

St-line interface



Overview

STM32 ST-LINK Utility (STSW-LINK004) is a full-featured software interface for programming STM32 microcontrollers.

Key Takeaways

The ST-LINK interface provides both graphical and command-line tools to program, debug, and manage STM32 microcontrollers via ST-LINK programmers. Overview

The ST-LINK interface is a hardware and software solution from STMicroelectronics that allows communication with STM32 microcontrollers for programming, debugging, and memory management. It supports multiple generations of ST-LINK programmers, including ST-LINK, ST-LINK/V2, and ST-LINK/V3, and can connect via SWD (Serial Wire Debug) or JTAG interfaces .

Command-Line Interface (CLI)

The ST-LINK CLI is part of the open-source stlink toolset, which provides utilities for interacting with STM32 devices without a graphical interface . Key command-line tools include:

- st-info: Displays information about connected ST-LINK programmers and the target STM32 device, such as flash size, SRAM, chip ID, and serial number .
- st-flash: Used to flash binary files to the microcontroller, read memory into binary files, and erase flash memory .

- `st-util`: Starts a GDB server for debugging, allowing connection from GDB or other debugging tools to the STM32 target .

Common CLI Features

- Set SWD/JTAG interface frequency (e.g., 5kHz to 4MHz) for communication speed adjustment .
- Connect to the target under reset or without reset, useful if the target firmware disables debug pins or enters sleep mode .
- Specify the serial number of the ST-LINK device to select among multiple programmers .
- Display version information and check tool compatibility .

Graphical Interface

For users preferring a GUI, the STM32 ST-LINK Utility (STSW-LINK004) provides a full-featured environment for reading, writing, verifying memory, and automating programming tasks . The GUI also includes a command-line mode for scripting and batch operations.

Practical Usage

- Flashing firmware: Use `st-flash write firmware.bin 0x8000000` to program the STM32 flash memory.
- Reading memory: Use `st-flash read dump.bin 0x8000000 0x20000` to extract memory contents.
- Debugging: Launch `st-util` and connect GDB to debug applications in real-time. The CLI is particularly useful for automation, scripting, and headless environments, while the GUI is convenient for interactive development and verification.

Summary

The ST-LINK interface provides a versatile solution for STM32 development, offering both graphical and command-line tools. The CLI tools—`st-info`, `st-flash`, and `st-util`—allow developers to program, debug, and query STM32 devices efficiently, supporting advanced features like frequency adjustment, reset control, and multi-device selection . This makes the ST-LINK interface essential for both development and production workflows.

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Guide: Connecting your debugger This small guide will explain how to connect your debugger to your development board. There are

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Data brief

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Optical fiber connector LC (top) and ST (bottom) optical fiber connectors, both with protective caps in place

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