

# Arm<sup>®</sup> DSTREAM-PT

Version 1.0

## Getting Started Guide

The logo for Arm, consisting of the lowercase letters 'arm' in a bold, sans-serif font.

**Arm® DSTREAM-PT****Getting Started Guide**

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**Release Information****Document History**

Issue	Date	Confidentiality	Change
0100-00	05 April 2019	Non-Confidential	First release
0100-01	18 April 2019	Non-Confidential	Document update to add the Conformance Notices.

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**Product Status**

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

**Web Address**

<http://www.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 Declaration of Conformity**

The system should be powered down when not in use.

It is recommended that ESD precautions be taken when handling DSTREAM-PT equipment.

The DSTREAM-PT modules generate, use, and can radiate radio frequency energy and may cause harmful interference to radio communications. There is no guarantee that interference will not occur in a particular installation. If this equipment causes harmful interference to radio reception, which can be determined by turning the equipment off or on, you are encouraged to try to correct the interference by one or more of the following measures:

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

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**Note**

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It is recommended that wherever possible shielded interface cables be used.

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# Preface

This preface introduces the *Arm® DSTREAM-PT Getting Started Guide*.

It contains the following:

- [About this book on page 7.](#)

## About this book

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

## Using this book

This book is organized into the following chapters:

### Chapter 1 Introduction

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.

### Chapter 2 Set up your DSTREAM-PT

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

### Chapter 3 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.

### Chapter 4 Troubleshooting

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

## Glossary

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

See the *Arm® Glossary* for more information.

## Typographic conventions

### *italic*

Introduces special terminology, denotes cross-references, and citations.

### **bold**

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

### monospace

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

### monospace

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

### *monospace italic*

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

### **monospace bold**

Denotes language keywords when used outside example code.

### <and>

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

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

SMALL CAPITALS

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

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- The product revision or version.
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- The number 101713\_0100\_01\_en.
- If applicable, the page number(s) to which your comments refer.
- A concise explanation of your comments.

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## Other information

- *Arm® Developer*.
- *Arm® Information Center*.
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- *Technical Support*.
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# Chapter 1

## Introduction

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.

It contains the following sections:

- [1.1 Buy Arm® DSTREAM-PT on page 1-11.](#)
- [1.2 Arm® DSTREAM-PT box contents on page 1-12.](#)
- [1.3 The DSTREAM-ST unit on page 1-15.](#)
- [1.4 The Parallel Trace probe on page 1-19.](#)

## 1.1 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 concepts*

[1.2 Arm® DSTREAM-PT box contents](#) on page 1-12

## 1.2 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 1-1 DSTREAM-ST unit

- Parallel Trace probe.



Figure 1-2 Parallel Trace (PT) probe

- Power supply unit and associated cables.



Figure 1-3 DSTREAM-PT power supply and cables

- 60-way Auxiliary (AUX) host port cable



Figure 1-4 60-way Auxiliary (AUX) host port cable

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



**Figure 1-5 CoreSight 10/20-way 0.05" pitch ribbon cable**

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



**Figure 1-6 CoreSight Short 20-way 0.05" pitch ribbon cable**

- JTAG 20-way 0.1" pitch ribbon cable.



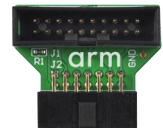
**Figure 1-7 JTAG 20-way 0.1" pitch ribbon cable**

- MIPI 60-way co-axial ribbon cable.



**Figure 1-8 MIPI 60-way co-axial ribbon cable**

- JTAG 14-way Texas Instruments adapter.



**Figure 1-9 JTAG 14-way Texas Instruments adapter**

- MICTOR 38-way 4-bit adapter.



## 1.3 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.

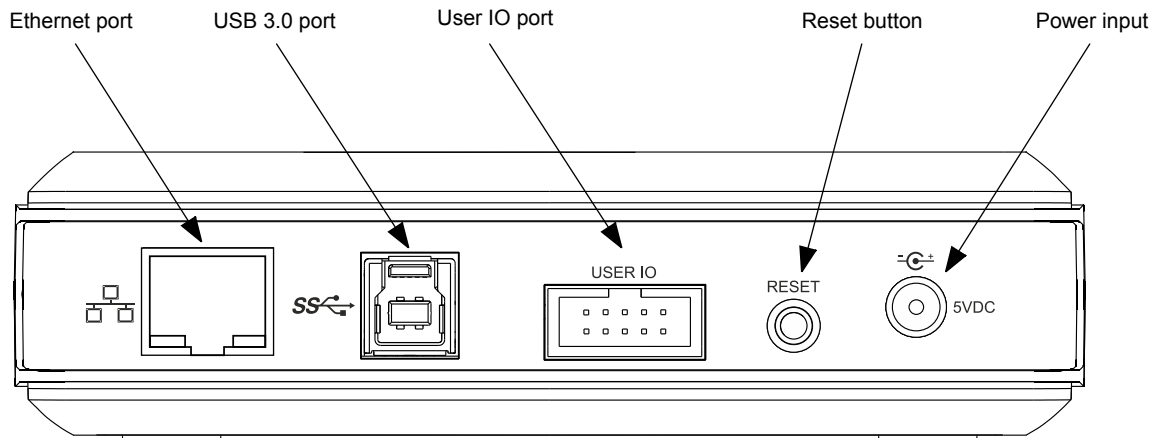


Figure 1-14 Rear of the DSTREAM-ST unit

### 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

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.

### Warning

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.

### 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 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.

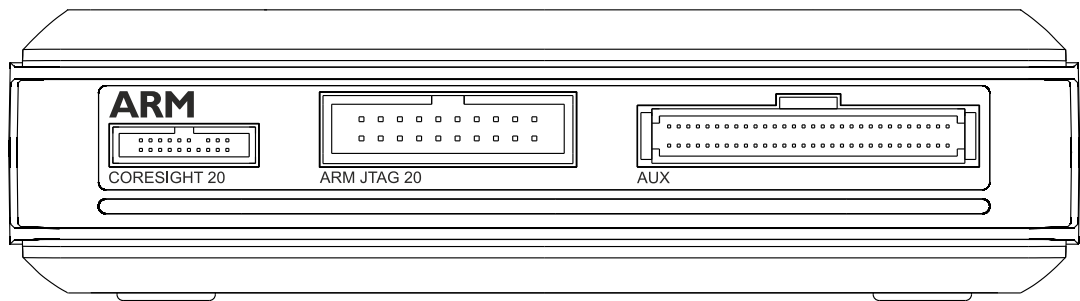


Figure 1-15 Front of the DSTREAM-ST unit.

## 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.

### 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 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.

————— **Note** —————

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

### Optional adapters

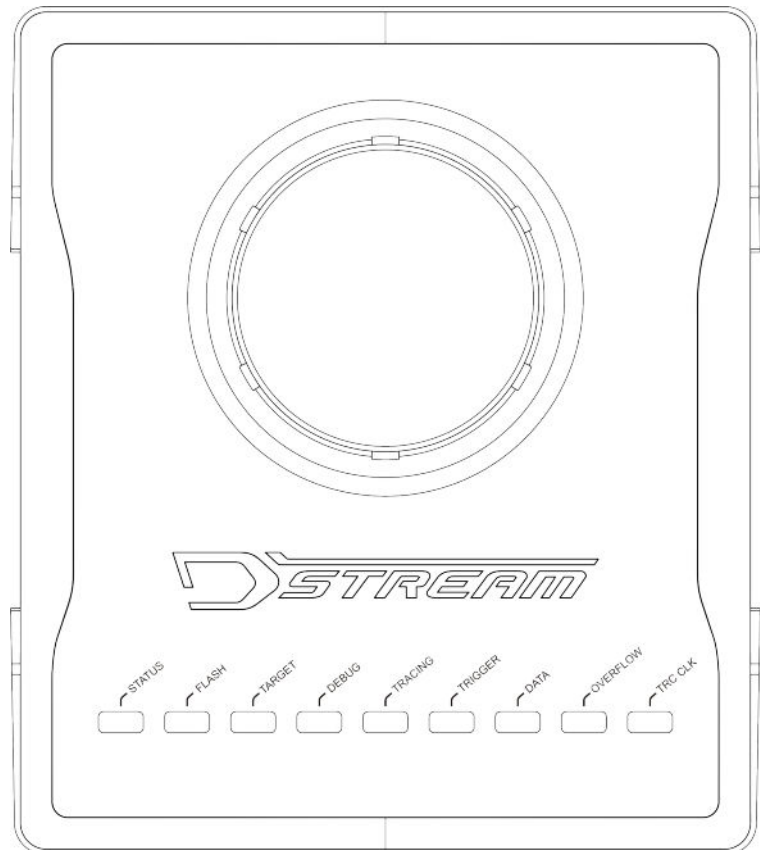
The following adapters are also available for use with DSTREAM-ST. Each of these allows DSTREAM-ST to capture up to 4-bit wide ETM trace and also allow the use of separate debug and trace power domains.

- **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 1-16** 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 press the **Identify** button in any of the debug hardware tools provided with 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 on page 4-38](#).

## **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 concepts*

[1.4 The Parallel Trace probe on page 1-19](#)

### *Related tasks*

[2.3 Connect and power up the DSTREAM-PT system on page 2-26](#)

## 1.4 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

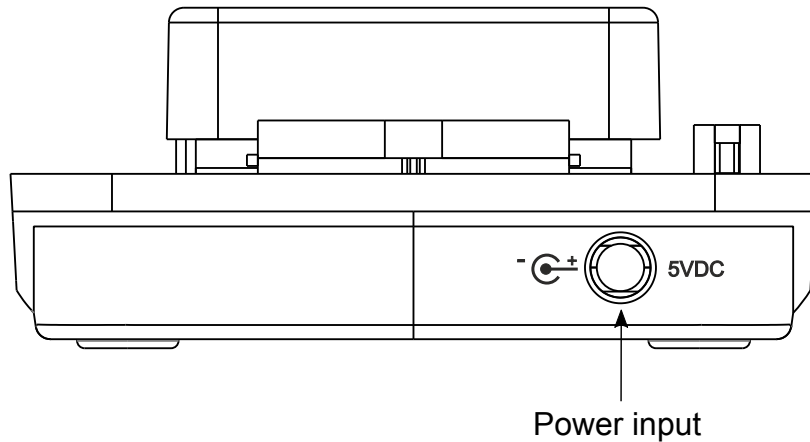


Figure 1-17 Rear of Parallel Trace probe

### 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.

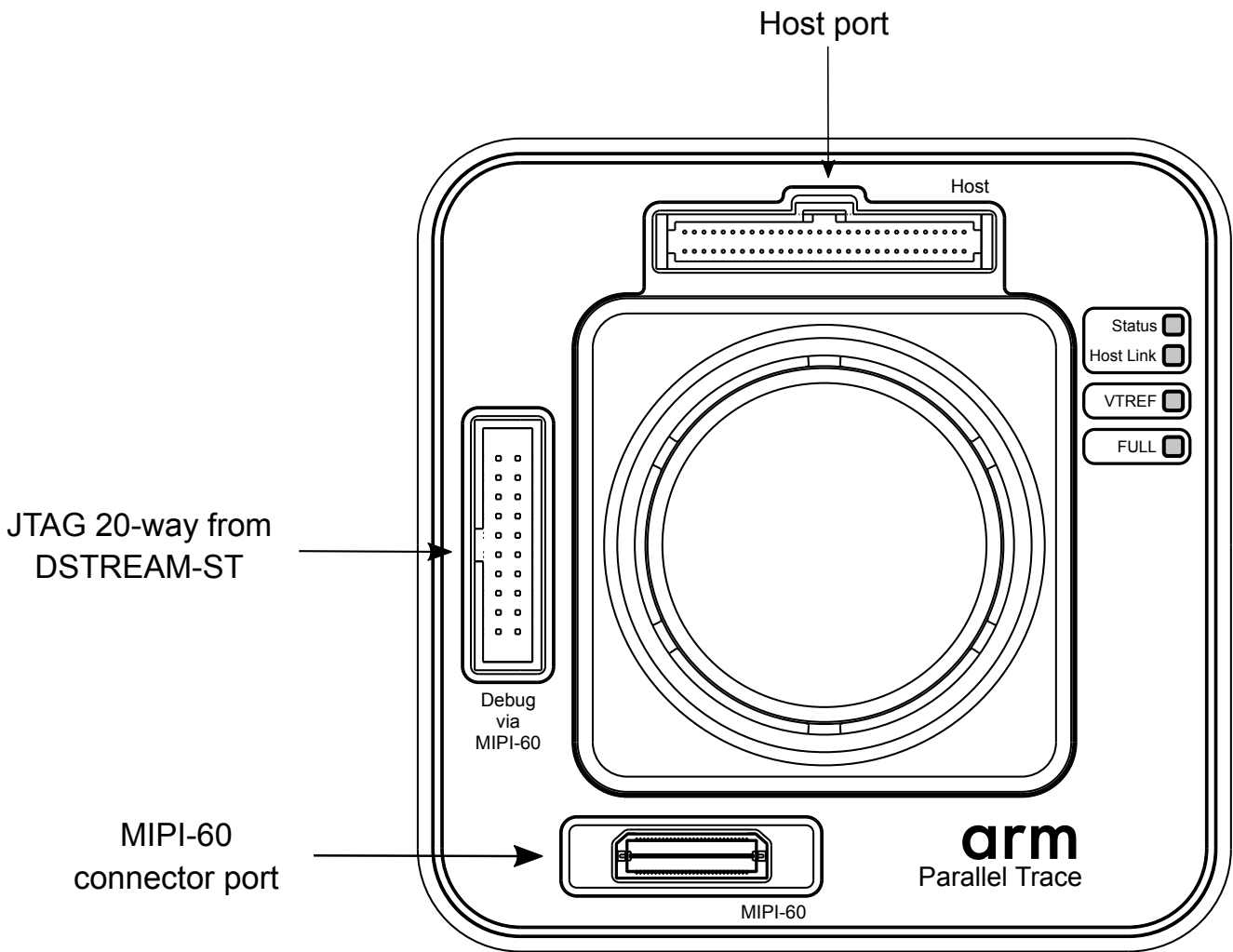


Figure 1-18 Top of Parallel Trace probe

### 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.

————— **Note** —————

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.

#### Note

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 on page 2-31](#). 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 on page 4-38](#).

### 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 on page 4-36](#)

### VTREF

Illuminates green when a valid **VTREF** or **TRACE\_VTREF** signal is detected.

#### Note

- 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 \(VTREF\) signals](#) in the Arm DSTREAM-PT System and Interface Design Reference Guide.

### Full

Illuminates green to indicates that the trace buffer is full.

***Related concepts***

*1.3 The DSTREAM-ST unit on page 1-15*

***Related tasks***

*2.3 Connect and power up the DSTREAM-PT system on page 2-26*

# Chapter 2

## Set up your DSTREAM-PT

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

It contains the following sections:

- [2.1 Install the USB drivers for the DSTREAM-PT system on Windows](#) on page 2-24.
- [2.2 Install the USB drivers for the DSTREAM-PT system on Linux](#) on page 2-25.
- [2.3 Connect and power up the DSTREAM-PT system](#) on page 2-26.
- [2.4 DSTREAM-PT system boot sequence](#) on page 2-30.
- [2.5 Update the DSTREAM-PT system firmware](#) on page 2-31.

## 2.1 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.

The drivers for the DSTREAM-PT system are optionally installed as part of the installation process for Arm Development Studio. If you have skipped the driver install process in Arm Development Studio, follow these steps to install them.

### Prerequisites

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**.

The USB drivers are now installed on your PC.

### Related tasks

[2.3 Connect and power up the DSTREAM-PT system on page 2-26](#)



## 2.2 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.

The drivers for the DSTREAM-PT system are optionally installed as part of the installation process for Arm Development Studio. If you have skipped the driver install process in Arm Development Studio, follow these steps to install them.

### Prerequisites

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`.

The USB drivers are now installed on your PC.

### Related tasks

[2.3 Connect and power up the DSTREAM-PT system on page 2-26](#)

## 2.3 Connect and power up the DSTREAM-PT system

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

### Prerequisites

- 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* on page 1-12:
  - 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* on page 1-12.

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### Warning

- 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.
  - Ensure the target connector has a compatible pinout before use. Incorrect connections might damage the debug or target hardware.
- 

### 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.

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- 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-PT system on Windows* on page 2-24 or *Install the USB drivers for the DSTREAM-PT system on Linux* on page 2-25.

---

- 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 on page 2-30](#).

---

**Note**

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](#).

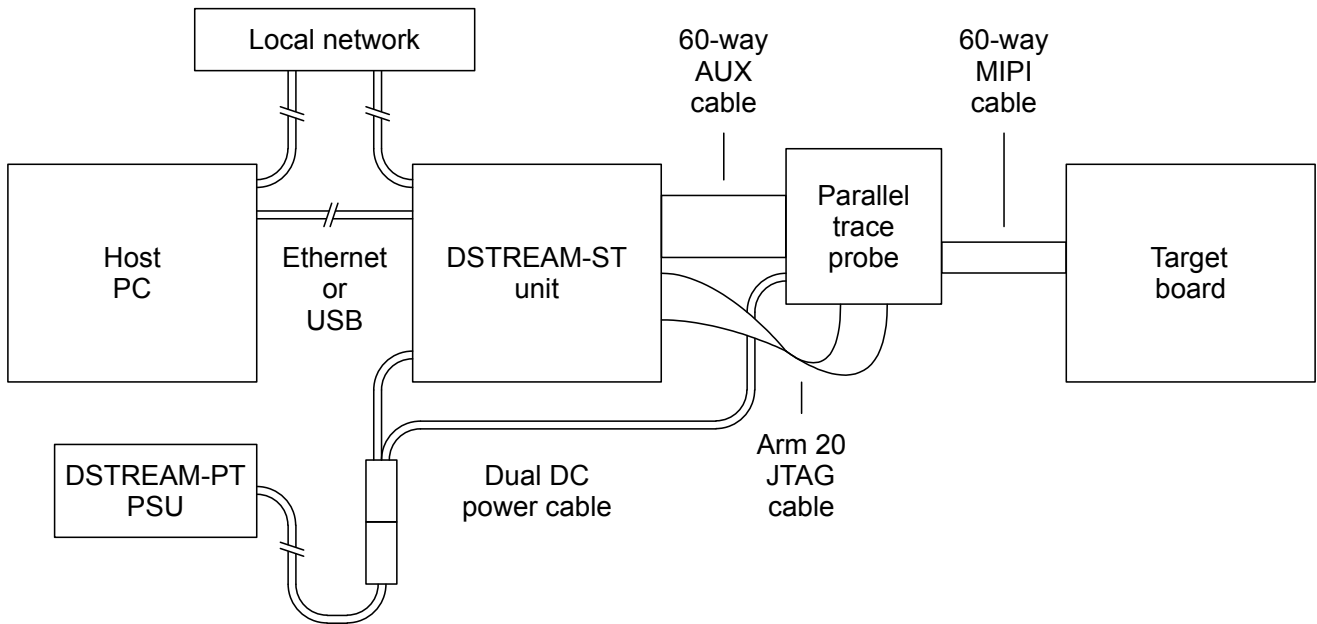
5. Connect the DSTREAM-PT system to the target hardware. Use the appropriate cables and adapters for the target debug and trace connector (or connectors). Some targets have debug and trace on a single connector, and some targets split them between two connectors. Each connector, and the appropriate cable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

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**Warning**

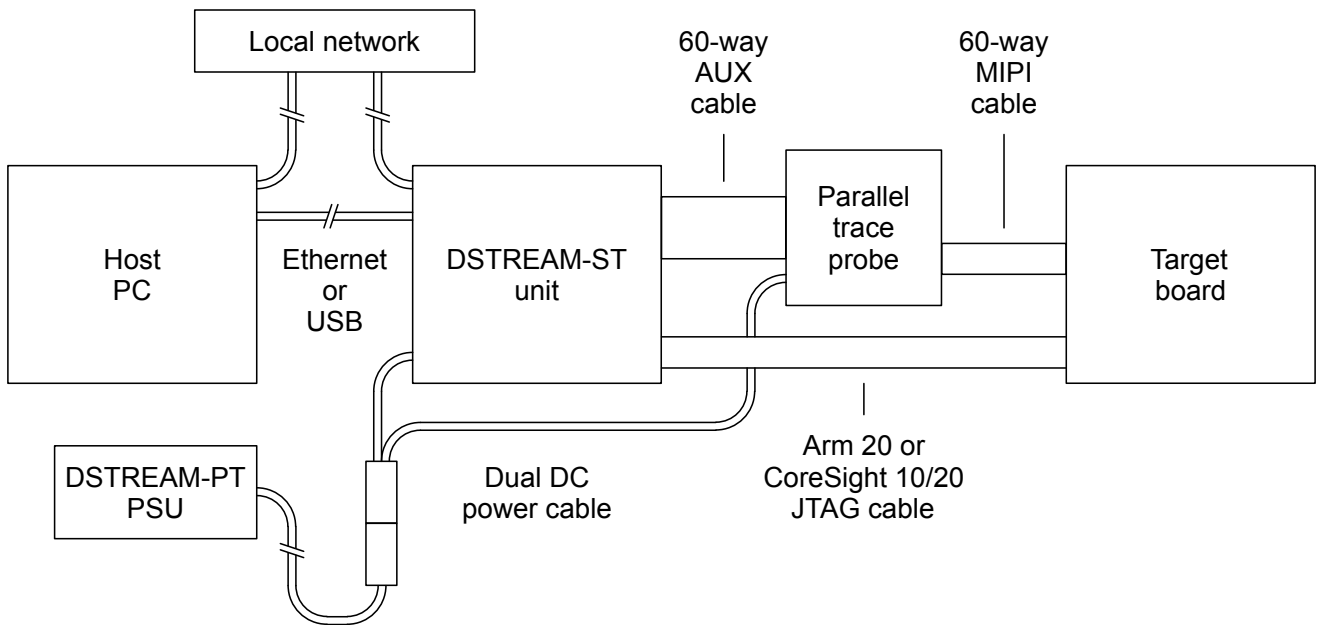
When connecting the DSTREAM-PT system to target hardware, to avoid damaging the target or debug hardware, ensure that the debug and trace connector (or connectors) on the target use pinouts supported by DSTREAM-PT. For supported pinout information, see the [Arm DSTREAM-PT System and Interface Design Reference Guide](#).

- 
- 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 2-1 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:
  1. Connect the Parallel Trace probe to the target using the 60-way MIPI cable and appropriate adapter.
  2. Connect the DSTREAM-ST unit to the target using the appropriate JTAG or CoreSight ribbon cable.



**Figure 2-2 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](#) on page 2-31.
- [Work with your DSTREAM-PT](#) on page 3-32

**Related concepts**

[1.2 Arm® DSTREAM-PT box contents](#) on page 1-12

[2.4 DSTREAM-PT system boot sequence](#) on page 2-30

## 2.4 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.

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**Note**

If your DSTREAM-PT system boot sequence does not follow this sequence, see [Troubleshooting on page 4-35](#).

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**Related tasks**

[2.3 Connect and power up the DSTREAM-PT system on page 2-26](#)

[4.3 Restore a DSTREAM-PT system on page 4-38](#)

## 2.5 Update the DSTREAM-PT system firmware

The DSTREAM-PT system firmware contains:

- The operating system that runs on the DSTREAM-ST unit.
- Templates that define how the debug hardware communicates with different target devices.
- Configuration files to load into any add-on probe units, such as the Parallel Trace probe.

Firmware updates are supplied with Arm Development Studio.

### Prerequisites

- 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 on page 2-26](#).
- You must ensure that the current DSTREAM-PT system firmware is at least the minimum version required by Arm Development Studio.
- 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/.

————— **Warning** —————

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

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. 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**.

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

### Related tasks

[2.3 Connect and power up the DSTREAM-PT system on page 2-26](#)

# Chapter 3

## 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.

It contains the following sections:

- [3.1 Debug software for DSTREAM-PT on page 3-33.](#)
- [3.2 Hot-plug the debug cable on page 3-34.](#)



## 3.1 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 `<install_directory>/Arm/Development Studio <version>/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 `<install_directory>/Arm/Development Studio <version>/bin/csat.exe`.

### Related tasks

[2.2 Install the USB drivers for the DSTREAM-PT system on Linux on page 2-25](#)

[2.1 Install the USB drivers for the DSTREAM-PT system on Windows on page 2-24](#)

## 3.2 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*.

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.

---

### Note

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.

---

### Hot-plugging: connecting

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.

---

### Warning

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.

---

### 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 DSTREAM-PT to a target. For more information on TAP resets, see [Reset signals](#).

### Related tasks

[2.3 Connect and power up the DSTREAM-PT system on page 2-26](#)

# Chapter 4

## Troubleshooting

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

For more information about troubleshooting and support for your DSTREAM-PT system, see the [Arm DSTREAM-PT web page](#) on the Arm Developer site.

It contains the following sections:

- [4.1 Host Link issues](#) on page 4-36.
- [4.2 DSTREAM-PT overheats](#) on page 4-37.
- [4.3 Restore a DSTREAM-PT system](#) on page 4-38.

## 4.1 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 on page 4-38](#).

### 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 on page 4-38](#).

### Related concepts

[1.4 The Parallel Trace probe on page 1-19](#)

[1.2 Arm® DSTREAM-PT box contents on page 1-12](#)

[2.4 DSTREAM-PT system boot sequence on page 2-30](#)

## 4.2 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 become 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 become blocked and the Parallel Trace probe overheats, it enters a low-power mode and all of its LEDs flash red.

### **Solution**

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

## 4.3 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.

### Prerequisites

- 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 on page 2-26](#)
- 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](#).

### 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.

————— **Note** —————

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

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-PT system firmware on page 2-31](#).

————— **Note** —————

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 on page 2-26](#)
- [Work with your DSTREAM-PT on page 3-32](#)

### Related tasks

[2.5 Update the DSTREAM-PT system firmware on page 2-31](#)