DSTREAM-XT

Version 1.0

Getting Started Guide

Issue 02
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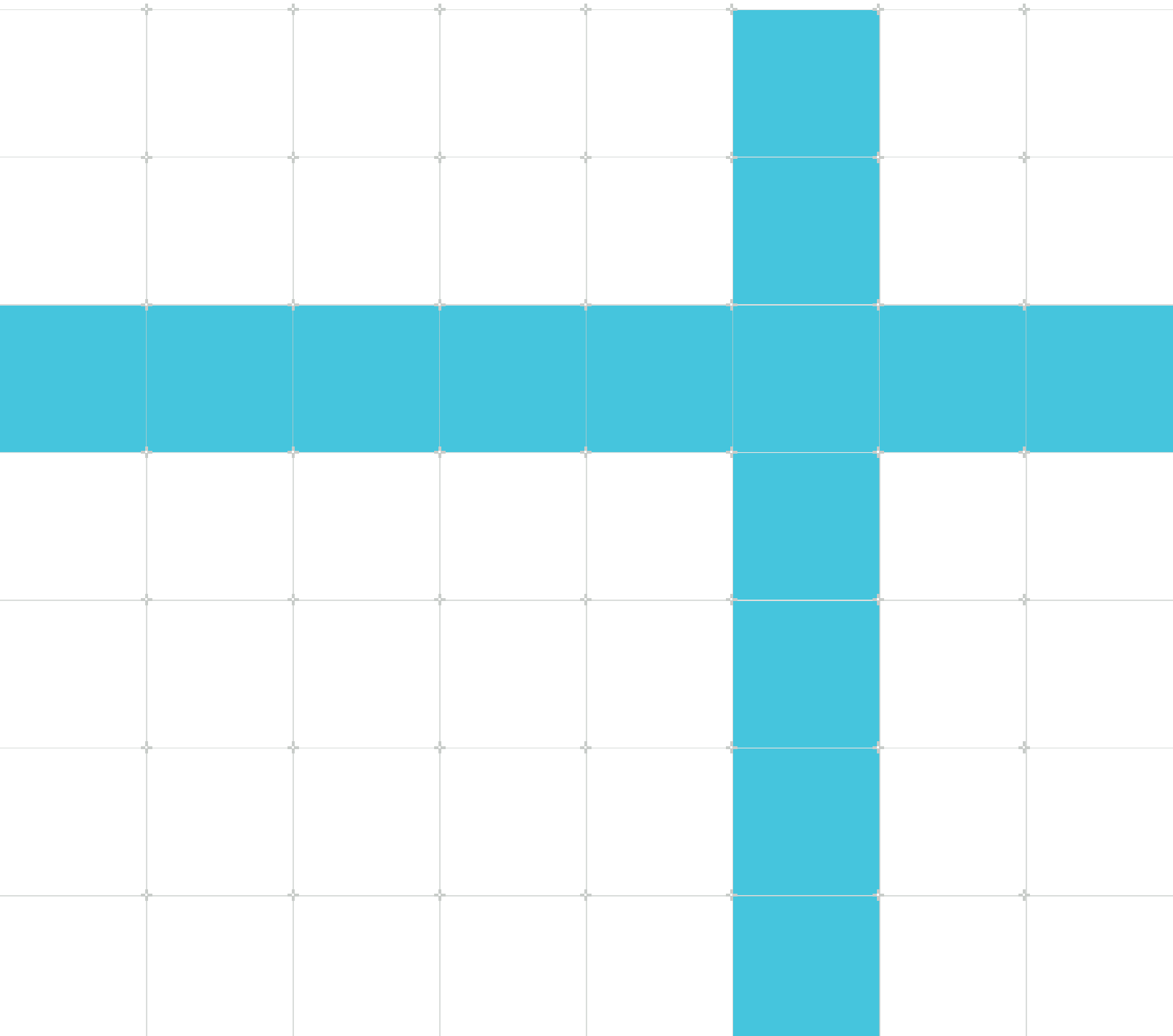

DSTREAM-XT
Getting Started Guide

Release information

Document history

Issue	Date	Confidentiality	Change
0100-00	15 July 2021	Non-Confidential	New document for v1.0
0100-01	10 October 2022	Non-Confidential	Documentation update for version 1.0 release
0100-02	18 August 2023	Non-Confidential	Documentation update for version 1.0 release

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

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Conformance Notices

This section contains conformance notices.

Federal Communications Commission Notice

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

Class A

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

CE/UKCA Conformity

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

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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.

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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.

Contents

List of Figures

1. Introduction

This book describes the DSTREAM-XT debug and trace system which enables you to debug and optimize your software on Arm® processor-based hardware targets.

1.1 Conventions

The following subsections describe conventions used in Arm documents.

Glossary

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

See the Arm Glossary for more information: developer.arm.com/glossary.

Typographic conventions

Arm documentation uses typographical conventions to convey specific meaning.

Convention	Use
italic	Citations.
bold	Interface elements, such as menu names. Terms in descriptive lists, where appropriate.
`monospace`	Text that you can enter at the keyboard, such as commands, file and program names, and source code.
`monospace underline`	A permitted abbreviation for a command or option. You can enter the underlined text instead of the full command or option name.
`<and>`	Encloses replaceable terms for assembler syntax where they appear in code or code fragments. For example: `MRC p15, 0, <Rd>, <CRn>, <CRm>, <Opcode_2>`
SMALL CAPITALS	Terms that have specific technical meanings as defined in the *Arm® Glossary*. For example, **IMPLEMENTATION DEFINED**, **IMPLEMENTATION SPECIFIC**, **UNKNOWN**, and **UNPREDICTABLE**.
	Recommendations. Not following these recommendations might lead to system failure or damage.
	Requirements for the system. Not following these requirements might result in system failure or damage.
	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-ST Getting Started Guide	100892	Non-Confidential
Arm DSTREAM-ST System and Interface Design Reference Guide	100893	Non-Confidential
Arm DSTREAM-XT System and Interface Design Reference Guide	102444	Non-Confidential
CoreSight Access Tool (CSAT) User Guide	epm051792	Non-Confidential

1.3 Other information

See the Arm website for other relevant information.

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

2. The DSTREAM-XT system

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

DSTREAM-XT provides an interface between a debugger such as Arm Debugger provided with Arm Development Studio and an Arm processor-based target using a hardware interface such as JTAG or Serial Wire Debug (SWD). DSTREAM-XT also allows a high-bandwidth connection over native PCIe interfaces enabling high-speed debug and trace for powerful code optimization.

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

- Debug on all current Arm processors.
- USB 3.0 and Gigabit Ethernet host connections.
- Code download speeds of up to 12MB per second using JTAG/SWD.
- JTAG clock frequencies of up to 180MHz.
- SWD frequencies of up to 125MHz.
- PCIe debug as an alternative to JTAG/SWD.
- A wide range of target connectors.
- Up to eight lanes of PCIe Gen 3 or four lanes of PCIe Gen 4 support.
- 16GB of trace memory storage on the XT probe.
- Support for up to 4096 active CoreSight™ device connections.
- Remote target reset.
- Device bring-up and test utilities.
- Flexible architecture to support third party IP and applications.
- **The DSTREAM-ST unit also supports:**
    - Up to 4-bit parallel trace support (up to 2.4Gbps maximum parallel trace bandwidth).
    - Flexible DDR trace clock timing of up to 300MHz (600Mbits/s, per pin).

For more feature information, see the DSTREAM-XT 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 DSTREAM-XT refers to both the DSTREAM-ST unit and XT probe working together as a system.

This chapter describes the DSTREAM-XT hardware.

2.1 Buy Arm DSTREAM-XT

Arm has over 30 trusted distributors around the world offering products, training, and support.

You can contact them to buy DSTREAM-XT.

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

Related information

Arm DSTREAM-XT box contents on page 11

2.2 Arm DSTREAM-XT box contents

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

The items are:

- DSTREAM-ST unit

  Figure 2-1: DSTREAM-ST unit

- DSTREAM-XT probe

  Figure 2-2: XT probe

- Power supply unit and associated cables

Figure 2-3: DSTREAM-XT 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

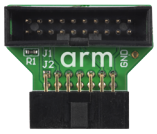
Figure 2-7: JTAG 20-way 0.1" pitch ribbon cable

- 98-way ribbon cable

Figure 2-8: 98-way ribbon cable

- JTAG 14-way Texas Instruments adapter

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

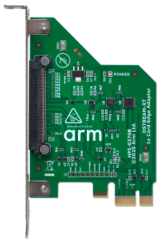


- MICTOR 38-way 4-bit adapter

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

- DSTREAM-XT x1 card edge adapter

Figure 2-11: DSTREAM-XT x1 card edge adapter



- DSTREAM-XT x4 card edge adapter

Figure 2-12: DSTREAM-XT x4 card edge adapter

- DSTREAM-XT x8 card edge adapter

Figure 2-13: DSTREAM-XT x8 card edge adapter

- DSTREAM-XT x16 card slot adapter

Figure 2-14: DSTREAM-XT x16 card slot adapter

- Ethernet cable

  (Not pictured)

- USB 3.0 cable

  (Not pictured)

Related information

Connect and power up the DSTREAM-XT system on page 25

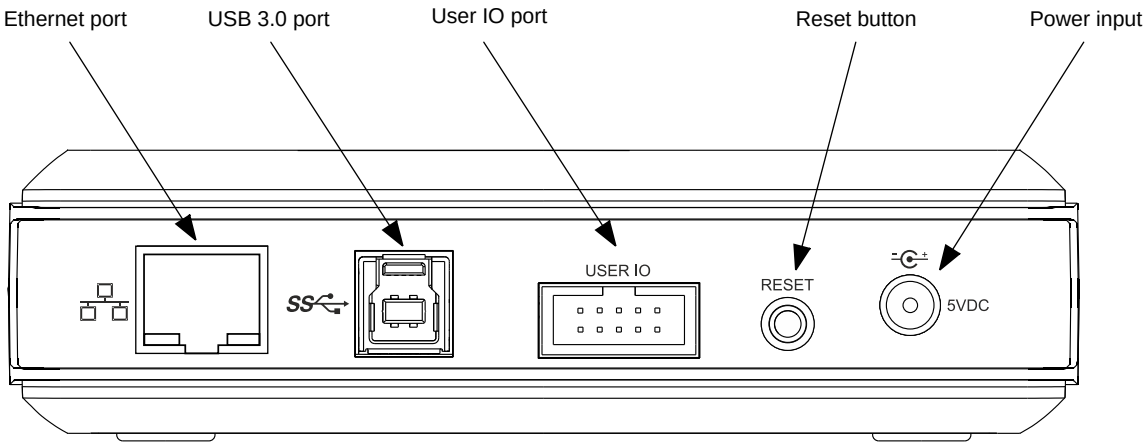
2.3 The DSTREAM-ST unit

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 computer, and the power source. It also contains the **RESET** button and the **USER IO** port.

Figure 2-15: 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 host computer 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 computer, 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 computer must have a USB 3.0 port.
- You must use the included USB 3.0 data cable.

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

USER IO port

Use the USER IO port to set up custom input or output connections to your target. See the Arm DSTREAM-ST 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 reconnecting the DC plug to power-cycle your target might cause ground-loop issues.

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

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

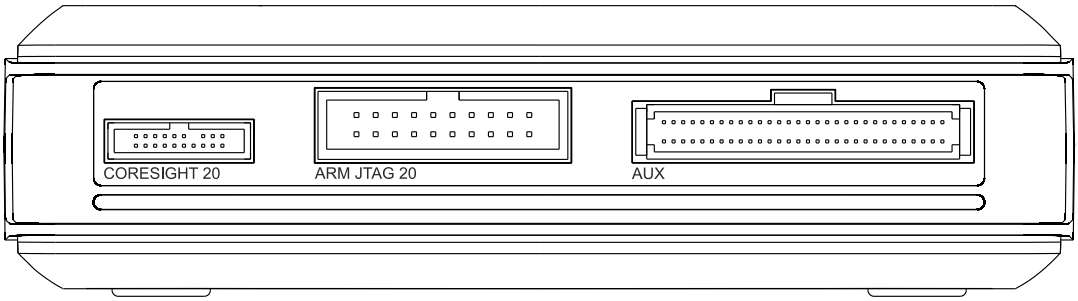
Connect the power adapter provided with the DSTREAM-ST unit to this port.

When using DSTREAM-ST with the XT probe, you must use the unified power cable provided with the power supply unit.

Front

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

Figure 2-16: Front of the DSTREAM-ST unit



CORESIGHT 20

This is 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 JTAG and SWD 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

The JTAG 20 connector 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 XT 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 **both** the Arm JTAG 20 **and** CoreSight 20 cables, this adapter provides debug and trace access to any target with a MICTOR socket.

Optional adapters

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

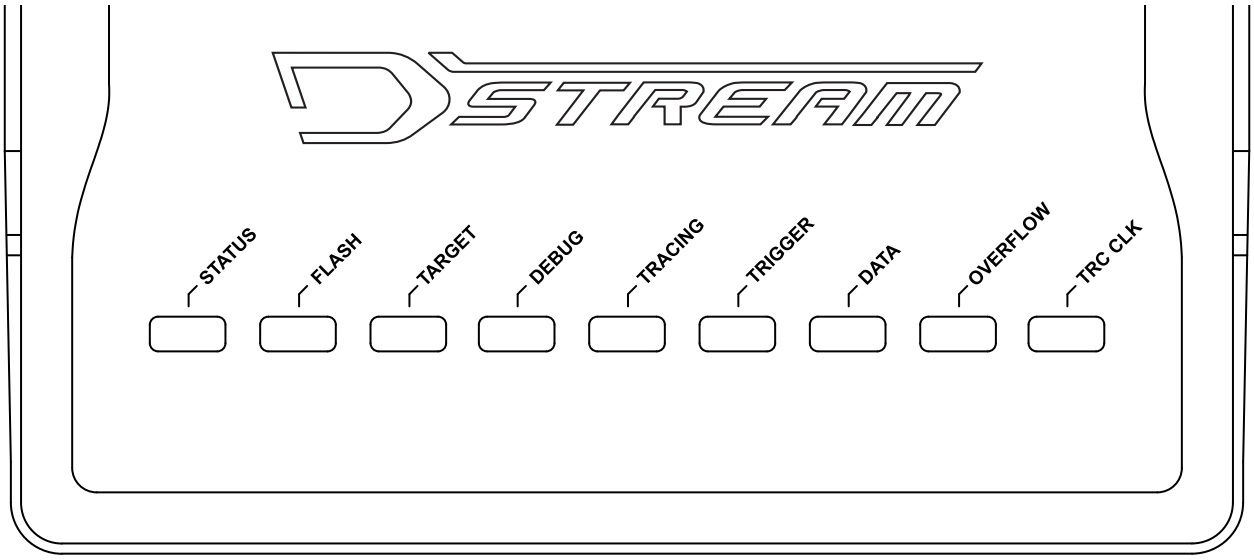
- **MIPI-34 adapter** - This adapter connects directly to the front panel of DSTREAM-ST. The adaptor is supplied with a MIPI-34 ribbon cable to provide debug and trace access to any target with a MIPI-34 header.
- **MIPI-60 adapter** - This adapter plugs into a target's MIPI-60 socket and converts it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

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

Indicator LEDs on the top

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

Figure 2-17: 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-XT 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 has been detected.

DATA

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

OVERFLOW

Indicates an overflow-condition during trace capture. An overflow condition occurs if it has not been possible to stream trace data to the host computer 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 computer are using too much USB or Ethernet bandwidth.

When streaming trace data, the best practice is to keep usage of other applications, on the host computer, to a minimum.

TRC CLK

This LED is for parallel trace only.

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

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

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

Related information

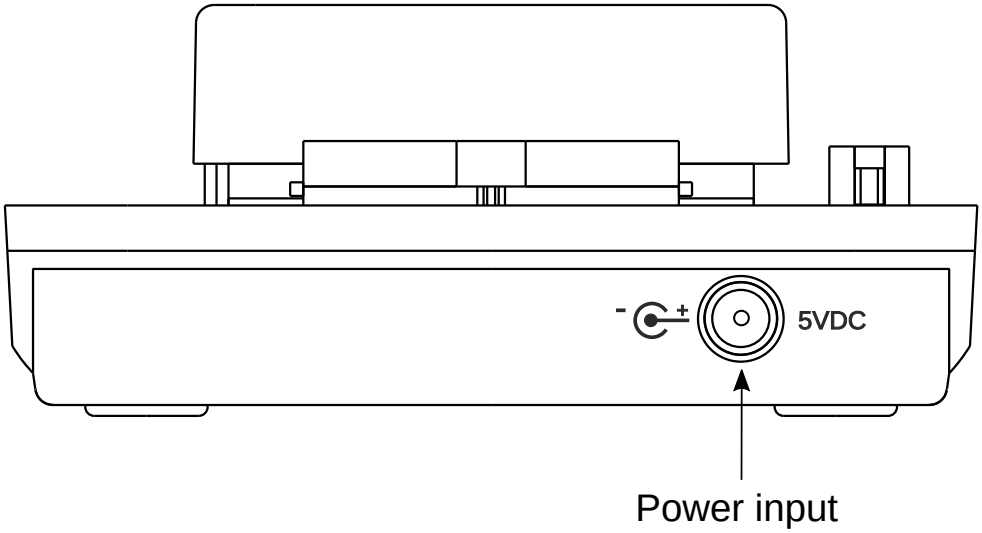
The DSTREAM-XT probe on page 19
Connect and power up the DSTREAM-XT system on page 25

2.4 The DSTREAM-XT probe

The DSTREAM-XT probe provides the hardware interface to connect your DSTREAM-XT system to the PCIe port of your target.

Rear

Figure 2-18: Rear of XT probe



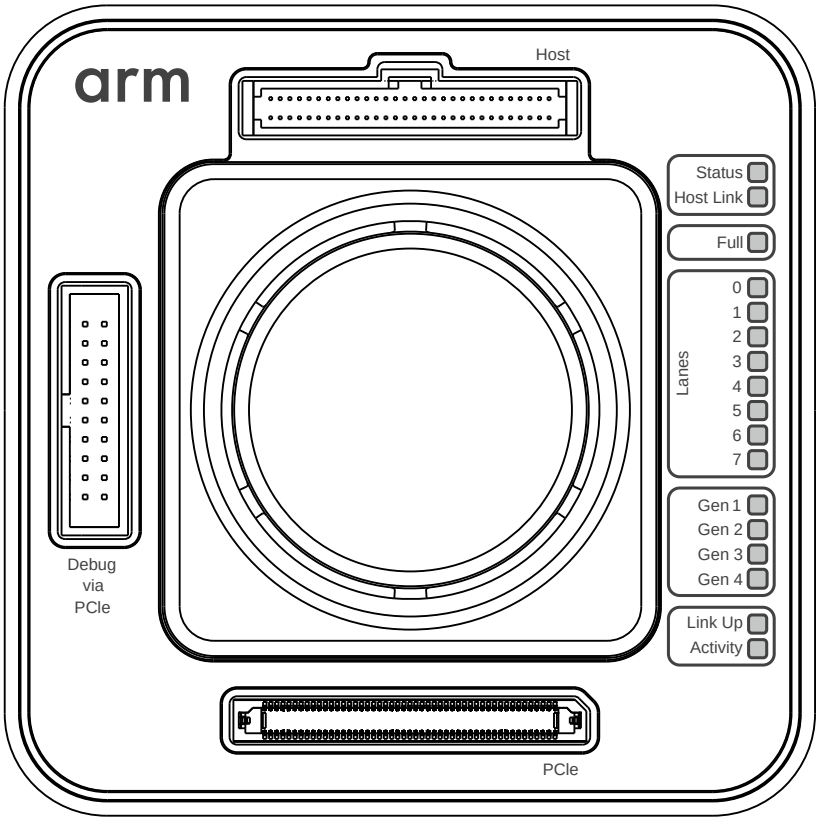
Power input

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

Top

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

Figure 2-19: Top of XT probe



Host connector

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

Debug via PCIe connector

Passes debug signals from DSTREAM-ST unit to the PCIe connector. It connects to the DSTREAM-ST unit using the Arm JTAG 20 cable.

Note

This connector is only required when using the low-level, single-ended JTAG connections of the PCIe interface. When performing debug using the main PCIe interface or a separate debug connector on the target, this connector is not required.

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 XT probe, unused.

PCIe connector

Connects the XT probe to the appropriate DSTREAM-XT adapter using the provided 98-way ribbon cable.

Indicator LEDs

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

Status

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

1. Briefly illuminates *red*, to indicate that the probe is powered and initializing.
2. Illuminates *green*, to indicate that the probe is in its ready state.

If the **Status** LED remains red, the XT probe has failed to boot. Ensure that your DSTREAM-ST firmware is version 7.6, or later. For more information on updating the DSTREAM-ST firmware, see Update the DSTREAM-XT 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-XT 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

Full

Illuminates *green* to indicate that the trace buffer is full.

Lanes [0-7]

The Lane LEDs indicate the numbers of the lanes that are in use during the debug session.

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

Gen [1-4]

Illuminates green to indicate the current PCIe protocol/lane-rate in use.

If a particular lane rate fails to initialize, DSTREAM-XT automatically falls-back to the next slowest lane rate.

Link Up

Illuminates *green* to indicate that the PCIe link has been established at the indicated lane rate.

Activity

Illuminates *green* to indicate that data is being transfered across the PCIe link.

Related information

The DSTREAM-ST unit on page 15
Connect and power up the DSTREAM-XT system on page 25
Troubleshooting on page 34
DSTREAM-XT trace probe configuration

3. Set up your DSTREAM-XT system

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

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

To use the DSTREAM-XT system with a USB connection, for your operating system, install the USB device drivers provided with Arm® Development Studio 2021.1 or later.

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 host computer.

About this task

The drivers for the DSTREAM-XT 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.

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 host computer.

Related information

Connect and power up the DSTREAM-XT system on page 25

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

To use the DSTREAM-XT system with a USB connection, for your operating system, install the USB device drivers provided with Arm® Development Studio 2021.1 or later.

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 host computer.

About this task

The drivers for the DSTREAM-XT 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.

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

Results

The USB drivers are now installed on your host computer.

Related information

Connect and power up the DSTREAM-XT system on page 25

3.3 Connect and power up the DSTREAM-XT system

Describes how to connect your DSTREAM-XT system to your host computer and target hardware.

Before you begin

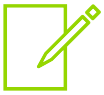
- You must install Arm Development Studio to access the software drivers and debug hardware configuration utilities.
- Your target hardware must have a debug or PCIe connector supported by DSTREAM-XT. For a list of supported connectors, see Target interface connectors in the Arm® DSTREAM-XT System and Interface Design Reference Guide.
- You must have the following items from the Arm DSTREAM-XT box contents:
  - The DSTREAM-ST unit.
  - The XT probe and 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 computer or the network, you need either:
  - The USB cable, to connect the DSTREAM-ST unit directly to the host computer using the USB 3.0 port.
  - The Ethernet cable, to connect the DSTREAM-ST unit to the network.
- To connect DSTREAM-XT to the target hardware, you need a target-compatible cable/adapter. For a list of supplied cables and adapters, see Arm DSTREAM-XT box contents.

- If DSTREAM-XT 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 cause unwanted resets to occur. See Hot-plug the debug cable for further details.
- When connecting the DSTREAM-XT 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-XT. For supported pinout information, see the Arm DSTREAM-XT System and Interface Design Reference Guide.

Procedure

1. Connect the DSTREAM-ST unit, the XT probe, and the power supply unit:
   a) Connect the DSTREAM-ST unit to the XT probe using the 60-way AUX cable.
   b) Attach the Power Supply Unit (PSU) to the PSU-adapter end of the split power supply cable.
   c) Attach one end of the split power supply cable to the DSTREAM-ST unit, and attach the other end to the XT probe.
2. Connect the DSTREAM-ST unit to the host computer:
   - If you are connecting using the USB port, connect the DSTREAM-ST unit to the host computer using the supplied USB 3.0 cable.



- 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-XT system on Windows or Install the USB drivers for the DSTREAM-XT 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-XT system.

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

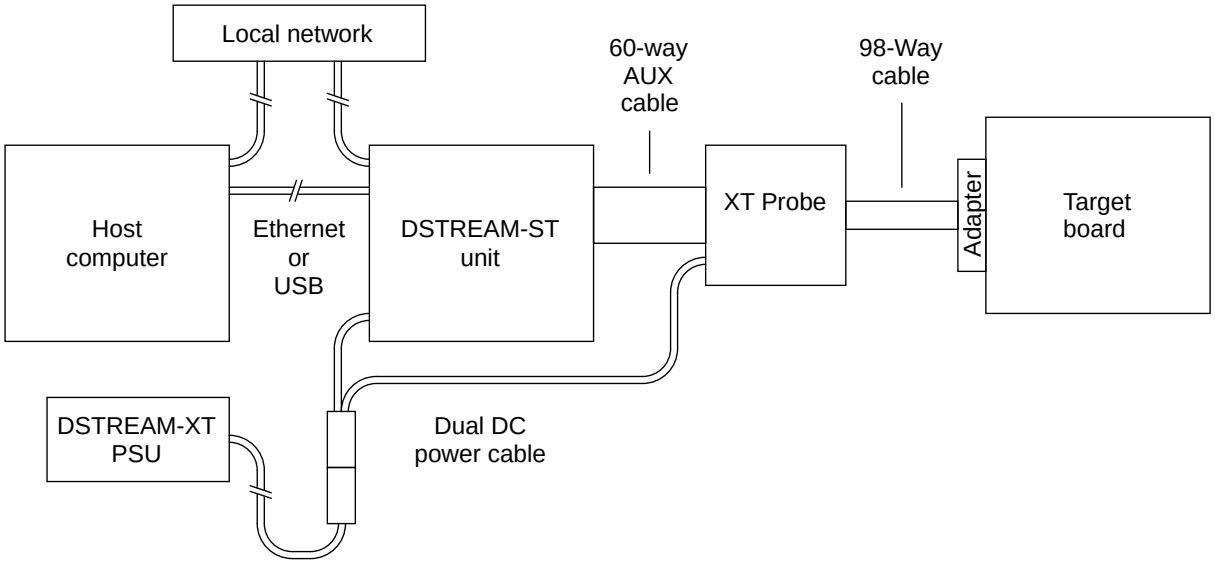
- Arm recommends that both the DSTREAM-ST unit and XT probe are powered-up simultaneously. Powering simultaneously ensures that the DSTREAM-ST unit correctly detects the XT probe during its boot sequence.
- If you need to reset the DSTREAM-XT system, press the reset button on the rear of the DSTREAM-ST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

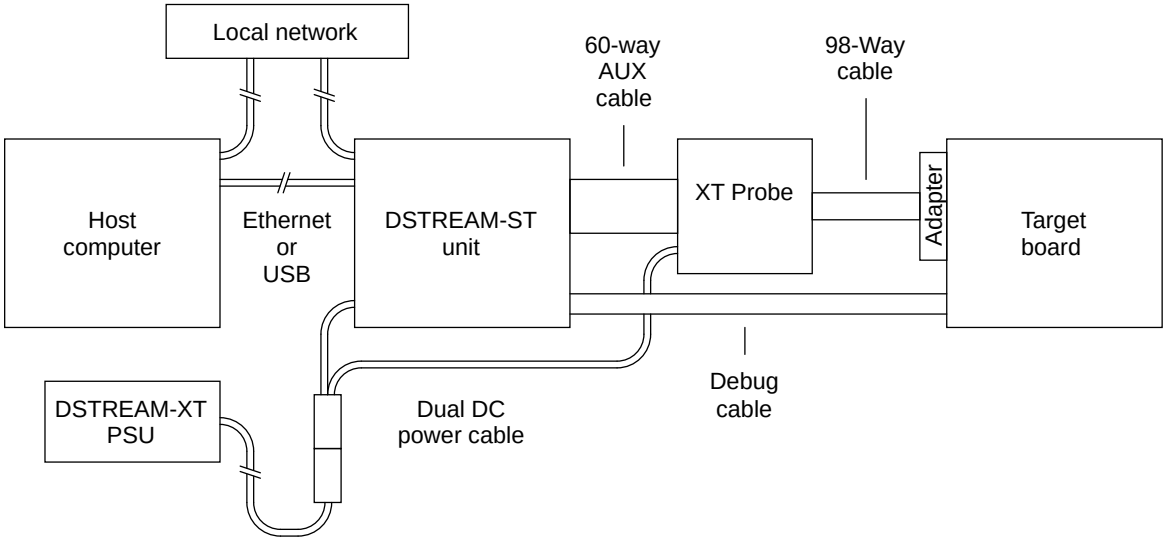
5. Connect the DSTREAM-XT system to the target hardware. Use the appropriate cables and adapters for the target debug and trace connector (or connectors). Some targets have debug and trace on a single connector, and some targets split them between two connectors. Each connector, and the appropriate cable to use for that connector, is described in Target interface connectors in the Arm DSTREAM-XT System and Interface Design Reference Guide.
   - If your target performs debug and trace using a single PCIe connector, connect the XT probe to the target using the 98-way ribbon cable and the appropriate DSTREAM-XT adapter:

Figure 3-1: DSTREAM-XT connection



- In some cases, where debug cannot be performed using PCIe, it might be necessary to bypass the XT probe and route the debug signals from the DSTREAM-ST directly to your target. If so, then:
  a. Connect the XT probe to the target using the 98-way ribbon 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-XT debug bypass connection




Note

In rare cases, it might be necessary to use the low-level single-ended JTAG signals of the target's native PCIe connector. In this case, the **JTAG 20-way 0.1"** cable must be connected between the **JTAG 20** connector of the DSTREAM-ST unit and the **Debug via PCIe** connector of the XT probe.

6. Power up the target hardware.


Note

- When the DSTREAM-XT system is powered-up, ensure that the air intakes on the top of each unit are free from any obstructions.
- If the DSTREAM-ST unit overheats, it shuts down, all the LEDs turn off, and it remains in a safe state.
- If the XT probe overheats, it enters a low-power mode and all of its LEDs flash red.
- To re-initialize the DSTREAM-XT system, press the **reset** button on the rear of the DSTREAM-ST unit.

Next steps

- The first time you connect and power-up your DSTREAM-XT system you must Update the DSTREAM-XT system firmware.
- Using DSTREAM-XT

Related information

DSTREAM-XT system boot sequence on page 29

3.4 DSTREAM-XT system boot sequence

When you power up the DSTREAM-XT 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 XT probe illuminates *red*.
2. The **FLASH** LED of the DSTREAM-ST unit flashes as it loads its firmware.
3. The **STATUS** LED of the XT 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 XT probe flashes *blue*, and then illuminates *green* to indicate that the units have successfully linked.

The DSTREAM-XT system is now ready for use.


Note

If your DSTREAM-XT system boot sequence does not follow this sequence, see Troubleshooting.

Related information

Connect and power up the DSTREAM-XT system on page 25
Restore a DSTREAM-XT system on page 35

3.5 Update the DSTREAM-XT system firmware

The DSTREAM-XT 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 XT probe).

Before you begin

- You must ensure that Arm Development Studio 2021.1 or later is installed on the host computer.


Note

- In Arm Development Studio, the latest firmware files are available at: `<Arm_Development_Studio_install_directory>/sw/debughw/firmware/`
- You must use firmware version 7.6 or later to detect the XT probe.

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

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**. You can view the currently installed firmware version, the auto-selected new firmware file, and the new firmware details.
3. Either accept the auto-selected firmware update file, or browse and select a different firmware update file:
   - To accept the auto-selected firmware update file, click **Install**.
   - To select a different firmware update file, in **Select Firmware Update File**, click **Browse**, select your firmware update file, and click **Open**. Then click **Install**.

Results

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

4. Using DSTREAM-XT

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

4.1 Debug software for DSTREAM-XT

The development software on your host computer provides the interface between your debugger and the DSTREAM-XT 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 requirements, 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, Arm Compiler, Arm Debugger, and Streamline Performance Analyzer. Combined with DSTREAM-XT, 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) or Debug and Trace Services Layer (DTSL)

Third-party applications, both for Arm and other processors, can connect to the DSTREAM-XT system using the RDDI or the DTSL libraries.

You can use them 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, you can use these libraries to create a low-level connection to the DSTREAM-XT system and gain access to the JTAG scan-chains inside the target device.

The RDDI and DTSL libraries are included as part of the Arm Development Studio installation.

RDDI is located in `<Arm_Development_Studio_install_directory>/sw/debugger/RDDI`. For more information about RDDI, see the RDDI documentation available at `<Arm_Development_Studio_install_directory>/sw/debugger/RDDI/docs/html/index.html`

DTSL is located in `<Arm_Development_Studio_install_directory>/sw/DTSL`. For more information about DTSL, see the Arm Development Studio User Guide.

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.

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`.

4.2 Hot-plug the debug cable

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

- If the DSTREAM-XT 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 of a PCIe interface is not recommended and could cause instability in a target's operating system.

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

- The DSTREAM-XT 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 potential variation, ensure that one of the GND pins of the debug connector makes contact first. This ensures that all signal levels are correctly interpreted as they connect. For pin details, see Target interface connections in the Arm® DSTREAM-XT System and Interface Design Reference Guide.

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

1. Power up the DSTREAM-XT system. Allow the DSTREAM-ST and XT 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-XT system. Otherwise, if the DSTREAM-XT 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-XT system to a target. For more information on TAP resets, see Reset signals.

Related information

Connect and power up the DSTREAM-XT system on page 25

5. Troubleshooting

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

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

5.1 Host Link issues

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

If the **Host Link** LED fails to illuminate *green*, the link connection has not been established.

Host Link LED fails to illuminate green

If the **Host Link** LED does not illuminate *green* within 12 seconds, the link connection is incomplete. This might be due to one or more of the following reasons:

- The XT probe factory firmware version requires updating.
- The flash memory on the XT probe is corrupt. If the flash memory is the cause, the **STATUS** LED illuminates *red*.
- The connection of the AUX 60-way ribbon cable is not complete.

Solution

1. Disconnect the AUX 60-way ribbon cable.
2. Ensure the Aux connector pins on the DSTREAM-ST unit and XT 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-XT 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-XT system. For more information, see Restore a DSTREAM-XT system.

Related information

The DSTREAM-XT probe on page 19
Arm DSTREAM-XT box contents on page 11
DSTREAM-XT system boot sequence on page 29

5.2 DSTREAM-XT overheats

The air intakes on the top of both the DSTREAM-ST unit and XT probe must remain clear of any obstructions.

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 XT probe becomes blocked and the XT probe overheats, it enters a low-power mode and its **Status**, **Host Link**, and **Full** LEDs flash *red*.

Solution

Check that the air intakes are clear, and then press **Reset** on the rear of the DSTREAM-ST unit to reinitialize the DSTREAM-XT system.

5.3 Restore a DSTREAM-XT system

Use the recovery mode in DSTREAM-ST to restore your DSTREAM-XT system back to its factory settings. If the other troubleshooting steps did not help, the recovery mode is useful to recover your DSTREAM-XT system.

Before you begin

- Connect and power-up the DSTREAM-XT system. For more information on how to connect and power-up the DSTREAM-XT system, see Connect and power up the DSTREAM-XT system
- Attempt a soft reset of your DSTREAM-XT system, by pressing the **Reset** button on the rear of the DSTREAM-ST unit, before running a full restore of the system.
- Debug hardware drivers are provided with Arm® Development Studio. You must have Arm Development Studio installed on your host computer 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.
   The DSTREAM-ST unit erases the current firmware in its internal flash, and replaces it with the original factory-installed version of the firmware.

When in recovery mode, debug and trace operations are disabled.

3. Update the firmware to the latest version, see Update the DSTREAM-XT system firmware.

To detect the XT probe, your DSTREAM-ST unit must have firmware version 7.6 or later installed.

   During the firmware update process on the DSTREAM-ST unit, it detects the attached XT probe and updates the probe firmware.

Results

After the recovery and the firmware update process is complete, the DSTREAM-XT system automatically reboots.

If your DSTREAM-ST unit continues to display unexpected behaviour or gets stuck in the reboot process, contact Arm support.

Next steps

- Connect and power up the DSTREAM-XT system
- Using DSTREAM-XT

5.4 Remotely restarting a DSTREAM-XT system

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

You can:

- Use the Arm® Development Studio Debug Hardware Configure IP view.
- Update the firmware of your DSTREAM-XT system. At the end of a firmware update, the DSTREAM-XT system restarts.

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

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