



Feature names in A-profile architecture

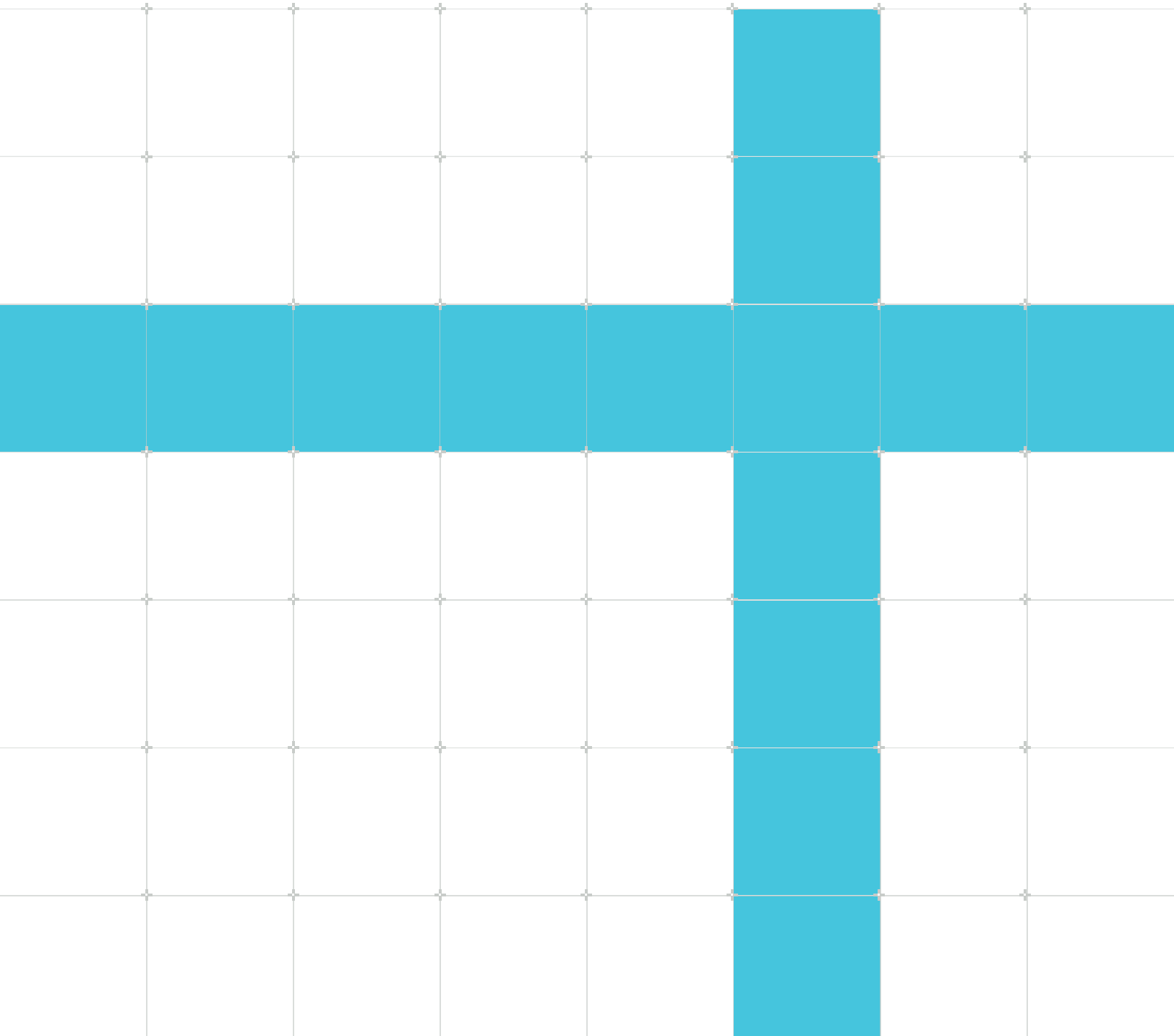
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Issue 01

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Feature names in A-profile architecture

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1. Feature names in A-profile architecture

The tables on this page list all the features that are in A-profile architecture.

2023 Architecture Extensions

Feature Name	Short description
FEAT_ASID2	Support for concurrent use of two ASIDs
FEAT_BWE2	Breakpoint and watchpoint enhancements 2
FEAT_CPA	Instruction-only Checked Pointer Arithmetic
FEAT_CPA2	Checked Pointer Arithmetic
FEAT_E2H0	Programming of HCR_EL2.E2H
FEAT_E3DSE	Delegated SError exception injection
FEAT_FAMINMAX	Floating-point maximum and minimum absolute value instructions
FEAT_FGWTE3	Fine-Grained Write Trap EL3
FEAT_FP8	FP8 convert instructions
FEAT_FP8FMA	FP8 multiply-accumulate to half-precision and single-precision instructions
FEAT_FP8DOT2	FP8 2-way dot product to half-precision instructions
FEAT_FP8DOT4	FP8 4-way dot product to single-precision instructions
FEAT_FPMR	Floating-point Mode Register
FEAT_HACDBS	Hardware accelerator for cleaning Dirty state
FEAT_HDBSS	Hardware Dirty state tracking Structure
FEAT_LUT	Lookup table instructions with 2-bit and 4-bit indices
FEAT_PAuth_LR	Pointer authentication instructions that allow signing of LR using SP and PC as diversifiers
FEAT_PMUv3_SME	Performance Monitors extensions for SME
FEAT_PMUv3_TH2	Performance Monitors event counter linking extension
FEAT_RME_GPC2	RME Granule Protection Check 2 Extension
FEAT_SME_F8F16	SME2 ZA-targeting FP8 multiply-accumulate, dot product, and outer product to half-precision instructions
FEAT_SME_F8F32	SME2 ZA-targeting FP8 multiply-accumulate, dot product, and outer product to single-precision instructions
FEAT_SME_LUTv2	Lookup table instructions with 4-bit indices and 8-bit elements
FEAT_SPE_ALTCLK	Statistical Profiling alternate clock domain extension
FEAT_SPE_EFT	Statistical Profiling extended filtering by type
FEAT_SPE_FPF	Statistical Profiling floating-point flag extension
FEAT_SPE_SME	Statistical Profiling extensions for SME
FEAT_SPMU	System Performance Monitors Extension version 2
FEAT_SSVE_FP8DOT4	SVE2 FP8 4-way dot product to single-precision instructions in Streaming SVE mode
FEAT_SSVE_FP8DOT2	SVE2 FP8 2-way dot product to half-precision instructions in Streaming SVE mode
FEAT_SSVE_FP8FMA	SVE2 FP8 multiply-accumulate to half-precision and single-precision instructions in Streaming SVE mode
FEAT_STEP2	Enhanced Software Step Extension
FEAT_TLBIW	TLBI VMALL for Dirty state

2022 Architecture Extensions

Feature Name	Short description
FEAT_ABLE	Address Breakpoint Linking Extension
FEAT_ADERR	Asynchronous Device error exceptions
FEAT_AIE	Memory Attribute Index Enhancement
FEAT_ANERR	Asynchronous Normal error exception
FEAT_AMU_EXT64	64-bit external interface to the AMU registers
FEAT_ATSIA	Stage 1 Address Translation enhancement
FEAT_BWE	Breakpoint Mismatch and Range Extension
FEAT_CLRBHB	Support for Clear Branch History instruction
FEAT_CHK	Check Feature Status
FEAT_CSSC	Common Short Sequence Compression instructions
FEAT_CSV2_3	Cache Speculation Variant 2 version 3
FEAT_D128	128-bit Translation Tables, 56 bit PA
FEAT_Debugv8p9	Debug v8.9
FEAT_DoubleFault2	Enhancements to the Double Fault Extension
FEAT_EBEP	Exception-based Event Profiling
FEAT_ECBHB	Exploitative control using branch history information
FEAT_EDHSR	Support for EDHSR
FEAT_ETEv1p3	Embedded Trace Extension version 1.3
FEAT_FGT2	Fine-grained traps 2
FEAT_GCS	Guarded Control Stack Extension
FEAT_HAFT	Hardware managed Access Flag for Table descriptors
FEAT_ITE	Instrumentation Extension
FEAT_LRCP3	Load-Acquire RCpc instructions version 3
FEAT_LSE128	128-bit Atomics
FEAT_LVA3	56-bit VA
FEAT_MEC	Memory Encryption Contexts
FEAT_MTE4	Enhanced Memory Tagging Extension
FEAT_MTE_CANONICAL_TAGS	Canonical Tag checking for Untagged memory
FEAT_MTE_TAGGED_FAR	FAR_ELx on a Tag Check Fault
FEAT_MTE_STORE_ONLY	Store-only Tag Checking
FEAT_MTE_NO_ADDRESS_TAGS	Memory tagging with Address tagging disabled
FEAT_MTE_ASYM_FAULT	Memory tagging asymmetric faults
FEAT_MTE_ASYNC	Memory Tagging asynchronous faulting
FEAT_MTE_PERM	Allocation tag access permission
FEAT_PCSRv8p9	Armv8.9 PC Sample-based Profiling Extension
FEAT_PFAR	Physical Fault Address Registers
FEAT_PMUv3p9	Armv8.9 PMU extensions
FEAT_PMUv3_EDGE	PMU event edge detection
FEAT_PMUv3_ICNTR	Fixed-function instruction counter

Feature Name	Short description
FEAT_PMUV3_SS	PMU Snapshot Extension
FEAT_PRFMSLC	SLC target support for PRFM instructions
FEAT_RASv2	RAS version 2
FEAT_RASSAv2	RAS version 2 System Architecture
FEAT_RPRFM	Support for Range Prefetch Memory instruction
FEAT_S1PIE	Permission model enhancements
FEAT_S2PIE	Permission model enhancements
FEAT_S1POE	Permission model enhancements
FEAT_S2POE	Permission model enhancements
FEAT_SCTLR2	Extension to SCTLR_ELx
FEAT_SEBEP	Synchronous Exception-based Event Profiling
FEAT_SME_F16F16	Non-widening half-precision FP16 to FP16 arithmetic for SME2.1
FEAT_SME2	Scalable Matrix Extensions version 2
FEAT_SME2p1	Scalable Matrix Extensions version 2.1
FEAT_SPECRES2	Enhanced speculation restriction instructions
FEAT_SPMU	System Performance Monitors Extension
FEAT_SPEv1p4	Statistical Profiling Extension version 1.4
FEAT_SPE_CRR	Call Return Branch Records
FEAT_SPE_DPFZS	Disable Cycle Counter on SPE Freeze
FEAT_SPE_FDS	Data Source Filtering
FEAT_SVE2p1	Scalable Vector Extension version SVE2.1
FEAT_SVE_B16B16	Non-widening BFloat16 to BFloat16 arithmetic for SVE
FEAT_SYSINSTR128	128-bit System instructions
FEAT_SYSREG128	128-bit System registers
FEAT_TCR2	Extension to TCR_ELx
FEAT_THE	Translation Hardening Extension
FEAT_TRBE_EXT	Trace Buffer external mode
FEAT_TRBE_MPAM	Trace Buffer MPAM extension

2021 Architecture Extensions

Feature Name	Short description
FEAT_CMOW	Control for cache maintenance permission
FEAT_CONSTPACFIELD	PAC algorithm enhancement
FEAT_Debugv8p8	Debug v8.8
FEAT_HBC	Hinted conditional branches
FEAT_HPMN0	Setting of MDCR_EL2.HPMN to zero
FEAT_NMI	Non-Maskable Interrupts
FEAT_GICv3_NMI	GIC Non-Maskable Interrupts
FEAT_MOPS	Standardization of memory operations
FEAT_PACQARMA3	Pointer authentication - QARMA3 algorithm

Feature Name	Short description
FEAT_PMUv3_TH	Event counting threshold
FEAT_PMUv3p8	Armv8.8 PMU extensions
FEAT_PMUv3_EXT64	64-bit external interface to the Performance Monitors
FEAT_PMUv3_EXT32	32-bit external interface to the Performance Monitors
FEAT_PMUv3_EXT	External interface to the Performance Monitors
FEAT_RNG_TRAP	Trapping support for RNDR/RNDRRS
FEAT_SPEv1p3	Statistical Profiling Extension version 1.3
FEAT_TIDCP1	ELO use of IMPLEMENTATION DEFINED functionality
FEAT_BRBEv1p1	Branch Record Buffer Extension version 1.1

2020 Architecture Extensions

Feature Name	Short description
FEAT_AFP	Alternate floating-point behavior
FEAT_HCX	Support for the HCRX_EL2 register
FEAT_LPA2	Larger physical address for 4KB and 16KB translation granules
FEAT_LS64	Support for 64 byte loads and stores without return
FEAT_LS64_V	Support for 64 byte stores with return
FEAT_LS64_ACCDATA	Support for 64-byte ELO stores with return
FEAT_MTE3	MTE Asymmetric Fault Handling
FEAT_PAN3	Support for SCTLRL_ELx.EPAN
FEAT_PMUv3p7	Armv8.7 PMU extensions
FEAT_RPRES	Increased precision of Reciprocal Estimate and Reciprocal Square Root Estimate
FEAT_RME	Realm Management Extension
FEAT_SME_FA64	Full A64 instruction set support in Streaming SVE mode
FEAT_SME_F64F64	Double-precision floating-point outer product instructions
FEAT_SME_I16I64	16-bit to 64-bit integer widening outer product instructions
FEAT_EBF16	AArch64 Extended BFloat16 instructions
FEAT_SPEv1p2	Statistical Profiling Extensions version 1.2
FEAT_WFxT	WFE and WFI instructions with timeout
FEAT_XS	XS attribute
FEAT_BRBE	Branch Record Buffer Extension

Features introduced prior to 2020

Prior to June 2020, features names did not follow the FEAT_ convention. The table below lists old (ARMv8.x-) and new feature (FEAT_) names. Note that some names have been split into two; for example, ARMv8.0-AES is split into AES and PMULL.

Old name	New name	Short description	Comments
ARMv8.0-AdvSIMD	FEAT_AdvSIMD	Advanced SIMD Extension	
ARMv8.0-AES	FEAT_AES	Advanced SIMD AES instructions	

Old name	New name	Short description	Comments
ARMv8.0-AES	FEAT_PMULL	Advanced SIMD PMULL instructions	ARMv8.0-AES is split into AES and PMULL
ARMv8.0-CP15SDISABLE2	FEAT_CP15SDISABLE2	CP15DISABLE2	
ARMv8.0-CSV2	FEAT_CSV2	Cache Speculation Variant 2	
-	FEAT_CSV2_1p1	Cache Speculation Variant 2 version 1.1	
-	FEAT_CSV2_1p2	Cache Speculation Variant 2 version 1.2	
ARMv8.0-CSV2_2	FEAT_CSV2	Cache Speculation Variant 2 version 2.1	
ARMv8.0-CSV3	FEAT_CSV3	Cache Speculation Variant 3	
ARMv8.0-DGH	FEAT_DGH	Data Gathering Hint	
ARMv8.0-DoubleLock	FEAT_DoubleLock	Double Lock	
	FEAT_ETS2	Enhanced Translation Synchronization	
ARMv8.0-FP	FEAT_FP	Floating Point Extensions	
-	FEAT_IVIPT	The IVIPT Extension	
ARMv8.0-PCSample	FEAT_PCSRv8	PC Sample-based Profiling extension	
ARMv8.0-PredInv	FEAT_SPECRES	Speculation restriction instructions	
RAS	FEAT_RAS	Reliability, Availability, and Serviceability (RAS) Extension	
ARMv8.0-SB	FEAT_SB	Speculation Barrier	
ARMv8.0-SHA	FEAT_SHA1	Advanced SIMD SHA1 instructions	
ARMv8.0-SHA	FEAT_SHA256	Advanced SIMD SHA256 instructions	Split ARMv8.2-SHA into SHA-256, SHA-512 and SHA-3
ARMv8.0-SSBS	FEAT_SSBS	Speculative Store Bypass Safe	ARMv8.0-SSBS is split into SSBS and SSBS2
ARMv8.0-SSBS	FEAT_SSBS2	MRS and MSR instructions for SSBS version 2	ARMv8.0-SSBS is split into SSBS and SSBS2
-	FEAT_ASID16	16 bit ASID	
-	FEAT_AdvSIMD	Advanced SIMD Extension	
-	FEAT_CRC32	CRC32 instructions	
-	FEAT_MixedEnd	Mixed-endian support	
-	FEAT_MixedEndELO	Mixed-endian support at ELO	
-	FEAT_nTLBPA	Intermediate caching of translation table walks	
-	FEAT_SpecSEI	SError interrupt exceptions from speculative reads of memory	
ARMv8.1-Debug	FEAT_Debugv8p1	Debug with VHE	
ARMv8.1-HPD	FEAT_HPDS	Hierarchical permission disables in translation tables	
ARMv8.1-LOR	FEAT_LOR	Limited ordering regions	
ARMv8.1-LSE	FEAT_LSE	Large System Extensions	
ARMv8.1-PAN	FEAT_PAN	Privileged access never	
ARMv8.1-PMU	FEAT_PMUv3p1	Arm v8.1 PMU extensions	

Old name	New name	Short description	Comments
ARMv8.1-RDMA	FEAT_RDM	Advanced SIMD rounding double multiply accumulate instructions	
ARMv8.1-TTHM	FEAT_HAFDBS	Hardware management of the Access flag and dirty state	
ARMv8.1-VHE	FEAT_VHE	Virtualization Host Extensions	
ARMv8.1-VMID16	FEAT_VMID16	16-bit VMID	
ARMv8.2-AA32BF16	FEAT_AA32BF16	AArch32 BFloat16 instructions	
ARMv8.2-AA32HPD	FEAT_AA32HPD	AArch32 Hierarchical permission disables	
ARMv8.2-AA32I8MM	FEAT_AA32I8MM	AArch32 Int8 matrix multiplication instructions	
ARMv8.2-ATS1E1	FEAT_PAN2	AT S1E1R and AT S1E1W instruction variants affected by PSTATE.PAN	
ARMv8.2-BF16	FEAT_BF16	AArch64 BFloat16 instructions	
ARMv8.2-DCCVADP	FEAT_DPB2	DC CVADP instruction	
ARMv8.2-DCPoP	FEAT_DPB	DC CVAP instruction	
ARMv8.2-Debug	FEAT_Debugv8p2	Debug v8.2	
ARMv8.2-DotProd	FEAT_DotProd	Advanced SIMD dot product instructions	
ARMv8.2-EVT	FEAT_EVT	Enhanced Virtualization Traps	
ARMv8.2-F32MM	FEAT_F32MM	Single-precision Matrix Multiplication	
ARMv8.2-F64MM	FEAT_F64MM	Single-precision Matrix Multiplication	
ARMv8.2-FHM	FEAT_FHM	Floating-point half-precision multiplication instructions	
ARMv8.2-FP16	FEAT_FP16	Half-precision floating-point data processing	
ARMv8.2-I8MM	FEAT_I8MM	AArch64 Int8 matrix multiplication instructions	
ARMv8.2-IESB	FEAT_IESB	Implicit Error Synchronization event	
ARMv8.2-LPA	FEAT_LPA	Large PA and IPA support	
ARMv8.2-LSMAOC	FEAT_LSMAOC	AArch32 Load/Store Multiple instruction atomicity and ordering controls	
ARMv8.2-LVA	FEAT_LVA	Large VA support	
MPAM	FEAT_MPAM	Memory Partitioning and Monitoring Extension	
ARMv8.2-PCSample	FEAT_PCSRv8p2	PC Sample-based Profiling Extension	
ARMv8.2-SHA	FEAT_SHA3	Advanced SIMD SHA3 instructions	Split ARMv8.2-SHA into SHA-256, SHA-512 and SHA-3
ARMv8.2-SHA	FEAT_SHA512	Advanced SIMD SHA512 instructions	Split ARMv8.2-SHA into SHA-256, SHA-512 and SHA-3
ARMv8.2-SM	FEAT_SM3	Advanced SIMD SM3 instructions	Split into SM3 and SM4
ARMv8.2-SM	FEAT_SM4	Advanced SIMD SM4 instructions	Split into SM3 and SM4
SPE	FEAT_SPE	Statistical Profiling Extension	
SVE	FEAT_SVE	Scalable Vector Extension	
ARMv8.2-TTCNP	FEAT_TTCNP	Translation table Common not private translations	

Old name	New name	Short description	Comments
ARMv8.2-TTPBHA	FEAT_HPDS2	Hierarchical permission disables	
ARMv8.2-TTS2UXN	FEAT_XNX	Translation table stage 2 Unprivileged Execute-never	
ARMv8.2-UAO	FEAT_UAO	Unprivileged Access Override control	
ARMv8.2-VPIPT	FEAT_VPIPT	VMID-aware PIPT instruction cache	
-	FEAT_ASMv8p2	Armv8.2 changes to the A64 ISA	
ARMv8.3-CCIDX	FEAT_CCIDX	Extended cache index	
ARMv8.3-CompNum	FEAT_FCMA	Floating-point complex number instructions	
ARMv8.3-DoPD	FEAT_DoPD	Debug over Powerdown	
-	FEAT_EPAC	Enhanced pointer authentication	
ARMv8.3-FPAC	FEAT_FPAC	Faulting on AUT* instructions	
-	FEAT_FPACCOMBINE	Faulting on combined pointer authentication instructions	
-	FEAT_FPACC_SPEC	Faulting on combined pointer authentication instructions	
ARMv8.3-JSConv	FEAT_JSCVT	JavaScript conversion instructions	
ARMv8.3-RCpc	FEAT_LRCPC	Load-Acquire RCpc instructions	
ARMv8.3-NV	FEAT_NV	Nested virtualization	
-	FEAT_PACQARMA5	Pointer authentication - QARMA5 algorithm	
-	FEAT_PACIMP	Pointer authentication - IMPLEMENTATION DEFINED algorithm	
ARMv8.3-TPAuth	FEAT_PAuth	Pointer authentication	
ARMv8.3-PAuth2	FEAT_PAuth2	Enhancements to pointer authentication	
ARMv8.3-SPE	FEAT_SPEv1p1	Statistical Profiling Extensions version 1.1	
AMUv1	FEAT_AMUv1	Activity Monitors Extension version 1	
ARMv8.4-CNTSC	FEAT_CNTSC	Generic Counter Scaling	
ARMv8.4-Debug	FEAT_Debugv8p4	Debug v8.4	
ARMv8.4-DFE	FEAT_DoubleFault	Double Fault Extension	
ARMv8.4-DIT	FEAT_DIT	Data Independent Timing instructions	
ARMv8.4-CondM	FEAT_FlagM	Condition flag manipulation instructions	
ARMv8.4-IDST	FEAT_IDST	ID space trap handling	
ARMv8.4-RCpc	FEAT_LRCPC2	Load-Acquire RCpc instructions version 2	
ARMv8.4-LSE	FEAT_LSE2	Large System Extensions version 2	
ARMv8.4-NV	FEAT_NV2	Enhanced nested virtualization support	
ARMv8.4-PMU	FEAT_PMUv3p4	Armv8.4 PMU Extensions	
ARMv8.4-RAS	FEAT_RASv1p1	RAS Extension v1.1	
	FEAT_RASSAv1	RAS Extension v1 System Architecture	
	FEAT_RASSAv1p1	RAS Extension v1.1 System Architecture	
ARMv8.4-S2FWB	FEAT_S2FWB	Stage 2 forced Write-Back	
ARMv8.4-SecEL2	FEAT_SEL2	Secure EL2	

Old name	New name	Short description	Comments
ARMv8.4-TLBI	FEAT_TLBIOS	TLB invalidate instructions in Outer Shareable domain	Split into TLBIOS and TLBIRANGE
ARMv8.4-TLBI	FEAT_TLBIRANGE	TLB invalidate range instructions	Split into TLBIOS and TLBIRANGE
ARMv8.4-Trace	FEAT_TRF	Self-hosted Trace Extensions	
ARMv8.4-TTL	FEAT_TTL	Translation Table Level	
ARMv8.4-TTRem	FEAT_BBM	Translation table break-before-make levels	
ARMv8.4-TTST	FEAT_TTST	Small translation tables	
ARMv8.5-BTI	FEAT_BTI	Branch Target Identification	
ARMv8.5-CondM	FEAT_FlagM2	Enhancements to flag manipulation instructions	
ARMv8.5-CSEH	FEAT_ExS	Context synchronization and exception handling	
ARMv8.5-EOPD	FEAT_EOPD	Preventing ELO access to halves of address maps	
ARMv8.5-FRINT	FEAT_FRINTTS	Floating-point to integer instructions	
ARMv8.5-GTG	FEAT_GTG	Guest translation granule size	
ARMv8.5-MemTag	FEAT_MTE	Instruction-only Memory Tagging Extension	
ARMv8.5-MemTag	FEAT_MTE2	Memory Tagging Extension version 2	
ARMv8.5-PMU	FEAT_PMUv3p5	Arm v8.5 PMU Extensions	
ARMv8.5-RNG	FEAT_RNG	Random number generator	
ARMv8.6-AMU	FEAT_AMUv1p1	AMU Extensions version 1.1	
-	FEAT_AMU_EXT	External AMU	
-	FEAT_AMU_EXT32	32-bit External access to the ANU registers	
ARMv8.6-ECV	FEAT_ECV	Enhanced Counter Virtualization	
ARMv8.6-FGT	FEAT_FGT	Fine Grain Traps	
ARMv8.6-MPAM	FEAT_MPAMv0p1	Memory Partitioning and Monitoring version 0.1	
ARMv8.6-MPAM	FEAT_MPAMv1p1	Memory Partitioning and Monitoring version 1.1	
ARMv8.6-MTPMU	FEAT_MTPMU	Multi-threaded PMU Extensions	
ARMv8.6-TWED	FEAT_TWED	Delayed Trapping of WFE	
ETMv4	FEAT_ETMv4	Embedded Trace Macrocell version 4	
ETMv4.1	FEAT_ETMv4p1	Embedded Trace Macrocell version 4.1	
ETMv4.2	FEAT_ETMv4p2	Embedded Trace Macrocell version 4.2	
ETMv4.3	FEAT_ETMv4p3	Embedded Trace Macrocell version 4.3	
ETMv4.4	FEAT_ETMv4p4	Embedded Trace Macrocell version 4.4	
ETMv4.5	FEAT_ETMv4p5	Embedded Trace Macrocell version 4.5	
ETMv4.6	FEAT_ETMv4p6	Embedded Trace Macrocell version 4.6	
GICv3	FEAT_GICv3	Generic Interrupt Controller version 3	
GICv3.1	FEAT_GICv3p1	Generic Interrupt Controller version 3.1	
-	FEAT_GICv3_TDIR	Trapping Non-secure EL1 writes to ICV_DIR	
GICv4	FEAT_GICv4	Generic Interrupt Controller version 4	
GICv4.1	FEAT_GICv4p1	Generic Interrupt Controller version 4.1	
PMUv3	FEAT_PMUv3	PMU extension version 3	
-	FEAT_TRC_EXT	External access for trace registers	
-	FEAT_TRC_SR	System register trace registers	

Old name	New name	Short description	Comments
ETE	FEAT_ETE	Embedded Trace Extension	
ETEv1.1	FEAT_ETEv1p1	Embedded Trace Extension, version 1.1	
ETEv1.2	FEAT_ETEv1p2	Embedded Trace Extension, version 1.2	
SVE2	FEAT_SVE2	Scalable Vector Extension version 2	
SVE2-AES	FEAT_SVE_AES	Scalable Vector AES instructions	
SVE2-AES	FEAT_SVE_PMULL128	Scalable Vector PMULL instructions	SVE2-AES is split into AES and PMULL support
SVE2-BitPerm	FEAT_SVE_BitPerm	Scalable Vector Bit Permutes instructions	
SVE2-SHA3	FEAT_SVE_SHA3	Scalable Vector SHA3 instructions	
SVE2-SM4	FEAT_SVE_SM4	Scalable Vector SM4 instructions	
TME	FEAT_TME	Transactional Memory Extension	
TRBE	FEAT_TRBE	Trace Buffer Extension	
-	FEAT_SME	Scalable Matrix Extension	