



Debug connections to your hardware

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1. Overview

For embedded system development, you will usually want to connect your target hardware to a host to perform debugging. Arm provides both JTAG and Serial Wire Debug (SWD) connections through a range of debug probes which are tuned to the needs of the system:

- [DSTREAM](#) and [DSTREAM-ST](#) enable powerful software debug and optimization of any Arm processor-based hardware target.
- The [ULINK family](#) provides uncomplicated debug, enabling cost efficient run-control debug on devices ranging from microcontrollers to multicore application processors.
- [CMSIS-DAP](#) provides simple debug over driverless USB.

For application development on Linux or Android, it is common to use [GDB \(the GNU Project Debugger\)](#) or [ADB \(Android Debug Bridge\)](#).

[Debug Probes and Adapters](#) gives more information, including a comprehensive overview and comparison of the available solutions.

2. Debugging with DSTREAM and DSTREAM-ST

[DSTREAM](#) and [DSTREAM-ST](#) enable powerful software debug and optimization of any Arm processor-based hardware target.

The following resources will help you get started debugging with DSTREAM:

- [Arm DS-5 Debugger Linux kernel debug example with DSTREAM and BeagleBoard setup](#). This short video guides you through debugging a sample Linux kernel using the DS-5 Debugger, a DSTREAM unit and a BeagleBoard.
- [Video Tutorial on ARM Cortex-M Series - Debug and Trace](#). This is a technical tutorial detailing the key aspects of the debug and trace features available in the Arm Cortex-M series of processors.
- [DSTREAM knowledge articles](#) provide answers to real-world questions regarding DSTREAM.

3. Debugging with the ULINK family

The [ULINK family](#) of debug probes provides uncomplicated debug, enabling cost efficient run-control debug on devices ranging from microcontrollers to multicore application processors.

The following resources will help you get started debugging with the ULINK family:

- These introductory videos cover the key ULINKplus features:
 - Part One: [Debug and Trace](#)
 - Part Two: [Power Measurement](#)
 - Part Three: [Test Automation and IO pin control](#)
- The [Introducing ULINKplus](#) webinar demonstrates how to use ULINKplus to provide better insight into the overall execution of the embedded system.
- The [Getting Started with ULINKpro trace](#) video shows how to connect to a target and capture trace information.
- The [ULINKpro Debug Adapter](#) video describes the unique features of the Keil ULINKpro Debug Adapter.

4. Debugging with CMSIS-DAP

[CMSIS-DAP](#) provides simple debug over driverless USB.

The following resources will help you get started debugging with the ULINK family:

- The [Enabling CMSIS-DAP debug on the Tower System](#) tutorial shows how to update the OpenSDA firmware on your NXP Semiconductors Vybrid Controller Tower System module to enable multicore debug with Arm DS-5 via USB using CMSIS-DAP (Cortex Microcontroller Software Interface Standard - Debug Access Port).
- The [CMSIS-DAP Debugger User's Guide](#) describes the configuration options of the CMSIS-DAP Debugger driver implemented in μ Vision. The driver can be used to flash and debug applications on Cortex-M processor-based devices.

5. Debugging with GDB

For application development on Linux or Android, it is common to use [GDB \(the GNU Project Debugger\)](#) for debugging.

The following resources will help you get started debugging with GDB:

- The [Linux Application Debug Tutorial](#) shows how to debug the open source fractal rendering application Xaos running on Linux on an Arm Cortex-A8 processor-based development board using Arm Development Studio 5 (DS-5) Community Edition.
- The [Learn how to debug an ARM Linux application on a Pandaboard](#) video demonstrates debugging on the the free toolchain ARM DS-5 Community Edition.
- The [Debugging Linux applications on the Altera SoC with ARM DS-5](#) video shows how to use ARM DS-5 Altera Edition, part of the Altera SoC EDS toolkit, to debug a Linux application running on an Altera Cyclone V SoC-based board.