATFLITV	Output	Transmit Memory Response Data Flit Valid	Connect to RXCGLRSPDATFLITV of the corresponding CXRH

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Table B-7 Transmit Memory Response interface signals (continued)

Signal	Type	Description	Connection information
TXCGLRSPDATFLIT[556:0]	Output	Transmit Memory Response Data Flit	Connect to RXCGLRSPDATFLIT of the corresponding CXRH
TXCGLRSPDATLCRDV	Input	Transmit Memory Response Data channel link layer credit	Connect to RXCGLRSPDATLCRDV of the corresponding CXRH

The following table contains Transmit Protocol Credit interface signals.

Table B-8 Transmit Protocol Credit interface signals

Signal	Type	Description	Connection information
TXCGLPCRDFLITPEND	Output	Transmit Protocol Credit Early Flit Valid hint	Connect to RXCGLPCRDFLITPEND of the corresponding CXRH
TXCGLPCRDFLITV	Output	Transmit Protocol Credit Flit Valid	Connect to RXCGLPCRDFLITV of the corresponding CXRH
TXCGLPCRDFLIT[50:0]	Output	Transmit Protocol Credit Flit	Connect to RXCGLPCRDFLIT of the corresponding CXRH
TXCGLPCRDLCRDV	Input	Transmit Protocol Credit channel link layer credit	Connect to RXCGLPCRDLCRDV of the corresponding CXRH

The following table contains Receive Memory Request interface signals.

Table B-9 Receive Memory Request interface signals

Signal	Type	Description	Connection information
RXCGLREQDATFLITPEND	Input	Receive Memory Request Early Flit Valid hint	Connect to TXCGLREQDATFLITPEND of the corresponding CXRH
RXCGLREQDATFLITV	Input	Receive Memory Request Flit Valid	Connect to TXCGLREQDATFLITV of the corresponding CXRH
RXCGLREQDATFLIT[n:0]	Input	Receive Memory Request Flit	Connect to TXCGLREQDATFLIT of the corresponding CXRH
RXCGLREQDATLCRDV	Output	Receive Memory Request channel link layer credit	Connect to TXCGLREQDATLCRDV of the corresponding CXRH

The following table contains Receive Snoop Request interface signals.

Table B-10 Receive Snoop Request interface signals

Signal	Type	Description	Connection information
RXCGLSNPFLITPEND	Input	Receive Snoop Request Early Flit Valid hint	Connect to TXCGLSNPFLITPEND of the corresponding CXRH
RXCGLSNPFLITV	Input	Receive Snoop Request Flit Valid	Connect to TXCGLSNPFLITV of the corresponding CXRH

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Table B-10 Receive Snoop Request interface signals (continued)

Signal	Type	Description	Connection information
RXCGLSNPFLIT[m:0]	Input	Receive Snoop Request Flit	Connect to TXCGLSNPFLIT of the corresponding CXRH
RXCGLSNPLCRDV	Output	Receive Snoop Request channel link layer credit	Connect to TXCGLSNPLCRDV of the corresponding CXRH

The following table contains Receive Memory Response interface signals.

Table B-11 Receive Memory Response interface signals

Signal	Type	Description	Connection information
RXCGLREQRSPFLITPEND	Input	Receive Memory Response Early Flit Valid hint	Connect to TXCGLREQRSPFLITPEND of the corresponding CXRH
RXCGLREQRSPFLITV	Input	Receive Memory Response Flit Valid	Connect to TXCGLREQRSPFLITV of the corresponding CXRH
RXCGLREQRSPFLIT[34:0]	Input	Receive Memory Response Flit	Connect to TXCGLREQRSPFLIT of the corresponding CXRH
RXCGLREQRSPLCRDV	Output	Receive Memory Response channel link layer credit	Connect to TXCGLREQRSPLCRDV of the corresponding CXRH

The following table contains Receive Snoop Response interface signals.

Table B-12 Receive Snoop Response interface signals

Signal	Type	Description	Connection information
RXCGLSNPRSPFLITPEND	Input	Receive Snoop Response Early Flit Valid hint	Connect to TXCGLSNPRSPFLITPEND of the corresponding CXRH
RXCGLSNPRSPFLITV	Input	Receive Snoop Response Flit Valid	Connect to TXCGLSNPRSPFLITV of the corresponding CXRH
RXCGLSNPRSPFLIT[34:0]	Input	Receive Snoop Response Flit	Connect to TXCGLSNPRSPFLIT of the corresponding CXRH
RXCGLSNPRSPLCRDV	Output	Receive Snoop Response channel link layer credit	Connect to TXCGLSNPRSPLCRDV of the corresponding CXRH

The following table contains Receive Snoop Data interface signals.

Table B-13 Receive Snoop Data interface signals

Signal	Type	Description	Connection information
RXCGLSNPDATFLITPEND	Input	Receive Snoop Data Early Flit Valid hint	Connect to TXCGLSNPDATFLITPEND of the corresponding CXRH
RXCGLSNPDATFLITV	Input	Receive Snoop Data Flit Valid	Connect to TXCGLSNPDATFLITV of the corresponding CXRH

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Table B-13 Receive Snoop Data interface signals (continued)

Signal	Type	Description	Connection information
RXCGLSNPDATFLIT[556:0]	Input	Receive Snoop Data Flit	Connect to TXCGLSNPDATFLIT of the corresponding CXRH
RXCGLSNPDATLCRDV	Output	Receive Snoop Data channel link layer credit	Connect to TXCGLSNPDATLCRDV of the corresponding CXRH

The following table contains Receive Memory Response interface signals.

Table B-14 Receive Memory Response interface signals

Signal	Type	Description	Connection information
RXCGLRSPDATFLITPEND	Input	Receive Memory Response Data Early Flit Valid hint	Connect to TXCGLRSPDATFLITPEND of the corresponding CXRH
RXCGLRSPDATFLITV	Input	Receive Memory Response Data Flit Valid	Connect to TXCGLRSPDATFLITV of the corresponding CXRH
RXCGLRSPDATFLIT[556:0]	Input	Receive Memory Response Data Flit	Connect to TXCGLRSPDATFLIT of the corresponding CXRH
RXCGLRSPDATLCRDV	Output	Receive Memory Response Data channel link layer credit	Connect to TXCGLRSPDATLCRDV of the corresponding CXRH

The following table contains Receive Protocol Credit interface signals.

Table B-15 Receive Protocol Credit interface signals

Signal	Type	Description	Connection information
RXCGLPCRDFLITPEND	Input	Receive Protocol Credit Early Flit Valid hint	Connect to TXCGLPCRDFLITPEND of the corresponding CXRH
RXCGLPCRDFLITV	Input	Receive Protocol Credit Flit Valid	Connect to TXCGLPCRDFLITV of the corresponding CXRH
RXCGLPCRDFLIT[50:0]	Input	Receive Protocol Credit Flit	Connect to TXCGLPCRDFLIT of the corresponding CXRH
RXCGLPCRDLCRDV	Output	Receive Protocol Credit channel link layer credit	Connect to TXCGLPCRDLCRDV of the corresponding CXRH

The following table contains Receive and Transmit channel LinkActive interface signals.

Table B-16 Receive and Transmit channel LinkActive interface signals

Signal	Type	Description	Connection information
RXCGLLINKACTIVEREQ	Input	Receive channel LinkActive request from CXRH	Connect to TXCGLLINKACTIVEREQ of the corresponding CXRH
RXCGLLINKACTIVEACK	Output	Receive channel LinkActive acknowledgement to CXRH	Connect to TXCGLLINKACTIVEACK of the corresponding CXRH

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Table B-16 Receive and Transmit channel LinkActive interface signals (continued)

Signal	Type	Description	Connection information
TXCGLLINKACTIVEREQ	Output	Transmit channel LinkActive request to CXRH	Connect to RXCGLLINKACTIVEREQ of the corresponding CXRH
TXCGLLINKACTIVEACK	Input	Transmit channel LinkActive acknowledgement from CXRH	Connect to RXCGLLINKACTIVEACK of the corresponding CXRH

The following table contains RXCGLSACTIVE and TXCGLSACTIVE interface signals.

Table B-17 RXCGLSACTIVE and TXCGLSACTIVE interface signals

Signal	Type	Description	Connection information
RXCGLSACTIVE	Input	Indication from CXRH that it has one or more outstanding protocol-layer transactions. RXSACTIVE must remain asserted throughout the lifetime of the transaction.	Connect to TXCGLSACTIVE of the corresponding CXRH
TXCGLSACTIVE	Output	Indication to CXRH that CXRH has one or more outstanding protocol-layer transactions. TXSACTIVE remains asserted throughout the lifetime of the transaction.	Connect to RXCGLSACTIVE of the corresponding CXRH

The following table contains CXLA configuration interface signals.

Table B-18 CXLA configuration interface signals

Signal	Type	Description	Connection information
TXPUBFLITPEND	Output	Transmit Utility Bus Early Flit Valid hint	Connect to RXPUBFLITPEND of the corresponding CXRH
TXPUBFLITV	Output	Transmit Utility Bus Flit Valid	Connect to RXPUBFLITV of the corresponding CXRH
TXPUBFLIT[34:0]	Output	Transmit Utility Bus Flit	Connect to RXPUBFLIT of the corresponding CXRH
TXPUBLCRDV[1:0]	Input	Transmit Utility Bus channel link layer credit	Connect to RXPUBLCRDV of the corresponding CXRH
RXPUBFLITPEND	Input	Receive Utility Bus Early Flit Valid hint	Connect to TXPUBFLITPEND of the corresponding CXRH
RXPUBFLITV	Input	Receive Utility Bus Flit Valid	Connect to TXPUBFLITV of the corresponding CXRH
RXPUBFLIT[34:0]	Input	Receive Utility Bus Flit	Connect to TXPUBFLIT of the corresponding CXRH
RXPUBLCRDV[1:0]	Output	Receive Utility Bus channel link layer credit	Connect to TXPUBLCRDV of the corresponding CXRH
RXPUBLINKACTIVEREQ	Input	Receive channel LinkActive request from CXRH	Connect to TXPUBLINKACTIVEREQ of the corresponding CXRH
RXPUBLINKACTIVEACK	Output	Receive channel LinkActive acknowledgement to CXRH	Connect to TXPUBLINKACTIVEACK of the corresponding CXRH
RXPUBLINKFLIT	Input	Receive channel Link Flit valid from CXRH. Indicates that RXPUBFLITV is a link flit	Connect to TXPUBLINKFLIT of the corresponding CXRH

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Table B-18 CXLA configuration interface signals (continued)

Signal	Type	Description	Connection information
TXPUBLINKACTIVEREQ	Output	Transmit channel LinkActive request to CXRH	Connect to RXPUBLINKACTIVEREQ of the corresponding CXRH
TXPUBLINKACTIVEACK	Input	Transmit channel LinkActive acknowledgement from CXRH	Connect to RXPUBLINKACTIVEACK of the corresponding CXRH
TXPUBLINKFLIT	Output	Transmit channel Link Flit valid to CXRH. Indicates that TXPUBFLITV is a link flit	Connect to RXPUBLINKFLIT of the corresponding CXRH

CXS interface

The following tables contain the transmit and receive signal descriptions.

Table B-19 TX signals

Signal	Type	Description	Connection information
CXSTXDATA[255:0]	Output	Transmit channel data flit	Connect to CXSRXDATA of the corresponding PCIe IP
CXSTXCNTL[13:0]	Output	Transmit channel control information	Connect to CXSRXCNTL of the corresponding PCIe IP
CXSTXVALID[31:0]	Output	Transmit channel data flit valid	Connect to CXSRXVALID of the corresponding PCIe IP
CXSTXCRDGNT	Input	Transmit channel link layer credit grant	Connect to CXSRXCRDGNT of the corresponding PCIe IP
CXSTXCRDRTN	Output	Transmit channel link layer credit return	Connect to CXSRXCRDRTN of the corresponding PCIe IP
CXSTXDATACHK	Output	Transmit channel Parity or ECC for DATA field	Connect to CXSRXDATACHK of the corresponding PCIe IP
CXSTXCNTLCHK	Output	Transmit channel Parity or ECC for CNTL field	Connect to CXSRXCNTLCHK of the corresponding PCIe IP
CXSTXVALIDCHK	Output	Transmit channel Duplication or Triplication for VALID bit	Connect to CXSRXVALIDCHK of the corresponding PCIe IP
CXSTXCRDGNTCHK	Input	Transmit channel Duplication or Triplication for CRDGNT bit	Connect to CXSRXCRDGNTCHK of the corresponding PCIe IP
CXSTXCRDRTNCHK	Output	Transmit channel Duplication or Triplication for CRDRTN bit	Connect to CXSRXCRDRTNCHK of the corresponding PCIe IP
CXSTXACTIVEREQ	Output	Transmit channel link activation/ deactivation request.	Connect to CXSRXACTIVEREQ of the corresponding PCIe IP.
CXSTXACTIVEACK	Input	Transmit channel link activation/ deactivation acknowledge	Connect to CXSRXACTIVEACK of the corresponding PCIe IP
CXSTXDEACTHINT	Input	Transmit channel hint for link deactivation	Connect to CXSRXDEACTHINT of the corresponding PCIe IP

The following table contains the receive signals.

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Table B-20 RX signals

Signal	I/O	Description	Connection information
CXSRXDATA[255:0]	Input	Receive channel data flit	Connect to CXSTXDATA of the corresponding PCIe IP
CXSRXCNTL[13:0]	Input	Receive channel control information	Connect to CXSTXCNTL of the corresponding PCIe IP
CXSRXVALID[31:0]	Input	Receive channel data flit valid	Connect to CXSTXVALID of the corresponding PCIe IP
CXSRXCRDGNT	Output	Receive channel link layer credit grant	Connect to CXSTXCRDGNT of the corresponding PCIe IP
CXSRXCRDRTN	Input	Receive channel link layer credit return	Connect to CXSTXCRDRTN of the corresponding PCIe IP
CXSRXDATACHK	Input	Receive channel Parity or ECC for DATA field	Connect to CXSTXDATACHK of the corresponding PCIe IP
CXSRXCNTLCHK	Input	Receive channel Parity or ECC for CNTL field	Connect to CXSTXCNTLCHK of the corresponding PCIe IP
CXSRXVALIDCHK	Input	Receive channel Duplication or Triplication for VALID bit	Connect to CXSTXVALIDCHK of the corresponding PCIe IP
CXSRXCRDGNTCHK	Output	Receive channel Duplication or Triplication for CRDGNT bit	Connect to CXSTXCRDGNTCHK of the corresponding PCIe IP
CXSRXCRDRTNCHK	Input	Receive channel Duplication or Triplication for CRDRTN bit	Connect to CXSTXCRDRTNCHK of the corresponding PCIe IP
CXSRXACTIVEREQ	Input	Receive channel link activation/ deactivation request	Connect to CXSTXACTIVEREQ of the corresponding PCIe IP
CXSRXACTIVEACK	Output	Receive channel link activation/ deactivation acknowledge	Connect to CXSTXACTIVEACK of the corresponding PCIe IP
CXSRXDEACTHINT	Output	Receive channel hint for link deactivation	Connect to CXSTXDEACTHINT of the corresponding PCIe IP

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Appendix C
Revisions

This appendix describes the technical changes between released issues of this book.

It contains the following section:

- *C.1 Revisions* on page Appx-C-1209.

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C.1 Revisions

Differences between released versions of the document are listed in this appendix.

Table C-1 Differences between issue 0000-00 and issue 0000-01

Change	Location
Updated the product name to CMN-600	Throughout the document
Various product overview changes	*Chapter 1 Introduction* on page 1-12
Various product feature changes	*Chapter 2 Functional description* on page 2-33
Register content update	*3.2 Register summary* on page 3-174
System level cache content changes	*Chapter 4 SLC memory system* on page 4-1085
Updated debug trace and PMU section	*Chapter 5 Debug trace and PMU* on page 5-1108
Updated signal descriptions	*Appendix A Signal descriptions* on page Appx-A-1161

Table C-2 Differences between issue 0000-01 and issue 0101-00

Change	Location
Added information about the CML product, optional features, and interfaces	*1.1 About CMN-600* on page 1-13, *1.3 Features* on page 1-16, and *1.4 Interfaces* on page 1-20
New section added on configuration options	*1.5 Configurable options* on page 1-21
Added content on the CML interfaces	*1.5.1 System component selection* on page 1-21
Updated relevant tables with CMN clarifications and new CML content	*1.5.2 Mesh sizing and top-level configuration* on page 1-23
Updated the CXG content	*2.1.6 CXG* on page 2-38
Updated cross chip routing and ID mapping content and flow diagrams	*2.22 Cross chip routing and ID mapping* on page 2-135
Updated content and flow diagrams	*2.3 CML system configurations* on page 2-48
Added CML discovery information	*2.5 Discovery* on page 2-55
Tables updated with XID_WIDTH values	*2.5.1 Configuration address space organization* on page 2-55
Added table with new CML node ID information	*2.5.2 Configuration register node structure* on page 2-58
Removed invalid values from mesh size and encoding bits table	*2.5.3 Child pointers* on page 2-60
Updated atomics transaction information for RN-I interfaces	*2.7 Atomics* on page 2-67
Added section about global address map	*2.16 System Address Map* on page 2-101
Updated RN-SAM regarding GIC support and target ID selection priorities	*2.17.1 Target IDs* on page 2-102
Added RA-SAM information for CXG	*2.18 CXRA SAM* on page 2-109
Updated HN-F SAM regarding system implementation	*2.19 HN-F SAM* on page 2-110
Added section on support for CCIX port aggregation	*2.20.4 Support for CCIX Port Aggregation* on page 2-125

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Table C-2 Differences between issue 0000-01 and issue 0101-00 (continued)

Change	Location
Updated clock domain diagrams to include CX-LA blocks	*2.25.2 CML clock inputs* on page 2-146
Global clock information updated to include CML support	*2.25.3 Clock hierarchy* on page 2-147
Added CML reset information	*2.26.1 CML reset* on page 2-150
Added CML configuration registers	*3.3.11 CXHA configuration registers* on page 3-887, *3.3.12 CXRA configuration registers* on page 3-952, and *3.3.13 CXLA configuration registers* on page 3-1026
Updated signal descriptions with CML support information	*Appendix A Signal descriptions* on page Appx-A-1161
Added CXS interface descriptions	*CXS Interface descriptions* on page Appx-B-1206 in *B.1 CXLA interface signals* on page Appx-B-1199

Table C-3 Differences between LAC issue 0101-00 and EAC issue 0100-00

Change	Location
Added content about global parameters	*1.5.2 Mesh sizing and top-level configuration* on page 1-23
Updated configurable options for HN-I and HN-D devices and SBSX devices	*1.5.3 Device placement and configuration* on page 1-26
Updated content about error handling	*2.14 Reliability, Availability, and Serviceability* on page 2-83
Updated error type content	*2.14.2 Error types* on page 2-85
Added physical_mem_en field name	*2.21.1 HN-I SAM example configuration* on page 2-128
Added programming sequence	*2.20 RN and HN-F SAM* on page 2-117
Added configurable options default values	*1.5.2 Mesh sizing and top-level configuration* on page 1-23 and *1.5.3 Device placement and configuration* on page 1-26
Updated CXHA and CXLA values	*2.5.2 Configuration register node structure* on page 2-58
Added new topic	*4.10 DataSource handling* on page 4-1099
Added new topic	*6.10 Occupancy and lifetime measurement using PMU events* on page 6-1159
Updated register descriptions	*3.3 Register descriptions* on page 3-196
Added new topic	*Delays at SBSX bridges due to backpressure* on page 6-1149
Added new tracker occupancy analysis topics	*Tracker occupancy analysis* on page 6-1150 and *Tracker occupancy analysis in HN-I* on page 6-1155
Added note on **NIDEN** and **SPNIDEN** assertion and deassertion	*5.1 Debug trace system overview* on page 5-1109
Updated BRESP values	*A.9 ACE-Lite and AXI Interface signals* on page Appx-A-1175 and *A.9.1 ACE-Lite-with-DVM slave interface signals* on page Appx-A-1175

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Table C-4 Differences between EAC issue 0100-00 and EAC issue 0100-01

Change	Location
Added new topic	*2.14.11 CXHA error handling* on page 2-98
Added new sections on CML programming	*3.5 CML programming* on page 3-1071
Added technical clarifications	*2.6 Addressing capabilities* on page 2-66 and *2.7 Atomics* on page 2-67
Added new topic	*1.3.1 CXS property support* on page 1-17

Table C-5 Differences between EAC issue 0100-00 and EAC issue 0101-01

Change	Location
Updated figure RN SAM target ID selection policy	*2.17.1 Target IDs* on page 2-102
Updated content	*2.19 HN-F SAM* on page 2-110
GIC memory partition sizes updated	*2.20.2 SAM memory region size configuration* on page 2-120
Updated content	*2.25.2 CML clock inputs* on page 2-146
Updated signal names	*2.27.4 P-Channel on device reset* on page 2-155
Updated register reset values	*por_rnsam_unit_info* on page 3-761
Updated content	*3.4.1 Boot-time programming sequence* on page 3-1069
Updated parameters	*4.1 About the SLC memory system* on page 4-1086
Updated event names	*Read and write delays at RN-I bridges* on page 6-1145
Updated endpoint references	*2.21 HN-I SAM* on page 2-127

Table C-6 Differences between EAC issue 0101-01 and EAC issue 0102-00

Change	Location
Updated RN-F LDID assignment	*2.22 Cross chip routing and ID mapping* on page 2-135
Updated figures to include CXHA blocks	*2.14 Reliability, Availability, and Serviceability* on page 2-83
Updated ERRMISC fields	*2.14.4 Error detection, signaling, and reporting* on page 2-88
New content added	*2.20.1 Program the SAM* on page 2-119
Updated power states transition figure to include NOSFLC references and Logic=ON transition states	*2.27.7 HN-F power domains* on page 2-157
Updated content on CMO propagation and OCM support	*4.1 About the SLC memory system* on page 4-1086
Updated descriptions for WUSER_S, RUSER_S, WUSER_M, and RUSER_M. New notes added for these channel signals.	*A.9.1 ACE-Lite-with-DVM slave interface signals* on page Appx-A-1175
Updated descriptions for WUSER_M and RUSER_M. New notes added for these channel signals.	*A.9.2 AXI and ACE-Lite master interface signals* on page Appx-A-1180
Updated various register descriptions and relevant content	*3.3 Register descriptions* on page 3-196
Added new section on CHI support for CML	*1.3.3 CHI feature support for CML* on page 1-17

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Table C-7 Differences between EAC issue 0102-00 and EAC issue 0103-00

Change	Location
Added new RA SAM configuration register table	*2.20.2 SAM memory region size configuration* on page 2-120
Added content on CCIX port aggregation	*3.5.1 CML-related programmable registers* on page 3-1071
Updated descriptions and content for various registers	*3.3 Register descriptions* on page 3-196
Updated MCSX, MCSY, and DCS count values	*1.5.2 Mesh sizing and top-level configuration* on page 1-23
Updated NUM_WR_REQ, NUM_RD_REQ, NUM_RD_BUF, and NUM_AXI_REQS values	*1.5.3 Device placement and configuration* on page 1-26

Table C-8 Differences between EAC issue 0103-00 and EAC issue 0103-01

Change	Location
Updated **maxpacketsize** field in por_cxla_ccix_prop_configured	*por_cxla_ccix_prop_configured* on page 3-1035
Updated CCIX architecture	*1.2 Compliance* on page 1-15
Updated revision bits register update	*por_cfgm_periph_id_2_periph_id_3* on page 3-198
Updated content	*2.27.9 HN-F power domain completion interrupt* on page 2-162

Table C-9 Differences between EAC issue 0103-01 and EAC issue 0200-00

Change	Location
CACTIVE_S signal no longer supported	*A.9.1 ACE-Lite-with-DVM slave interface signals* on page Appx-A-1175
Added new content on HN-D accessing DN events	*6.7 DN performance events* on page 6-1156
Added new content on r2 supported features	*4.9 Hardware-based cache flush engine* on page 4-1096, *2.20 RN and HN-F SAM* on page 2-117, and *4.14 Source-based SLC cache partitioning* on page 4-1104
Updated external child behavior	*2.5.3 Child pointers* on page 2-60
Updated configurable global parameters and configurable component counts (processor resources, and system cache values)	*1.5.2 Mesh sizing and top-level configuration* on page 1-23
Updated programming sequence	*2.20.4 Support for CCIX Port Aggregation* on page 2-125
Updated content on PMU event updates for CXRA	*6.2 About the Performance Monitoring Unit* on page 6-1135
Added new registers for r2	*3.3 Register descriptions* on page 3-196
Added new CHI support features for CML	*1.3.3 CHI feature support for CML* on page 1-17
Updated content on A4S features and signal list	*2.24 GIC communication over AXI4-Stream ports* on page 2-144 and *A.9.3 A4S Signal list* on page Appx-A-1183
Updated content on Component Aggregation Layer	*2.1.12 Component Aggregation Layer* on page 2-40
Updated content on r2 VMID filter	*2.12 DVM messages* on page 2-80
Updated the SBSX errors	*2.14.8 SBSX error handling* on page 2-96

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Table C-10 Differences between EAC issue 0200-00 and EAC issue 0300-00

Change	Location	Affects
Updated content on r3 supported features	*1.3 Features* on page 1-16	r3p0-00
Added new register descriptions for r3	*3.3 Register descriptions* on page 3-196	
Updated content on 128 RN-F support	*2.23 128 RN-F support* on page 2-141	
Updated content on CPAGs	*2.15 CCIX Port Aggregation Groups* on page 2-100	
Added new CCS parameters and example configuration, CMN-600 r2	*1.5.2 Mesh sizing and top-level configuration* on page 1-23 and *1.5.3 Device placement and configuration* on page 1-26	

Table C-11 Differences between EAC issue 0300-00 and EAC issue 0201-00

Change	Location
Removed Appendix B to create CXS RX and TX interface descriptions	*CXS Interface descriptions* on page Appx-B-1206 in *B.1 CXLA interface signals* on page Appx-B-1199

Table C-12 Differences between EAC issue 0201-00 and REL issue 0301-00

Change	Location
Added CGL clock management table	*A.3 Clock management signals* on page Appx-A-1164
Updated RNF_CHIC, RNF_CHIC_ESAM, and relevant RN component count descriptions	*1.5.2 Mesh sizing and top-level configuration* on page 1-23
Added a note on prefetch operations	*2.17.4 PrefetchTgt RN SAM* on page 2-108
Update content on HN-F and SCG when they use CAL or normal modes	*2.20 RN and HN-F SAM* on page 2-117
Added section on trace tag packet generation	*5.3.2 Trace tag* on page 5-1125
Updated REQ_RSVCD_WIDTH value	*A.9.1 ACE-Lite-with-DVM slave interface signals* on page Appx-A-1175 and *A.9.2 AXI and ACE-Lite master interface signals* on page Appx-A-1180
Added `RNSAM_NUM_NONHASHGROUP` parameter	*1.5.2 Mesh sizing and top-level configuration* on page 1-23
Updated the `AXDATAPOISON_EN` values	*1.5.3 Device placement and configuration* on page 1-26
Updated the CGL and CXLA signals	*A.10 CGL interface signals* on page Appx-A-1185 and *A.14 CXLA configuration interface signals* on page Appx-A-1195
Added new r3p1 features	*1.3 Features* on page 1-16
Added note on number of DTCs per crosspoint	*5.1 Debug trace system overview* on page 5-1109

Table C-13 Differences between REL issue 0302-00 and REL issue 0302-01

Change	Location
Numerous edits and restructuring of content, sections, and tables of contents	Throughout
Updated the number of supported HN-Is with an ACE-Lite master port from 16 to eight	*1.3 Features* on page 1-16
Updated table to state CML configurations do not support CHI-A RN-F nodes	*1.3.3 CHI feature support for CML* on page 1-17

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Table C-13 Differences between REL issue 0302-00 and REL issue 0302-01 (continued)

Change	Location
Cross referencing added and updated the configurable component counts for the no of HN-Is from 1-16 to 1-8, number of SN-Fs from 0-8 to 0-16 and number of SBSXs changed from 0-8 to 0-16	*HNF CALs* on page 1-25 in *1.5.2 Mesh sizing and top-level configuration* on page 1-23
Updated the number of Write Request Tracker entries from 32 to 64, with a default value of 32 Updated the Comments column in the Configurable options for CXG devices table	*1.5.3 Device placement and configuration* on page 1-26
Updated PERIPHBASE address range where X and Y dimensions are greater than 4	*2.5.1 Configuration address space organization* on page 2-55
Updated NODEPOINTER information for child pointer register per child node	*2.5.3 Child pointers* on page 2-60
Updated the minimum PA width that CCIX supports to 48-bits	*2.6 Addressing capabilities* on page 2-66
Section title changed from request errors at HN-F to Errors at HN-F	*2.14.6 HN-F error handling* on page 2-92
Updated section title names	*ECC errors in SF Tag, SLC Tag, and Data RAMs* on page 2-92
Removed topic on MPU access violations	
Removed register bit por_sbsx_cfg_ctl.sbsx_rpt_err_on_poison_rd	*2.14.8 SBSX error handling* on page 2-96
Added new content that when a parity error is detected in the Read Data Buffer (RDB) RAMs (if present), RN-I or RN-D propagates the error on AXI-R channel as RPOISON or RRESP	*2.14.9 RN-I error handling* on page 2-96
Replaced all content in System Cache Groups	*2.17.3 System Cache Groups* on page 2-104
Replaced table on, Address region example bit settings: 3-SN example	*2.19.1 HN-F SAM 3-SN and 6-SN memory striping modes* on page 2-111
Added note on HN-F with CAL support, added note to section on RN SAM SCG Target ID Registers, removed references to r2 of CMN-600	*2.20 RN and HN-F SAM* on page 2-117
Removed section on 64 hashed targets in RN SAM and the table on RN SAM SCG Target ID Registers	*2.21.1 HN-I SAM example configuration* on page 2-128
Removed note, added note on chip configuration scenarios, and updated GIC communication over AX14-Stream ports	*2.24 GIC communication over AXI4-Stream ports* on page 2-144
Added the por_cxla_tlp_hdr_fields register to the CXLA register summary	*3.2.13 CXLA register summary* on page 3-194
Added the por_cxla_tlp_hdr_fields configuration register	*por_cxla_tlp_hdr_fields* on page 3-1056
Removed 2 registers from CXRA section, por_cxg_ra_rnf_ldid_to_ovrd_ldid_reg<X> and por_cxg_ra_rnf_ldid_to_nodeid_reg<X>	*3.5.1 CML-related programmable registers* on page 3-1071
Removed the value 16, CMN-600 does not support 16 POCQ entries	*4.2 HN-F configurable options* on page 4-1088
Updated text and memory region sizes	*4.11 Software configurable memory region locking* on page 4-1100
Applicable build versions updated in note	*4.14 Source-based SLC cache partitioning* on page 4-1104
Updated relevant examples	*Updated Deferred errors* on page 4-1107 in *4.16 Error reporting and software-configured error injection* on page 4-1107

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Table C-13 Differences between REL issue 0302-00 and REL issue 0302-01 (continued)

Change	Location
Removed note and updated text	*4.16.1 Software-configurable error injection* on page 4-1107
Updated the bit range of the TRACETAG field for RSP channel	*WP match value and mask register* on page 5-1111
Reworded text from 'read status for each piece of WP trace data' to 'availability of WP trace data for each FIFO entry'	*5.1.3 Read mode* on page 5-1117
Updated Step 3 and split Step 3 into two steps	*Flit tracing example* on page 5-1124
Updated Step 3 and split Step 3 into two steps	*Trace tag example programming* on page 5-1126
Added section on CXG performance events	*6.8 CXG performance events* on page 6-1157
Updated clock management (and Q management) signal descriptions to identify them as active-LOW signals: **QACCEPTn_CLKCTL**, **QREQn_CGLCLKCTL**, **QACCEPTn_CGLCLKCTL**	*A.3 Clock management signals* on page Appx-A-1164
Added GICD_DESTID signal description	*GICD_DESTID signal description* on page Appx-A-1184 in *A.9.3 A4S Signal list* on page Appx-A-1183
Updated RXA4STRI description	*A.9.3 A4S Signal list* on page Appx-A-1183
Updated DFT and MBIST interface signal **nMBISTRESET** to identify as active-LOW	*A.12 DFT and MBIST interface signals* on page Appx-A-1193
Updated CXLA global signals **PWR_QACCEPTn_CXLA** to identify as active-LOW	*A.14 CXLA configuration interface signals* on page Appx-A-1195

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