



DSTREAM-PT

Version 1.0

Getting Started Guide

Non-Confidential

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DSTREAM-PT

Getting Started Guide

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Release information

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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

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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).



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

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1. Introduction

Describes the DSTREAM-PT 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 |
|--|--|
| <i>italic</i> | 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: <pre>MRC p15, 0, <Rd>, <CRn>, <CRm>, <Opcode_2></pre> |
| SMALL CAPITALS | Terms that have specific technical meanings as defined in the <i>Arm® Glossary</i> . 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-PT System and Interface Design Reference Guide | 101714 | 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 |

| Non-Arm resources | Documentation | Organization |
|--------------------------------|--------------------------------|--------------|
| Samtec website | Samtec website | Samtec |

1.3 Other information

See the Arm website for other relevant information.

- [Arm® Developer](#).
- [Arm® Documentation](#).

- [Technical Support](#).
- [Arm® Glossary](#).

2. The DSTREAM-PT system

DSTREAM-PT 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-PT 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-PT also enables the collection of up to 32-bit wide CoreSight™-compliant parallel trace for powerful code optimization.

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

- Debug on Arm processors from Armv4 to Armv8, and CoreSight trace.
- 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.
- Flexible DDR trace clock timing of up to 300MHz (600Mbits/s, per pin).
- Up to 32-bit parallel trace support (up to 19.2Gbps maximum trace bandwidth).
- 8GB of trace memory storage on the Parallel Trace probe.
- Real-time dynamic monitoring, to automatically calibrate trace sampling between clock edges.
- 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-PT 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 term Parallel Trace refers only to the Parallel Trace probe.
- The terms DSTREAM-PT or DSTREAM-PT system refer to both the DSTREAM-ST unit and Parallel Trace probe working in combination.

This chapter describes the DSTREAM-PT hardware.

2.1 Buy Arm DSTREAM-PT

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

You can [contact them](#) to buy DSTREAM-PT.

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.

Related information

[Arm DSTREAM-PT box contents](#) on page 12

2.2 Arm DSTREAM-PT box contents

The DSTREAM-PT 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



- Parallel Trace probe.

Figure 2-2: Parallel Trace (PT) probe



- Power supply unit and associated cables.

Figure 2-3: DSTREAM-PT 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

- MIPI 60-way co-axial ribbon cable.

Figure 2-8: MIPI 60-way co-axial ribbon cable

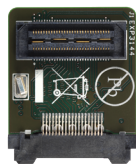
- JTAG 14-way Texas Instruments adapter.

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

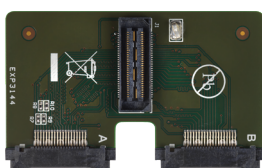
- MICTOR 38-way 4-bit adapter.

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

- MICTOR 38-way 16-bit adapter.

Figure 2-11: MICTOR 38-way 16-bit adapter

- MICTOR 38-way 32-bit adapter.

Figure 2-12: MICTOR 38-way 32-bit adapter

- CoreSight 20-way adapter.

Figure 2-13: CoreSight 20-way adapter

- Ethernet cable.

(Not pictured)

- USB 3.0 cable.

(Not pictured)

Related information

[Buy Arm DSTREAM-PT](#) on page 11

[Connect and power up the DSTREAM-PT system](#) on page 26

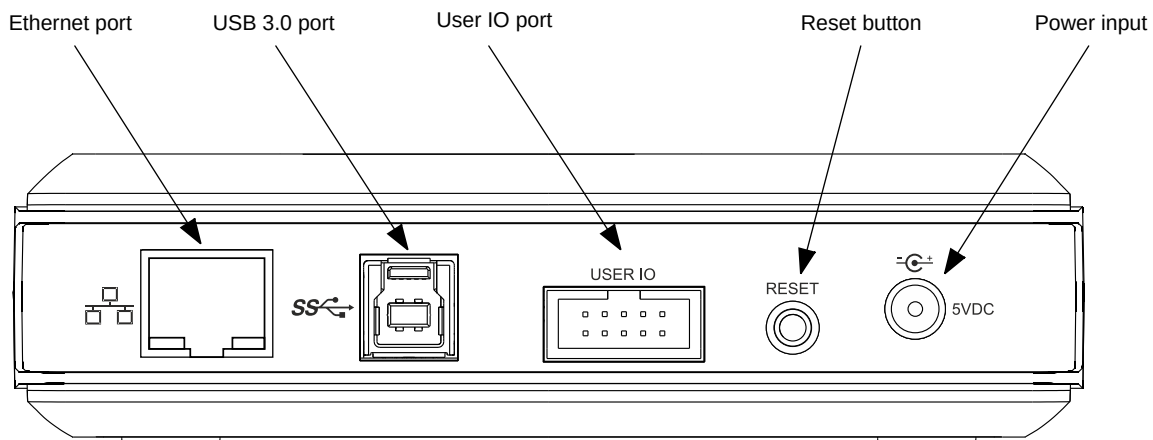
2.3 The DSTREAM-ST unit

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 2-14: 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 will revert 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-PT System and Interface Design Reference Guide](#) for more details.

RESET Button



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 will also reset any attached probes.



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.

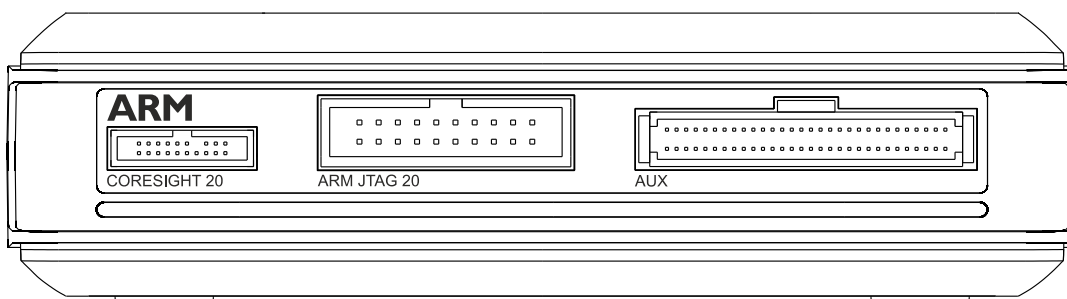


When using DSTREAM-ST with the Parallel Trace probe, you must use the dual power cable provided with the power supply unit.

Front

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

Figure 2-15: 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.



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 Parallel Trace 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.



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

Optional adapters

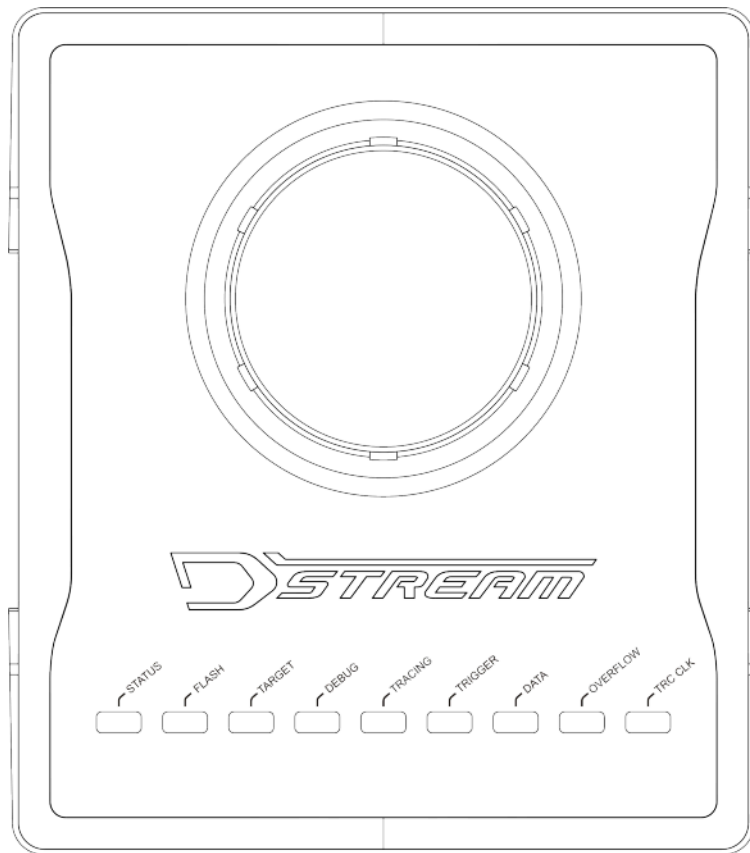
The following adapters are also available for use with DSTREAM-ST. Each of these allows DSTREAM-ST to capture up to 4-bit wide ETM trace and also allow the use of separate debug and trace power domains.

- **MIPI-34 adapter** - This adapter connects directly to the front panel of DSTREAM-ST and 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 2-16: 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-PT 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 aligns with the trace data stream on detection of a full synchronization packet.

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

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

[The Parallel Trace probe](#) on page 20

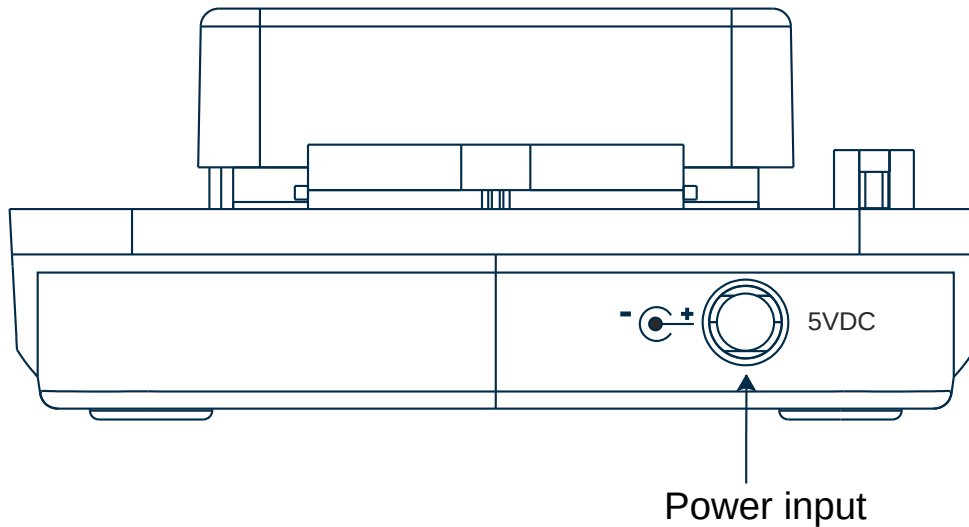
[Connect and power up the DSTREAM-PT system](#) on page 26

2.4 The Parallel Trace probe

The Parallel Trace probe provides the hardware interface to connect the DSTREAM-ST unit to the parallel trace port of your target.

Rear

Figure 2-17: Rear of Parallel Trace probe

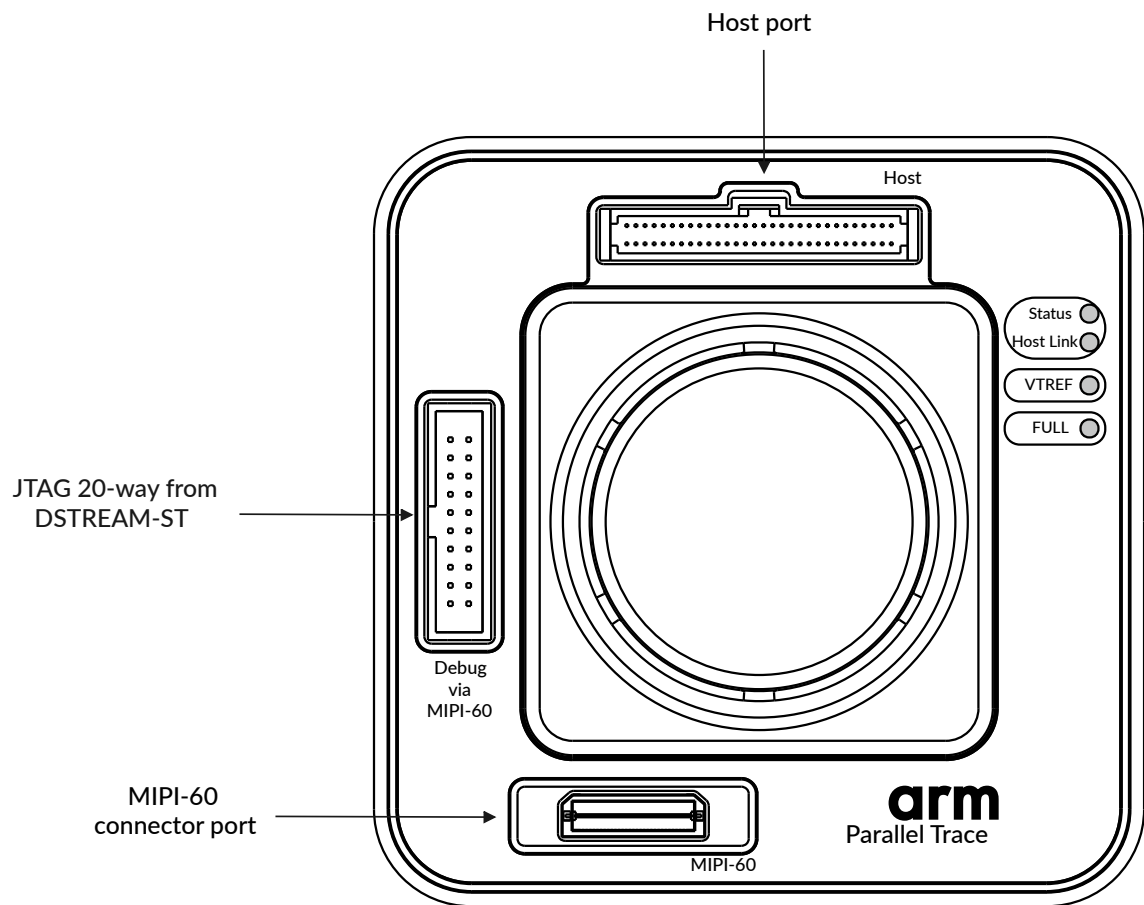


Power input

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

Top

The top of the Parallel Trace probe has ports for connecting to a DSTREAM-ST unit and to a target.

Figure 2-18: Top of Parallel Trace probe**Host port**

Connects to the DSTREAM-ST unit using a 60-way ribbon cable. The **host port** also controls the Parallel Trace probe and retrieves trace data from it.

Debug via MIPI-60 port

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 Parallel Trace probe, unused.

MIPI-60 port

Connects to the target trace connector via a MIPI-60 co-axial ribbon cable.



The MIPI-60 cable is a Samtec HQCD-030-12.00-TEU-SEU-1. For physical and electrical data, see the [Samtec website](#).

Adapters

Included with DSTREAM-PT are:

- **CoreSight adapter** - This plugs directly into the MIPI-60 port of the Parallel Trace probe and is used together with the CoreSight™ 20-way cable.
- **MICTOR 16-Bit adapter** - This plugs directly into the target board and is used together with the MIPI-60 cable.
- **MICTOR 32-Bit adapter** - This plugs directly into the target board and is used together with the MIPI-60 cable. Refer to the [Arm DSTREAM-PT System and Interface Design Reference Guide](#) for further information about requirements for using dual MICTOR sockets.

Indicator LEDs

When you power up the Parallel Trace probe, various 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.



If the **Status** LED remains red, the Parallel Trace probe has failed to boot. Ensure your DSTREAM-ST firmware is version 5.0.0, or later. For more information on updating the DSTREAM-ST firmware, see [Update the DSTREAM-PT 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-PT 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.



If the **Host Link** LED does not flash blue, or continues to only flash blue, see [Host Link issues](#)

VTREF

Illuminates green when a valid **VTREF** or **TRACE_VTREF** signal is detected.



- If debug and trace use the same power domain, it is referred to as **VTREF**.
- If debug and trace use separate trace and debug power domains, **TRACE_VTREF** and **DEBUG_VTREF** are referred to separately.
- The **TARGET** LED on the DSTREAM-ST unit indicates the state of **DEBUG_VTREF** for targets which use separate debug and trace power domains.

For more information about Target Voltage Reference (**VTREF**) signals, see [Target Voltage Reference signals](#) in the Arm® DSTREAM-PT System and Interface Design Reference Guide.

Full

Illuminates green to indicates that the trace buffer is full.

Related information

[The DSTREAM-ST unit](#) on page 15

[Connect and power up the DSTREAM-PT system](#) on page 26

3. Set up your DSTREAM-PT

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

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

To use the DSTREAM-PT system with a USB connection, install the USB device drivers for your operating system. The USB drivers for the DSTREAM-PT 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.



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-PT system](#) on page 26

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

To use the DSTREAM-PT system with a USB connection, install the USB device drivers for your operating system. The USB drivers for the DSTREAM-PT 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-PT system](#) on page 26

3.3 Connect and power up the DSTREAM-PT system

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

Before you begin

- You must have [installed Arm Development Studio](#) to access the software drivers and debug hardware configuration utilities.
- Your target hardware must have a debug connector supported by DSTREAM-PT. For a list of supported connectors, see [Target interface connectors](#) the Arm® DSTREAM-PT System and Interface Design Reference Guide.
- You must have the following items from the [Arm DSTREAM-PT box contents](#):
 - The DSTREAM-ST unit.
 - The Parallel Trace 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-PT to the target hardware, you need a target-compatible cable. For a list of supplied cables, see [Arm DSTREAM-PT box contents](#).



Caution

- If DSTREAM-PT 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-PT 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-PT. For supported pinout information, see the [Arm DSTREAM-PT System and Interface Design Reference Guide](#).

Procedure

1. Connect the DSTREAM-ST unit, the Parallel Trace probe, and the power supply unit:
 - a) Connect the DSTREAM-ST unit and the Parallel Trace 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 Parallel Trace 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 Parallel Trace probe.

- c) Attach the Power Supply Unit (PSU) to the PSU-adaptor 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-PT system on Windows](#) or [Install the USB drivers for the DSTREAM-PT 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-PT system.

When you power up the DSTREAM-ST unit and Parallel Trace probe, both units follow a boot sequence. The LEDs identify the progress of the boot sequence. For more information, see [DSTREAM-PT system boot sequence](#).



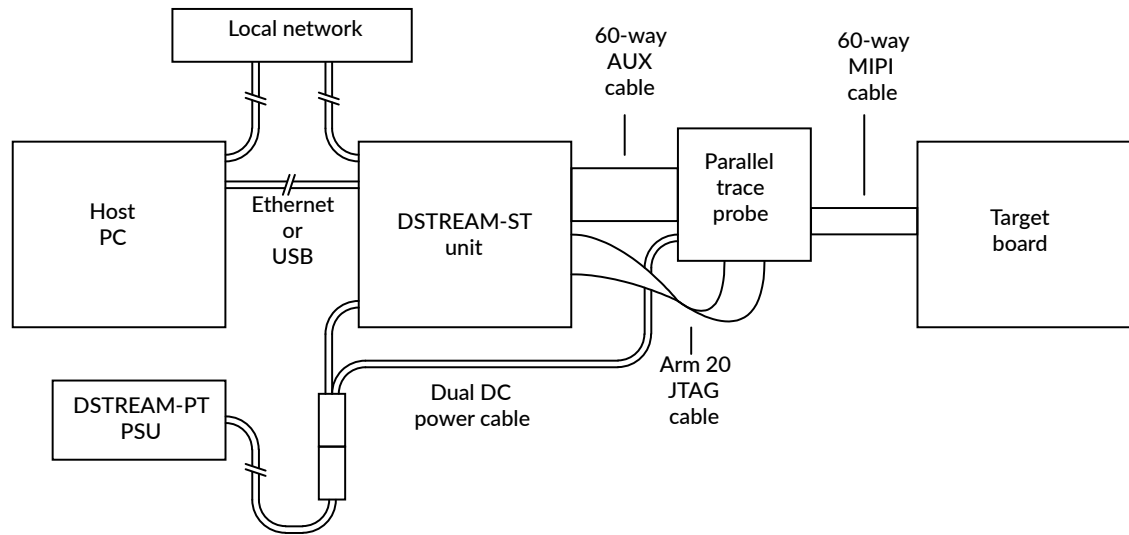
- Arm recommends that both the DSTREAM-ST unit and Parallel Trace probe are powered-up simultaneously. Powering simultaneously ensures that the DSTREAM-ST unit correctly detects the Parallel Trace probe during its boot sequence.
- If you need to reset the DSTREAM-PT system, press the reset button on the rear of the DSTREAM-ST unit. When a DSTREAM-ST unit is connected in a DSTREAM-PT system, the reset button on the DSTREAM-ST unit re-initializes both the DSTREAM-ST unit and the Parallel Trace 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.

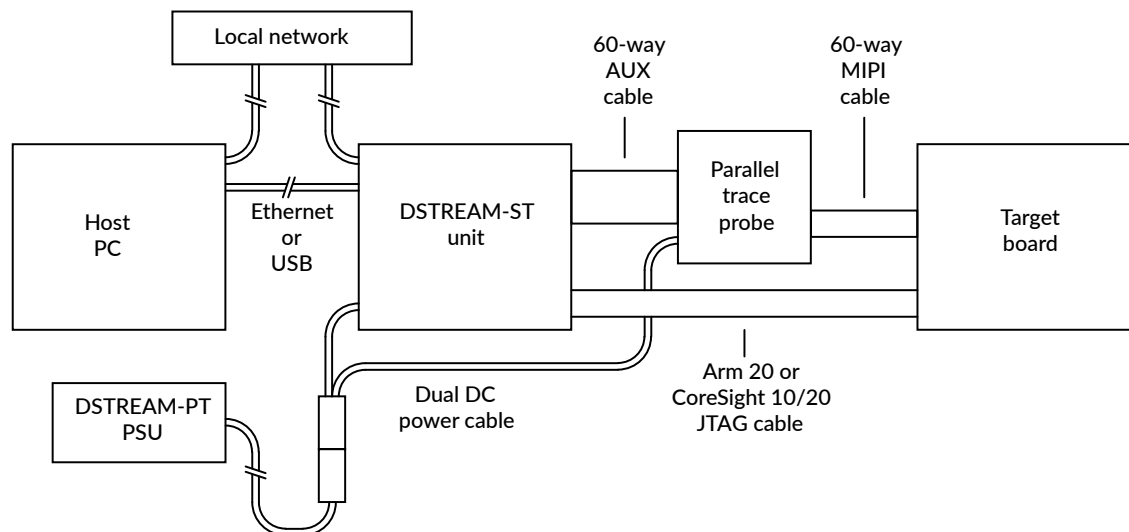


You can also use the **Debug Hardware Configure IP** view to assign a name for the DSTREAM-ST unit. For more information, see the Arm Development Studio documentation for [Debug Hardware Configure IP view](#).

5. Connect the DSTREAM-PT 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-PT System and Interface Design Reference Guide.
 - If your target has debug and trace on a single connector, connect the Parallel Trace probe to the target using the 60-way MIPI cable and the appropriate adapter:

Figure 3-1: DSTREAM-PT connection.

- If your target has separate debug and trace connectors, connect the DSTREAM-PT system with the debug cable bypassing the Parallel Trace probe:
 - a. Connect the Parallel Trace probe to the target using the 60-way MIPI cable and appropriate adapter.
 - b. Connect the DSTREAM-ST unit to the target using the appropriate JTAG or CoreSight™ ribbon cable.

Figure 3-2: DSTREAM-PT debug bypass connection.

6. Power up the target hardware.



Note

- When the DSTREAM-PT 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 Parallel Trace probe overheats, it enters a low-power mode and all of its LEDs flash red.
- To re-initialize the DSTREAM-PT system, press the reset button on the rear of the DSTREAM-ST unit.

Next steps

- If this is the first time you connect and power-up your DSTREAM-PT system, you must [Update the DSTREAM-PT system firmware](#).
- [Work with your DSTREAM-PT](#)

Related information

[DSTREAM-PT system boot sequence](#) on page 30

3.4 DSTREAM-PT system boot sequence

When you power up the DSTREAM-PT 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 Parallel Trace probe illuminates RED.
2. The **FLASH** LED of the DSTREAM-ST unit flashes as it loads its firmware.
3. The **STATUS** LED of the Parallel Trace 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 Parallel Trace probe flashes blue, and then illuminates green to indicate that the units have successfully linked.
6. If the target is connected to the DSTREAM-PT system and powered, the **TARGET** LED on the DSTREAM-ST unit and the **VTREF** LED on the Parallel Trace probe illuminate green.

The DSTREAM-PT unit is now ready for use.



Note

If your DSTREAM-PT system boot sequence does not follow this sequence, see [Troubleshooting](#).

Related information

[Connect and power up the DSTREAM-PT system](#) on page 26

[Restore a DSTREAM-PT system](#) on page 37

3.5 Update the DSTREAM-PT system firmware

The DSTREAM-PT system firmware provided with Arm® Development Studio 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 Parallel Trace 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-PT system so the firmware on both the DSTREAM-ST unit and Parallel Trace probe is updated simultaneously. For more information, see [Connect and power up the DSTREAM-PT system](#).
- You must also ensure that the current DSTREAM-PT system firmware is at least the minimum version required by Arm Development Studio.



Note

You must have firmware version 5.0.0, or later, installed for the Parallel Trace probe to be detected.

If earlier firmware is installed, the DSTREAM-ST unit does not function as part of a DSTREAM-PT system. Instead, the DSTREAM-ST unit functions only as a DSTREAM-ST unit and is limited to 4-bit streaming trace.

Procedure

- Open the [Debug Hardware Firmware Installer view](#) from the main menu in Arm Development Studio, select **Window > Show View > Debug Hardware Firmware Installer**.
- 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. Accept the auto-selected firmware update file, or browse and select a different firmware update file. Either:
 - 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 Parallel Trace probe.

Related information

[Connect and power up the DSTREAM-PT system](#) on page 26

4. Work with your DSTREAM-PT

Arm® DSTREAM-PT 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-PT to work with your targets.

4.1 Debug software for DSTREAM-PT

The development software on your host PC provides the interface between your debugger and the DSTREAM-PT 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-PT, 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-PT 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-PT 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-PT system on Linux](#) on page 25

[Install the USB drivers for the DSTREAM-PT system on Windows](#) on page 25

4.2 Hot-plug the debug cable

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



If the DSTREAM-PT 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-PT 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



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-PT System and Interface Design Reference Guide.

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

1. Power up the DSTREAM-PT system. Allow the DSTREAM-ST and Parallel Trace probe to boot up.
2. 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-PT system. Otherwise, if the DSTREAM-PT 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-PT system to a target. For more information on TAP resets, see [Reset signals](#).

Related information

[Connect and power up the DSTREAM-PT system](#) on page 26

5. Troubleshooting

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

For information about troubleshooting your DSTREAM-PT system when you are collecting Trace data, see the [Troubleshooting DSTREAM-PT Trace tutorial](#) on the Arm Developer web site.

5.1 Host Link issues

During the DSTREAM-PT system boot sequence, the LEDs identify the progress of the boot sequence. On the Parallel Trace 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 Parallel Trace probe factory firmware version requires updating.
- The flash memory on the Parallel Trace 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 Parallel Trace 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-PT 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-PT system. For more information, see [Restore a DSTREAM-PT 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 Parallel Trace 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-PT 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-PT system. For more information, see [Restore a DSTREAM-PT system](#).

Related information

[The Parallel Trace probe](#) on page 20

[Arm DSTREAM-PT box contents](#) on page 12

[DSTREAM-PT system boot sequence](#) on page 30

5.2 DSTREAM-PT overheats

The air intakes on the top of both the DSTREAM-ST unit and Parallel Trace probe, in a powered-up DSTREAM-PT 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 Parallel Trace probe becomes blocked and the Parallel Trace probe overheats, it enters a low-power mode and all of its LEDs flash red.

Solution

Ensure the air intake on the top of the DSTREAM-PT unit is clear of any blockage.

To re-initialize the DSTREAM-PT system, press the reset button on the rear of the DSTREAM-ST unit.

5.3 Restore a DSTREAM-PT system

If there are any problems with the DSTREAM-PT system, you can restore it back to its factory settings using the recovery mode for the DSTREAM-ST unit.

Before you begin

- Connect and power-up the DSTREAM-PT system. For more information on how to connect and power-up the DSTREAM-PT system, see [Connect and power up the DSTREAM-PT system](#).
- Attempt a reset of your DSTREAM-PT system 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](#).

About this task

You might need to perform a factory reset if you have any of the following problems:

- Your DSTREAM-ST unit does not boot correctly.
- You cannot browse for your DSTREAM-ST unit as a connection target.
- The LEDs on your DSTREAM-ST unit indicate unstable behaviour during debug activity.
- Your DSTREAM-ST unit performs unexpectedly during debug activity. For example, the unit loses a connection that previously worked. If the target connection works with a different DSTREAM or debug probe, try a factory reset.

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 Parallel Trace probe erase their existing firmware within their internal flash, and replaces it with the original factory-installed version.



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 your DSTREAM-ST unit continues to display unexpected behaviour or gets stuck in the reboot process, 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-PT system firmware](#).



To use the Parallel Trace probe, your DSTREAM-ST must have firmware version 5.0.0, or later, installed.

- [Connect and power up the DSTREAM-PT system](#)
- [Work with your DSTREAM-PT](#)

5.4 Remotely restarting a DSTREAM-PT system

There are multiple ways to remotely restart a DSTREAM-PT system.

You can:

- Use the DSTREAM dashboard.

To use the DSTREAM dashboard, simply enter the IP address or host-name of your DSTREAM-ST unit into a web browser. This then shows the dashboard for your DSTREAM-ST unit which provides various low-level status information and also provides a *Restart DSTREAM-ST* button.



For further information about the DSTREAM dashboard, see the [DSTREAM dashboard](#) topic in the Arm® Development Studio User Guide.

-
- Use the Arm Development Studio [Debug Hardware Configure IP](#) view.
 - Update the firmware of your DSTREAM-PT system. At the end of a firmware update, the DSTREAM-PT system restarts.

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

- The Arm Development Studio IDE. For instructions, see [Update the DSTREAM-PT 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.