arm

DSTREAM-HT

Version 1.0

Getting Started Guide

DSTREAM-HT

Getting Started Guide

Release information

Document history

Issue	Date	Confidentiality	Change
0100-00	15 July 2019	Non-Confidential	New document for v1.0
0100-01	13 December 2019	Non-Confidential	Documentation update for version 1.0 release
0100-02	10 October 2022	Non-Confidential	Documentation update for version 1.0 release

Proprietary Notice

Confidentiality Status

Product Status

The information in this document is Final, that is for a developed product.

Feedback

Arm® welcomes feedback on this product and its documentation. To provide feedback on the product, create a ticket on https://support.developer.arm.com

To provide feedback on the document, fill the following survey: https://developer.arm.com/documentation-feedback-survey.

Inclusive language commitment

Arm values inclusive communities. Arm recognizes that we and our industry have used language that can be offensive. Arm strives to lead the industry and create change.

Previous issues of this document included language that can be offensive. We have replaced this language.

To report offensive language in this document, email terms@arm.com.

Conformance Notices

This section contains conformance notices.

Federal Communications Commission Notice

This device is test equipment and consequently is exempt from part 15 of the FCC Rules under section 15.103 (c).

Class A

Important: This is a Class A device. In residential areas, this device may cause radio interference. The user should take the necessary precautions, if appropriate.

CE/UKCA Conformity

These marks indicate that this product meets all essential health, safety and environmental requirements. The CE mark indicates conformity within EU member states and the UKCA mark indicates conformity within the UK.

The Declarations of Conformity are available on request.

The *Waste Electrical and Electronic Equipment* (WEEE) marking, that is, the crossed out wheelie-bin figure, indicates that this product must not be disposed of with general waste within the European Union. To prevent possible harm to the environment from uncontrolled waste disposal, the user is required to recycle the product responsibly to promote reuse of material resources. To comply with EU law, you must dispose of the product in one of the following ways:

- Return it to the distributor where it was purchased. The distributor is required to arrange free collection when requested.
- Recycle it using local WEEE recycling facilities. These facilities are now very common and might provide free collection.
- If purchased directly from Arm, Arm provides free collection. Please e-mail weee@arm.com for instructions.

- End-of-Life products can be disposed of safely using an *Approved Authorized Treatment Facility* (AATF). To support safe disposal, Arm has partnered with B2B Compliance. B2B can be contacted at the following weblink: https://b2bcompliance.org.uk

During the lifetime of the product, you are advised to:

- Inspect the product regularly to ensure that it is in good working order.
- Ensure that the product is free from dust and debris that might cause damage.
- Clean the product with an air duster when necessary.
- Power down the system when not in use.
- Observe ESD precautions when handling the product.

The product can radiate Radio Frequency Interference (RFI) or Electromagnetic Interference (EMI) and might cause harmful interference to radio communications. There is no guarantee that interference cannot occur in a particular installation. If you suspect that this equipment is causing interference to other equipment, you are encouraged to try to correct the interference by one or more of the following measures:

- Ensure attached cables do not lie across any sensitive equipment.
- Increase the distance between the product and the receiver.
- Connect the equipment to an outlet on a circuit different from that to which the product is connected.
- Consult Arm for help.

The product can be sensitive to Radio Frequency Interference (RFI) or Electromagnetic Interference (EMI) which might cause incorrect operation of the product:

- Avoid using the product near sources of EMI.
- Never use the product in *Safety-Critical-Systems* (SCS), or *Life-Critical-Systems* (LCS).

Note   Arm recommends that, wherever possible, shielded interface cables be used.

Contents

List of Figures

1. Introduction

Describes the DSTREAM-HT debug and trace system which enables you to debug and optimize your software on Arm® processor-based hardware targets.

1.1 Conventions

The following subsections describe conventions used in Arm documents.

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: developer.arm.com/glossary.

Typographic conventions

Arm documentation uses typographical conventions to convey specific meaning.

Convention	Use
italic	Citations.
bold	Interface elements, such as menu names. Terms in descriptive lists, where appropriate.
`monospace`	Text that you can enter at the keyboard, such as commands, file and program names, and source code.
`monospace `<u>`underline`</u>	A permitted abbreviation for a command or option. You can enter the underlined text instead of the full command or option name.
`<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	Terms that have specific technical meanings as defined in the *Arm® Glossary*. For example, **IMPLEMENTATION DEFINED**, **IMPLEMENTATION SPECIFIC**, **UNKNOWN**, and **UNPREDICTABLE**.
⚠ Caution	Recommendations. Not following these recommendations might lead to system failure or damage.
⚠ Warning	Requirements for the system. Not following these requirements might result in system failure or damage.
⚠ Danger	Requirements for the system. Not following these requirements will result in system failure or damage.

Convention	Use
Note	An important piece of information that needs your attention.
Tip	A useful tip that might make it easier, better or faster to perform a task.
Remember	A reminder of something important that relates to the information you are reading.

1.2 Useful resources

This document contains information that is specific to this product. See the following resources for other useful information.

Access to Arm documents depends on their confidentiality:

- Non-Confidential documents are available at developer.arm.com/documentation. Each document link in the following tables goes to the online version of the document.

- Confidential documents are available to licensees only through the product package.

Arm product resources	Document ID	Confidentiality
Arm Development Studio Getting Started Guide	101469	Non-Confidential
Arm Development Studio Heterogeneous system debug with Arm Development Studio	102021	Non-Confidential
Arm Development Studio User Guide	101470	Non-Confidential
Arm DSTREAM-HT System and Interface Design Reference Guide	101761	Non-Confidential
Arm DSTREAM-ST Getting Started Guide	100892	Non-Confidential
Arm DSTREAM-ST System and Interface Design Reference Guide	100893	Non-Confidential
CoreSight Access Tool (CSAT) User Guide	epm051792	Non-Confidential

1.3 Other information

See the Arm website for other relevant information.

- Arm® Developer.
- Arm® Documentation.
- Technical Support.
- Arm® Glossary.

2. The DSTREAM-HT system

DSTREAM-HT is a debug and trace hardware system that enables software debug and trace for the optimization of software running on Arm® processor-based targets.

DSTREAM-HT provides an interface between a host such as Arm Development Studio and an Arm processor-based target using a hardware interface such as JTAG or Serial Wire Debug (SWD). DSTREAM-HT also enables the collection of up to six lanes of HSSTP trace for powerful code optimization.

The DSTREAM-HT debug system is made up of a standard Arm DSTREAM-ST unit, along with an additional Arm HSSTP probe, enabling:

- Debug on Arm processors from Armv4 to Armv8.
- USB 3.0 and remote Gigabit Ethernet host connections.
- Code download speeds of up to 12MB per second.
- JTAG clock of up to 180MHz.
- Serial Wire Debug of up to 125MHz (standard single-ended signaling).
- A wide range of target connectors.
- Up to six lane HSSTP trace support (up to 60Gbps maximum trace bandwidth).
- Up to two lanes of SETM trace.
- Flexible HSSTP lane rates of up to 12.5Gbps.
- Up to 4-bit parallel trace support (up to 2.4Gbps maximum trace bandwidth).
- Flexible DDR trace clock timing of up to 300MHz (600Mbits/s, per pin).
- 8GB of trace memory storage on the HSSTP probe.
- Support for up to 1022 CoreSight™ devices.
- Remote target reset.
- Device bring-up and test utilities.
- Flexible architecture to support third party IP and debuggers.

For more feature information, see the DSTREAM-HT web page on the Arm Developer website.

For the purposes of this content:

- The term DSTREAM-ST refers only to the DSTREAM-ST unit.
- The terms DSTREAM-HT or DSTREAM-HT system refer to both the DSTREAM-ST unit and HSSTP probe working in combination.

This chapter describes the DSTREAM-HT hardware.

2.1 Buy Arm DSTREAM-HT

Arm has over 100 trusted distributors around the world offering products, training, and support.

You can contact them to buy DSTREAM-HT.

For debug unit product comparisons, and more information about purchasing options, see the **Debug Probe** subset of tools in the Arm Developer Store.

For OEM licenses, contact Arm directly at salesinfo@arm.com.

Related information
Arm DSTREAM-HT box contents on page 11

2.2 Arm DSTREAM-HT box contents

The DSTREAM-HT product box contains the required components to set up and connect your host PC to your Arm® architecture-based development board.

The items are:

- DSTREAM-ST unit.

    Figure 2-1: DSTREAM-ST unit

- High Speed Serial Trace (HSSTP) probe.

    Figure 2-2: HSSTP Trace probe

- Power supply unit and associated cables.

Figure 2-3: DSTREAM-HT power supply and cables

- 60-way Auxiliary (AUX) host port cable

Figure 2-4: 60-way Auxiliary (AUX) host port cable

- CoreSight™ 10/20-way 0.05" pitch ribbon cable.

Figure 2-5: CoreSight 10/20-way 0.05" pitch ribbon cable

- CoreSight Short 20-way 0.05" pitch ribbon cable.

Figure 2-6: CoreSight Short 20-way 0.05" pitch ribbon cable

- JTAG 20-way 0.1" pitch ribbon cable.

Figure 2-7: JTAG 20-way 0.1" pitch ribbon cable

- HSSTP 40-way co-axial ribbon cable.

Figure 2-8: HSSTP 40-way co-axial ribbon cable

- JTAG 14-way Texas Instruments adapter.

Figure 2-9: JTAG 14-way Texas Instruments adapter

- MICTOR 38-way 4-bit adapter.

Figure 2-10: MICTOR 38-way 4-bit adapter

- Ethernet cable.

  (Not pictured)
- USB 3.0 cable.

  (Not pictured)

Related information

Buy Arm DSTREAM-HT on page 10

2.3 The DSTREAM-ST unit

The DSTREAM-ST unit provides the hardware interface to connect the host computer to your target.

Rear

The rear of the DSTREAM-ST unit contains ports for connecting to the network, host PC, and the power source. It also contains the **RESET** button and the **USER IO** port.

Figure 2-11: Rear of the DSTREAM-ST unit
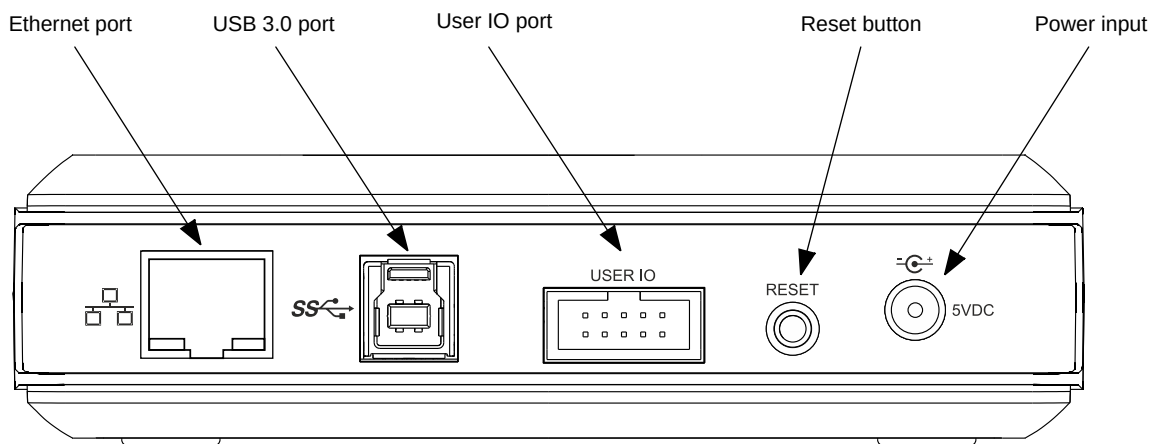
Ethernet port

> If you want to access your DSTREAM-ST unit over a local area network, use the Ethernet port.
>
> The green LED indicates that the Ethernet link is up and running. The yellow LED indicates that activity is taking place. Supported data rates are: 10/100/1000 Mbps.
>
> DSTREAM-ST is a Gigabit Ethernet (GbE) device. To achieve the maximum GbE data transfer rate:
>
> - Your PC must support the GbE standard.
> - Your network infrastructure must support the GbE standard.
> - You must use the included GbE cable.

USB 3.0 port

> To connect the DSTREAM-ST unit directly to your host PC, use the USB 3.0 port.
>
> DSTREAM-ST is a USB 3.0 device. To achieve the maximum USB 3.0 data transfer rate:
>
> - Your PC must have a USB 3.0 port.

- You must use the included USB 3.0 data cable.

Longer or lower-quality cables might not operate at USB 3.0 data transfer rates because of higher signal loss. In this event, DSTREAM-ST reverts to USB 2.0 mode.

USER IO port

Use the USER IO port to set up custom input or output connections to your target. See the Arm DSTREAM-HT System and Interface Design Reference Guide for more details.

RESET Button

⚠️ **Caution** Always use the RESET button to power-cycle your DSTREAM-ST unit. Disconnecting and re-connecting the DC plug to power-cycle your target might cause ground-loop issues.

To reset the DSTREAM-ST unit, press and release the RESET button. The RESET button operates immediately and performs a full internal power-cycle. This also resets any attached probes.

📝 **Note** If you continue to hold the RESET button for 10 seconds more, the STATUS LED flashes red rapidly. When you release the RESET button after this point, DSTREAM-ST reboots and defaults back to factory installed firmware. Use the Debug Hardware Firmware Installer view in Arm® Development Studio to update the firmware of your DSTREAM-ST unit.

Power input

Connect the power adapter provided with the DSTREAM-ST unit to this port.

📝 **Note** When using DSTREAM-ST with the HSSTP probe, you must use the dual power cable provided with the power supply unit.

Front

The front of the DSTREAM-ST unit contains ports for connecting to your target.

Figure 2-12: Front of the DSTREAM-ST unit.
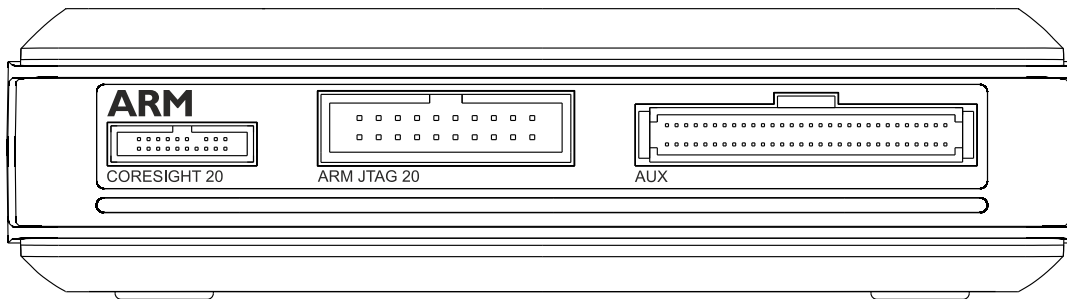
CORESIGHT 20

A high-density connector that supports 10-way or 20-way CoreSight™ standards in addition to a subset of the MIPI debug connection standards. It provides support for Serial Wire and JTAG interface modes in a 20-pin (0.05") connector.

> **Note**
>
> To achieve the highest possible trace data rate, Arm recommends using the short, 15cm ribbon cable.

ARM JTAG 20

JTAG 20 provides support for Serial Wire and JTAG interface modes in a 20-pin (0.1") connector.

AUX

This port is included to connect DSTREAM-ST with external probe units such as the HSSTP probe.

Other connectors

Included with DSTREAM-ST are:

- **Texas Instruments 14-way adapter** - Used in conjunction with the Arm JTAG 20 cable, provides debug access to any target with a TI JTAG 14 header.

- **MICTOR adapter** - Used in conjunction with the Arm JTAG 20 and CoreSight 20 cables, this adapter provides debug and trace access to any target with a MICTOR socket.

> **Note**
>
> To achieve full MICTOR connectivity, you must use both the Arm JTAG 20 and CoreSight 20 cables.

Optional adapters

The following adapters are also available for use with DSTREAM-ST. Each of these allows DSTREAM-ST to capture up to 4-bit wide ETM trace, and also allows the use of separate debug and trace power domains.

- **MIPI-34 adapter** - This adapter connects directly to the front panel of DSTREAM-ST. The adaptor is supplied with a MIPI-34 ribbon cable to provide debug and trace access to any target with a MIPI-34 header.
- **MIPI-60 adapter** - This adapter plugs into a target's MIPI-60 socket and converts it to a MICTOR socket for use with the DSTREAM-ST MICTOR adapter.

To obtain optional adapters, contact Arm support with your requirements.

Indicator LEDs on the top

When you power up the DSTREAM-ST unit, the LEDs on top of the unit indicate the status of the unit.

Figure 2-13: Indicator LEDs
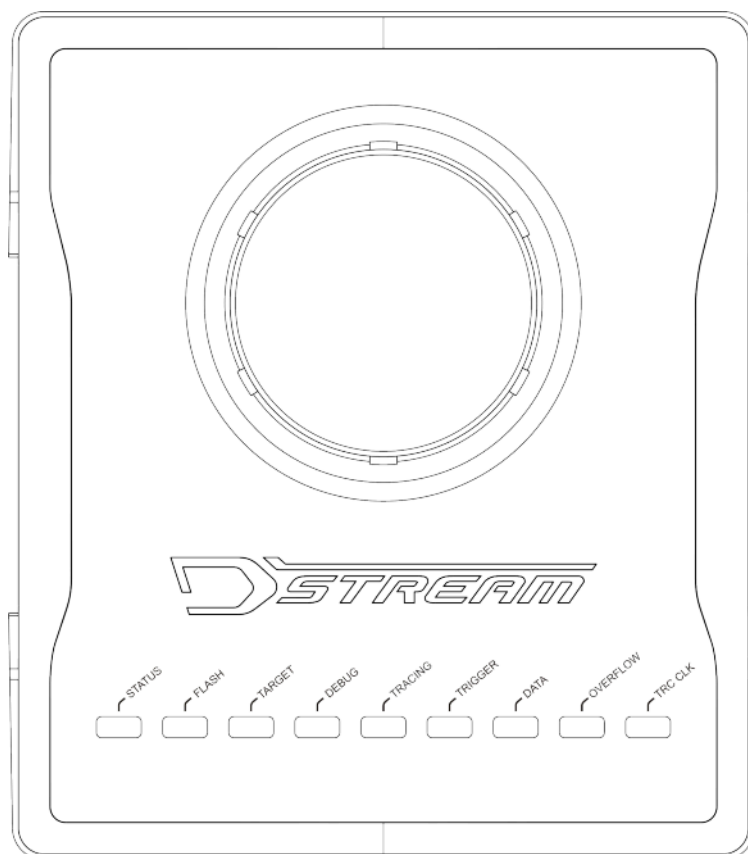
DSTREAM logo

The DSTREAM logo on the top of the unit illuminates and the **STATUS** LED begins to flash when you power up the DSTREAM-ST unit. The DSTREAM logo also flashes when you click the **Identify** button in the Debug Hardware Configure IP view or the Debug Hardware Firmware Installer view in Arm Development Studio.

STATUS

Illuminates green to show that DSTREAM-ST is in its ready state.

If a critical error is detected, the **STATUS** LED illuminates as continuous red. If the **STATUS** LED is red, then you must reset the DSTREAM-ST unit to the factory settings before you can continue using it. If the DSTREAM-ST unit fails to boot after a reset, contact Arm support. For more information, see Restore a DSTREAM-HT system.

FLASH

Illuminates when the unit is accessing its internal flash storage.

TARGET

Illuminates when a valid target VTREF is detected.

DEBUG

Illuminates when debug data transfer takes place.

TRACING

Indicates that DSTREAM-ST is attempting to capture data and synchronize with the trace stream.

TRIGGER

Indicates that a trigger is present in the trace data.

DATA

Indicates that trace synchronization is complete and DSTREAM-ST is capturing trace data. Trace synchronization is when the DSTREAM-ST unit detects a full synchronization packet and aligns with the trace data stream.

OVERFLOW

Indicates an overflow-condition during trace capture. An overflow condition occurs if it has not been possible to stream trace data to the host PC at a high enough rate. For example, if the USB port is only operating in USB 2.0 mode, if the Ethernet port is only operating at 100Mbps, or if other applications on the host PC are using too much USB or Ethernet bandwidth.

In general, when streaming trace data, the best practice is to keep usage of other applications, on the host PC, to a minimum.

TRC CLK

This LED is for parallel trace only.

If the **TRC CLK** LED is green, it indicates that a valid trace clock is detected. This is the normal condition when capturing trace data from a target.

If the **TRC CLK** LED is off, then no parallel trace clock signal is detected.

If the **TRC CLK** LED is red and flashing, it indicates that the received trace clock frequency is too high or too low to be captured.

Related information

2.4 The HSSTP probe

The HSSTP probe provides the hardware interface to connect the DSTREAM-ST unit to the HSSTP port of your target.

Rear

Figure 2-14: Rear of HSSTP Trace probe
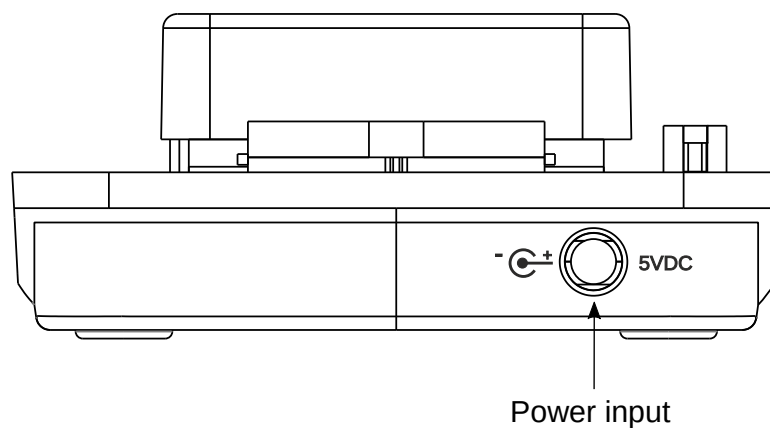
Power input

Power input

Connect the power supply unit to **Power input** port using the dual power cable.

Top

The top of the HSSTP probe has connectors for connecting to a DSTREAM-ST unit and to a target.

Figure 2-15: Top of HSSTP Trace probe
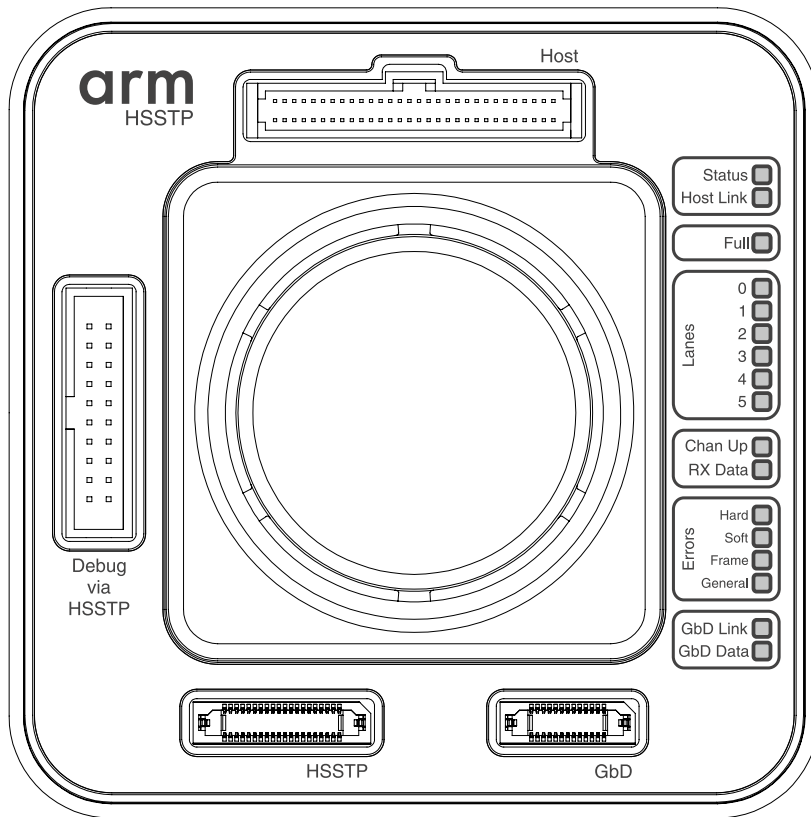
Host connector

> Connects to the DSTREAM-ST unit using a 60-way ribbon cable. The **Host** connector also controls the HSSTP probe and retrieves trace data from it.

Debug via HSSTP connector

> Passes debug signals from DSTREAM-ST unit to the trace connector. When used, it connects to the DSTREAM-ST unit using the Arm JTAG 20 cable.
>
> If the target uses separate debug and trace connectors, the debug connection must be made directly between the DSTREAM-ST unit and the target, leaving this connector, on the HSSTP probe, unused.

HSSTP connector

> Connects to the target trace connector via an HSSTP 40-way co-axial ribbon cable.

GbD connector

> This connector is currently reserved, and is not used in Arm® Development Studio.

Indicator LEDs

When you power-up the HSSTP probe, the LEDs on top of the unit indicate the status of the unit.

Status

> At power-up, the **Status** LED:

1. Briefly illuminates red, to indicate that the probe is powered and initializing.

2. Illuminates green, to indicate that the probe is in its ready state.

> **Note**
>
> If the **Status** LED remains red, the HSSTP probe has failed to boot. Ensure that your DSTREAM-ST firmware is version 5.4, or later. For more information on updating the DSTREAM-ST firmware, see Update the DSTREAM-HT system firmware. If the firmware is the correct version, restore the DSTREAM-ST unit. To restore the DSTREAM-ST unit, follow the instructions in Restore a DSTREAM-HT system.

Host Link

At power-up, the **Host Link** LED:

1. Briefly flashes blue, to indicate that the link to the DSTREAM-ST unit is initializing.

2. Illuminates green, to indicate that the link is ready.

> **Note**
>
> If the **Host Link** LED does not flash blue, or continues to only flash blue, see Host Link issues

Full

Illuminates green to indicate that the trace buffer is full.

Lanes [0-5]

The Lane LEDs indicate the numbers of the lanes that are expected to be used during the debug session.

Illuminates green to indicate that the numbered lane has initialized correctly.

Illuminates red to indicate that the numbered lane has failed to initialize.

> **Note**
>
> When you first power on the HSSTP probe, the Lane LEDs might illuminate red. After a short amount of time, they change to green. If they remain red at connection time, this indicates that there is a problem. See HSSTP probe LED errors for further details.

Chan Up (Channel)

Illuminates green to indicate that the channel has initialized correctly.

Illuminates red to indicate that the channel has failed to initialize.

> **Note** The number of lanes available is target dependent. If one lane is available, the Channel LED illuminates green when the lane is ready for use. If more than one lane is available, the lanes have to be bonded first. The Channel LED illuminates green when the lanes are bonded and they are ready for use.

RX Data

Flashes green when the HSSTP probe is successfully receiving data.

Hard Error

Illuminates red to indicate that a high number of consecutive soft errors were detected. This usually indicates that there are signal-integrity issues, or that there are bad connections with the HSSTP signals.

Illuminates yellow to indicate that a hard error was detected, but is now resolved.

Soft Error

Illuminates red to indicate that badly encoded data is being received which is causing disparity errors.

Illuminates yellow to indicate that disparity errors were detected, but are now resolved.

Frame Error

Illuminates red to indicate that the received frames do not match the expected format. For example, Cyclic Redundancy Check (CRC) checking is enabled in the target device, but not in the debug configuration.

Illuminates yellow to indicate that incorrect frames were received, but are now correct.

General Error

Illuminates red to indicate a miscellaneous error, such as CRC, End of Frame (EOF), or First in First out (FIFO), overrun errors. Further diagnostic information is available through the Debug Hardware log client, in Arm Development Studio: `<armds_installation_directory>/sw/debughw/tools2/dbghw_log_client`

Illuminates yellow to indicate that a miscellaneous error was detected, but is now resolved.

GbD Link and GbD Data

These LEDs are currently reserved, and are not used by the HSSTP probe.

Related information

3. Set up your DSTREAM-HT

This chapter contains instructions about connecting the DSTREAM-HT system to your host PC and target system.

3.1 Install the USB drivers for the DSTREAM-HT system on Windows

To use the DSTREAM-HT system with a USB connection, install the USB device drivers for your operating system. The USB drivers for the DSTREAM-HT system are provided with Arm® Development Studio.

Before you begin

Ensure you have:

- Installed Arm Development Studio. For more information, see the Arm Development Studio Getting Started Guide.

- Administrative privileges on your PC.

Procedure

1. Using administrative privileges, run the `driver_install.bat` batch file that is available in `<Arm_Development_Studio_install_directory>\sw\driver_files` directory.

2. In the **Arm Development Studio Driver Installation Wizard**, click **Next** and follow the steps.

> **Note**
>
> During installation, you might receive warnings such as **Windows can't verify the publisher of this driver software**. You can safely ignore these warnings and continue with the installation.

---

3. After the drivers are installed, click **Finish**.

Results

The USB drivers are now installed on your PC.

Related information

Connect and power up the DSTREAM-HT system on page 24

3.2 Install the USB drivers for the DSTREAM-HT system on Linux

To use the DSTREAM-HT system with a USB connection, install the USB device drivers for your operating system. The USB drivers for the DSTREAM-HT system are provided with Arm® Development Studio.

Before you begin

Ensure you have:

- Installed Arm Development Studio. For more information, see the Arm Development Studio Getting Started Guide.

- Administrative privileges on your PC.

Procedure

1. Using root privileges, run the `run_post_install_for_Arm_Development_Studio_vx.x.sh` script file that is available in the Arm Development Studio install directory. The `x.x` in the filename denotes the Arm Development Studio version that is installed on your PC.

2. To confirm the installation, enter `yes`.

Results

The USB drivers are now installed on your PC.

Related information

Connect and power up the DSTREAM-HT system on page 24

3.3 Connect and power up the DSTREAM-HT system

Describes how to connect your DSTREAM-HT system to your host PC and target hardware.

Before you begin

- You must install Arm Development Studio to access the software drivers and debug hardware configuration utilities.

- Your target hardware must have a debug connector supported by DSTREAM-HT. For a list of supported connectors, see Target interface connectors in the Arm® DSTREAM-HT System and Interface Design Reference Guide.

- You must have the following items from the Arm DSTREAM-HT box contents:

  ◦ The DSTREAM-ST unit.

  ◦ The HSSTP probe, with the 60-way AUX cable.

  ◦ The power supply unit, dual DC power cable, and the mains cable that is appropriate for your region.

  ◦ To connect the DSTREAM-ST unit to the host PC or the network, you need either:

- ▪ The USB cable, to connect the DSTREAM-ST unit directly to the host PC using the USB 3.0 port.
- ▪ The Ethernet cable, to connect the DSTREAM-ST unit to the network.
- ◦ To connect DSTREAM-HT to the target hardware, you need a target-compatible cable. For a list of supplied cables, see Arm DSTREAM-HT box contents.

Caution

- • If DSTREAM-HT or the target hardware are not earthed, potential differences can occur between them. During connection, potential differences cause unwanted pulses in the debug interface. This might also cause unwanted resets to occur.
- • When connecting the DSTREAM-HT system to target hardware, to avoid damaging the target or debug hardware, ensure that the debug and trace connector (or connectors) on the target use pinouts supported by DSTREAM-HT. For supported pinout information, see the Arm DSTREAM-HT System and Interface Design Reference Guide.

Procedure

1. Connect the DSTREAM-ST unit, the HSSTP probe, and the power supply unit:
   a) Connect the DSTREAM-ST unit and the HSSTP probe using the 60-way AUX cable.
   b) Attach the shorter 5V DC input end of the split power supply cable to the DSTREAM-ST unit, and attach the longer 5V DC input end to the HSSTP probe.

Note

Depending on your device arrangement, the 5V DC inputs are identical and you can attach them to either the DSTREAM-ST unit or the HSSTP probe.

---

   c) Attach the Power Supply Unit (PSU) to the PSU-adapter end of the split power supply cable.

2. Connect the DSTREAM-ST unit to the host PC:

   - • If you are connecting using the USB port, connect the DSTREAM-ST unit to the host PC using the supplied USB 3.0 cable.

Note

- ◦ The USB drivers are provided with Arm Development Studio. For more information, see the USB driver installation topics: Install the USB drivers for the DSTREAM-HT system on Windows or Install the USB drivers for the DSTREAM-HT system on Linux.
- ◦ The DSTREAM-ST unit uses the Remote Network Driver Interface Specification (RNDIS) to provide a virtual Ethernet link over USB. To ensure your DSTREAM-ST unit is discoverable, enable the RNDIS protocol in your network and firewall settings.

   - • If you are connecting across an Ethernet network, connect the DSTREAM-ST unit to the local network using the supplied Ethernet cable.

3. Power up the DSTREAM-HT system.

When you power up the DSTREAM-ST unit and HSSTP probe, both units follow a boot sequence. The LEDs identify the progress of the boot sequence. For more information, see DSTREAM-HT system boot sequence.

Note

- Arm recommends that both the DSTREAM-ST unit and HSSTP probe are powered-up simultaneously. Powering simultaneously ensures that the DSTREAM-ST unit correctly detects the HSSTP probe during its boot sequence.

- If you need to reset the DSTREAM-HT system, press the reset button on the rear of the DSTREAM-ST unit. When a DSTREAM-ST unit is connected in a DSTREAM-HT system, the reset button on the DSTREAM-ST unit re-initializes both the DSTREAM-ST unit and the HSSTP probe.

---

4. If you are connecting across an Ethernet network, configure the Ethernet and internet protocol settings for your DSTREAM-ST unit. To configure these settings, use the Debug Hardware Configure IP view in Arm Development Studio.

Note

You can also use the **Debug Hardware Configure IP** view to assign a name for the DSTREAM-ST unit. For more information, see the Arm Development Studio documentation for Debug Hardware Configure IP view.

---

5. Connect the DSTREAM-HT system to the target hardware. Use the appropriate cables and adapters for the target debug and trace connector (or connectors). Some targets have debug and trace on a single connector, and some targets split them between two connectors. Each connector, and the appropriate cable to use for that connector, is described in Target interface connectors in the Arm DSTREAM-HT System and Interface Design Reference Guide.

- If your target has debug and trace on a single connector, connect the HSSTP probe to the target using the 40-way HSSTP cable:

Figure 3-1: DSTREAM-HT connection.
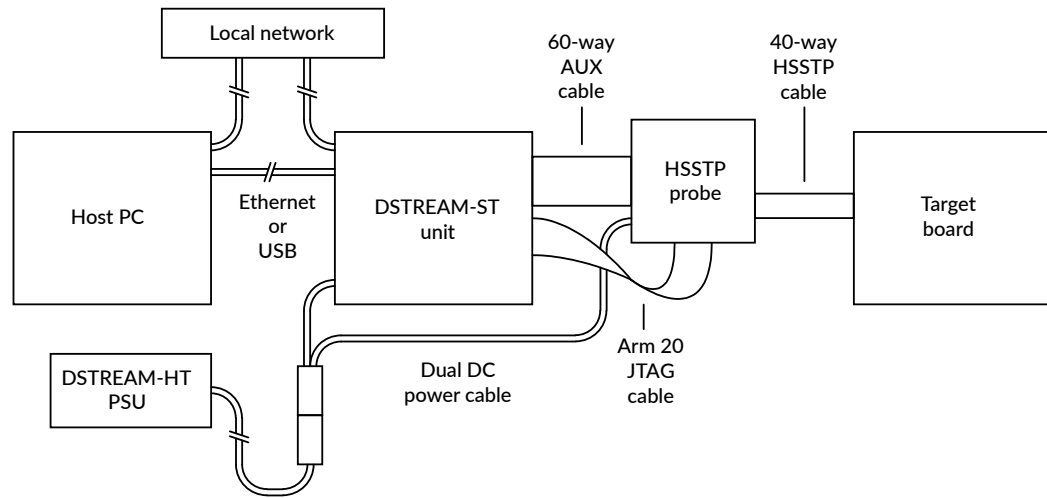
- If your target has separate debug and trace connectors, connect the DSTREAM-HT system with the debug cable bypassing the HSSTP probe:

  a. Connect the HSSTP probe to the target using the 40-way HSSTP cable.

  b. Connect the DSTREAM-ST unit to the target using the appropriate JTAG or CoreSight™ ribbon cable.

Figure 3-2: DSTREAM-HT debug bypass connection.
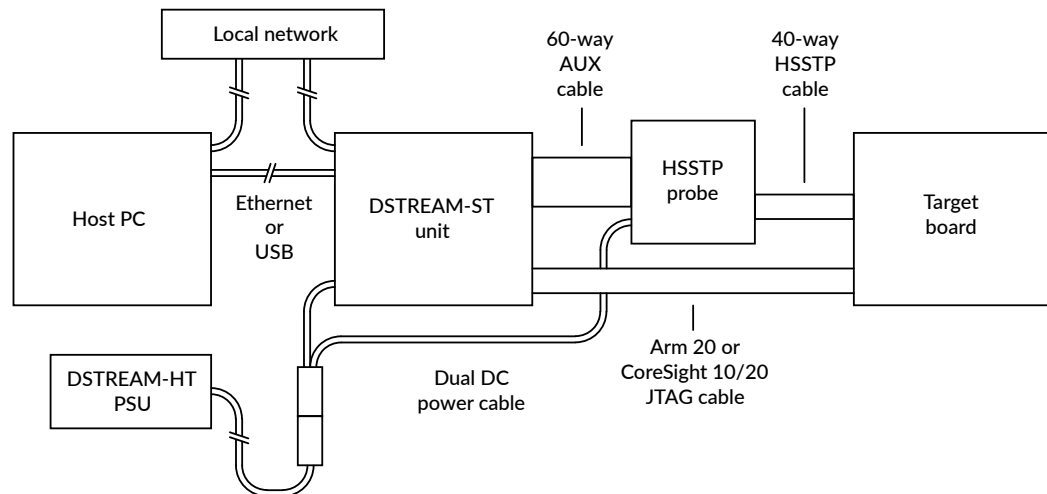
6. Power up the target hardware.

> **Note**
> - When the DSTREAM-HT system is powered-up, ensure that the air intakes on the top of each unit, are not blocked.
> - If the DSTREAM-ST unit overheats, it shuts down, all the LEDs turn off, and it remains in a safe state.
> - If the HSSTP probe overheats, it enters a low-power mode and all of its LEDs flash red.
> - To re-initialize the DSTREAM-HT system, press the reset button on the rear of the DSTREAM-ST unit.

Next steps

- The first time you connect and power-up your DSTREAM-HT system you must Update the DSTREAM-HT system firmware.
- Work with your DSTREAM-HT

Related information
DSTREAM-HT system boot sequence on page 28

3.4 DSTREAM-HT system boot sequence

When you power up the DSTREAM-HT system, it goes through a boot sequence. The LEDs identify the progress of the boot sequence.

The boot sequence is:

1. To indicate that both units are powered, the DSTREAM logo of the DSTREAM-ST unit illuminates blue and the **STATUS** LED of the HSSTP probe illuminates RED.
2. The **FLASH** LED of the DSTREAM-ST unit flashes as it loads its firmware.
3. The **STATUS** LED of the HSSTP probe illuminates green, indicating that its FPGA has successfully loaded.
4. The **STATUS** LED of the DSTREAM-ST unit flashes green, and then stays illuminated, indicating that it has successfully booted.
5. The **Host Link** LED of the HSSTP probe flashes blue, and then illuminates green to indicate that the units have successfully linked.
6. If the target is connected to the DSTREAM-HT system and powered, the **TARGET** LED on the DSTREAM-ST unit illuminates green.

The DSTREAM-HT system is now ready for use.

> **Note**
> If your DSTREAM-HT system boot sequence does not follow this sequence, see Troubleshooting.

Related information
Connect and power up the DSTREAM-HT system on page 24
Restore a DSTREAM-HT system on page 37

3.5 Update the DSTREAM-HT system firmware

The DSTREAM-HT system firmware contains the DSTREAM-ST operating system, templates that define how the debug hardware communicates with target devices, and configuration files for add-on probes (such as the HSSTP probe).

Before you begin

- You must ensure that Arm® Development Studio is installed on the host PC.

> **Note**
> In Arm Development Studio, the latest firmware files are available at:
> `<Arm_Development_Studio_install_directory>/sw/debughw/firmware/.`

- Ensure you connect and power-up the DSTREAM-HT system so the firmware on both the DSTREAM-ST unit and HSSTP probe is updated simultaneously. For more information, see Connect and power up the DSTREAM-HT system.

- You must also ensure that the current DSTREAM-HT system firmware is at least the minimum version required by Arm Development Studio.

> **Note**
> You must have firmware version 5.4 or later, installed for the HSSTP probe to be detected.
>
> If earlier firmware is installed, the DSTREAM-ST unit does not function as part of a DSTREAM-HT system. Instead, the DSTREAM-ST unit functions only as a DSTREAM-ST unit and is limited to 4-bit streaming trace.

Procedure

1. Open the Debug Hardware Firmware Installer view from the main menu in Arm Development Studio, select **Window > Show View > Debug Hardware Firmware Installer**.
2. For the **Debug Hardware** field, click **Browse...** and **Select** your debug unit, then click **Connect**. Result: You can view the currently installed firmware version, the auto-selected new firmware file, and the new firmware details.

3. Either accept the auto-selected firmware update file, or browse and select a different firmware update file:

- To accept the auto-selected firmware update file, click **Install**.

- To select a different firmware update file, in **Select Firmware Update File**, click **Browse**, select your firmware update file, and click **Open**. Click **Install**.

Results

The firmware is now updated on both the DSTREAM-ST unit and HSSTP probe.

Related information

Connect and power up the DSTREAM-HT system on page 24

4. Work with your DSTREAM-HT

Arm® DSTREAM-HT is a comprehensive solution for the development and debug of complex Arm-based devices. This chapter explains some of the ways you can use DSTREAM-HT to work with your targets.

4.1 Debug software for DSTREAM-HT

The development software on your host PC provides the interface between your debugger and the DSTREAM-HT hardware that controls the target devices. The host software translates debugger commands, such as `start`, `stop`, and `download`, into control sequences for a particular processor.

Depending on your needs, there are several options:

Arm Development Studio

Arm® Development Studio is a suite of tools for embedded C/C++ software development on any Arm-based device. It features an editor, compilers, debugger, and a system profiler. Combined with DSTREAM-HT, you get a comprehensive solution for developing and debugging complex systems.

For more information on debugging using Arm Development Studio, see the documentation.

You can download the latest version of Arm Development Studio from the Arm Development Studio downloads page.

Remote Device Debug Interface (RDDI)

Third-party debuggers, both for Arm and other processors, can connect to DSTREAM-HT using the RDDI interface.

You can use the RDDI interface to:

- Address each target device individually, without affecting other devices on the board. It uses this ability to create virtual connections for each of the JTAG devices on the board. Your debugger can attach to one of these virtual connections, and perform debugging operations with no knowledge of the other devices on the board.

- Enable multiple concurrent connections to debug multiprocessor systems. Depending on the system, you can also perform a synchronized start or stop of processors for debugging multiprocessor systems where the processors interact with each other.

- Perform simple tasks. For example, for production testing, a low-level RDDI connection to DSTREAM-HT can be used to gain access to the JTAG scan-chains inside the target device.

RDDI is freely available from within the Arm Development Studio installation. It is located `<Arm_Development_Studio_install_directory>/sw/debugger/RDDI`.

CoreSight Access Tool (CSAT)

The CoreSight™ Access Tool (CSAT) provides a scriptable low-level interface to the CoreSight Debug Access Port (DAP) on a target. CSAT is useful to perform initial bring-up tests before a debugger connection to the target is available.

CSAT provides low-level, command-line manipulation of devices connected to a DAP, for example, custom instrumentation hardware, at the memory or register level. CSAT removes the complexity, complication, or overhead of a debugger. CSAT can be used while a debugger is connected to an Arm processor. This enables the debugging of complex hardware-related problems.

For more information, see the CoreSight Access Tool (CSAT) User Guide. In your Arm Development Studio installation, CSAT is located in `<Arm_Development_Studio_install_directory>/bin/csat`.

Related information

Install the USB drivers for the DSTREAM-HT system on Linux on page 23
Install the USB drivers for the DSTREAM-HT system on Windows on page 23

4.2 Hot-plug the debug cable

At times, you might want to connect or disconnect the debug cable between the DSTREAM-HT system and the target hardware, without powering off the target. This process is known as *hot-plugging*.

⚠️ **Caution** If the DSTREAM-HT system or the target hardware are not properly earthed, potential differences can occur between them. During connection, potential differences can cause unwanted pulses in the debug interface. Pulses in the debug interface can cause unwanted resets to occur.

Arm recommends you avoid hot-plugging the debug cable. However, you can hot-plug without affecting operation of the target, if:

- The DSTREAM-HT system is powered by its original power supply (which has an earthed-output).

- The target hardware is earthed, either through its power supply, or a separate earth connection.

Hot-plugging: connecting

⚠️ **Caution** When connecting the debug cable to the target system, to guard against ground-loop noise, ensure that one of the GND pins of the debug connector makes contact first. This contact ensures that the current target state is not affected. For pin details, see Target interface connections in the Arm® DSTREAM-HT System and Interface Design Reference Guide.

To connect a DSTREAM-HT system to a target without affecting its current state, you must:

1. Power up the DSTREAM-HT system. Allow the DSTREAM-ST and HSSTP probe to boot up.

2. Connect the HSSTP trace cable to the target.

3. Connect the debug cable to the target.

Hot-plugging: disconnecting

When unplugging the debug connector, you must be aware that:

- If you are using a Return Test Clock (RTCK) system, make sure that no communication is taking place between the system and the DSTREAM-HT system. Otherwise, if the DSTREAM-HT system is waiting for a return clock, it might lock up.

- If you are not using an RTCK system, the debug software can handle this situation. However, you must perform a Test Access Port (TAP) reset using the debugger when you next connect the DSTREAM-HT system to a target. For more information on TAP resets, see Reset signals.

Related information
Connect and power up the DSTREAM-HT system on page 24

5. Troubleshooting

This chapter describes the steps that you need to take when your DSTREAM-HT system does not function as expected.

For more information about troubleshooting and support for your DSTREAM-HT system, see the Arm DSTREAM-HT web page on the Arm Developer web site.

5.1 HSSTP probe LED errors

Lists the LED combinations that indicate HSSTP probe errors, and how to resolve them.

If your HSSTP probe detects bad signal integrity or an error state, the **Chan up** or one or more of the **Errors** section LEDs on the probe illuminates red.

Bad signal integrity

Bad signal integrity on any of the HSSTP lanes causes one or more of the lanes to fail link training. This causes the HSSTP probe to reach an error state.

Indicated by: A red LED for the affected lane, in the **Lanes** LED section on the probe.

Solution

Using Arm® Development Studio, open the configuration file for your target and check that:

1. The lane speed option, `HSSTP_SPEED`, is configured correctly.

2. The lane width option, `HSSTP_LANES`, is configured correctly.

3. The equalization mode option, `HSSTP_RX_EQUALIZATION`, is configured correctly.

If these steps do not resolve the issue, contact Arm support.

Disparity error

A disparity error is when there is a bit error on the link.

Indicated as follows:

- A single disparity error is indicated by a red **Soft** LED in the **Errors** LED section on the probe.

- Multiple disparity errors are indicated by red **Soft** and **Hard** LEDs in the **Errors** LED section on the probe.

Solution

1. Check all the cables are correctly connected on the HSSTP probe and target.

2. On your target, check the transmitter amplitude and pre-emphasis settings.

3. Use Arm Development Studio to reconnect to the target device.

If the above steps do not resolve the issue, contact Arm support.

Cyclic Redundancy Check (CRC) error

CRC errors occur if there is a mismatch between the CRC configuration, which is enabled or disabled in Arm Development Studio, and the generated CRC output from the target.

Indicated by: A red **Frame** and **General** LEDs in the **Errors** LED section on the probe.

Solution

To check that your debug configuration and target configurations match, use the DSTREAM-ST log client:

- If CRC is enabled in the target device, ensure that CRC is enabled in the debug configuration (`HSSTP_CRC` option).
- If CRC is not enabled in the target device, ensure that CRC is not enabled in the debug configuration (`HSSTP_CRC` option).

If this solution does not resolve the issue, contact Arm support.

End of Frame (EOF) or First in First out (FIFO) overrun errors

EOF or FIFO overrun errors are indicated in the DSTREAM-ST log client.

Indicated by: A red **General** LED in the **Errors** LED section on the probe.

Solution

Contact Arm support.

Bonding sequence transmission error

Bonding sequence transmission errors occur when the bonding sequence transmission length is incorrectly set.

Indicated by: A green **Lanes** LEDs and a red **Chan up** LED on the probe.

Solution

In Arm Development Studio, check the bonding sequence transmission length that is set in the python script for your target.

If the bonding sequence transmission length is set correctly, contact Arm support.

Related information

5.2 Host Link issues

During the DSTREAM-HT system boot sequence, the LEDs identify the progress of the boot sequence. On the HSSTP probe, to indicate that the units are successfully linked, the **Host Link** LED briefly flashes blue, then illuminates green.

If the **Host Link** LED does not flash, or continues to only flash blue and not illuminate green, the link connection is not established.

Host Link LED does not flash or illuminate

If the **Host Link** LED does not flash or illuminate, the link connection is incomplete, because:

- The HSSTP probe factory firmware version requires updating.

- The flash memory on the HSSTP probe is corrupt. If the flash memory is the cause, the **STATUS** LED illuminates red.

- The connection with the AUX 60-way ribbon cable is not complete.

Solution

1. Disconnect the AUX 60-way ribbon cable.

2. Ensure the connector pins on the DSTREAM-ST unit and HSSTP probe are not damaged.

3. Ensure the 60-way ribbon cable is not damaged.

4. Reconnect the 60-way ribbon cable. Ensure both ends of the cable are securely connected.

5. Reset the DSTREAM-HT system. Use the reset button on the rear of the DSTREAM-ST unit.

6. If a reset does not fix the **Host Link** connection, restore the DSTREAM-HT system. For more information, see Restore a DSTREAM-HT system.

Host Link LED only flashes blue

If the **Host Link** LED continues to flash blue, the link connection is incomplete.

Solution

1. Disconnect the AUX 60-way ribbon cable.

2. Ensure the connector pins on the DSTREAM-ST unit and HSSTP probe are not damaged.

3. Ensure the 60-way ribbon cable is not damaged.

4. Reconnect the 60-way ribbon cable. Ensure both ends of the cable are securely connected.

5. Reset the DSTREAM-HT system. Use the reset button on the rear of the DSTREAM-ST unit.

6. If a reset does not fix the **Host Link** connection, restore the DSTREAM-HT system. For more information, see Restore a DSTREAM-HT system.

Related information

The HSSTP probe on page 18
Arm DSTREAM-HT box contents on page 11
DSTREAM-HT system boot sequence on page 28

5.3 DSTREAM-HT overheats

The air intakes on the top of both the DSTREAM-ST unit and HSSTP probe, in a powered-up DSTREAM-HT system, must remain clear.

Air intakes are blocked

If the air intake on the top of the DSTREAM-ST unit becomes blocked and the DSTREAM-ST unit overheats, it shuts down, all the LEDs turn off, and it remains in a safe state.

If the air intake on the top of the HSSTP probe becomes blocked and the HSSTP probe overheats, it enters a low-power mode and all of its LEDs flash red.

Solution

Check that the air intake is clear, and then press **Reset** on the rear of the DSTREAM-ST unit to reinitialize the DSTREAM-HT system.

5.4 Arm Development Studio invalid trace

Invalid trace errors for Arm® Development Studio might not cause a red LED error on the HSSTP probe.

Badly ordered data

If Arm Development Studio receives data in an incorrect order, it reports an `Invalid trace` error.

Indicated by: Arm Development Studio warning only.

Solution

Enable the HSSTP probe to reorder the data using the `HSSTP_NDALT` debug configuration setting in Arm Development Studio.

If this does not resolve the issue, contact Arm support.

Related information
HSSTP probe LED errors on page 34
Host Link issues on page 35
Restore a DSTREAM-HT system on page 37

5.5 Restore a DSTREAM-HT system

If there are any problems with the DSTREAM-HT system, and the other troubleshooting sections did not help or do not apply, you can restore your DSTREAM-HT system back to its factory settings using the recovery mode for the DSTREAM-ST unit.

Before you begin

- Connect and power-up the DSTREAM-HT system. For more information on how to connect and power-up the DSTREAM-HT system, see Connect and power up the DSTREAM-HT system

- Attempt a soft reset of your DSTREAM-HT system, by pressing the **Reset** button on the rear of the DSTREAM-ST unit, before running a full restore of the system.

- Debug hardware drivers are provided with Arm® Development Studio. You must have Arm Development Studio installed on your PC to access the drivers. For more information on installing Arm Development Studio, see the Arm Development Studio Getting Started Guide.

Procedure

1. Press and hold the reset button on the DSTREAM-ST unit for approximately 10 seconds.
2. When the **STATUS** LED flashes red, release the button.
   Both the DSTREAM-ST unit and the HSSTP probe erase their existing firmware within their internal flash, and replaces it with the original factory-installed version.

   > **Note** When in recovery mode, debug and trace operations are not enabled.

Results

After the recovery process is complete, the DSTREAM-ST unit automatically reboots with its factory settings.

If a restore fails, contact Arm support.

Next steps

- You must perform a firmware update to restore full functionality.

  To update the firmware to the latest version, see Update the DSTREAM-HT system firmware.

  > **Note** To use the HSSTP probe, your DSTREAM-ST must have firmware version 5.4 or later, installed.

- Connect and power up the DSTREAM-HT system
- Work with your DSTREAM-HT

Related information

5.6 Remotely restart a DSTREAM-HT system

Describes how to remotely restart a DSTREAM-HT system.

Remote restart is not supported by Arm Development Studio

Arm® Development Studio does not currently have a feature to remotely restart a DSTREAM-HT system, however, a workaround is available.

Workaround

To restart your DSTREAM-HT system, update the firmware. At the end of a firmware update, the DSTREAM-HT system restarts.

To update the firmware of a DSTREAM-HT system, either use:

- The Arm Development Studio IDE. For instructions, see Update the DSTREAM-HT system firmware.

- The `dbghw_batchupdater` utility on the command line. For instructions, see the Updating multiple debug hardware units topic in the Arm Development Studio User Guide.