LPC-Link2 Debug Probe Firmware Programming

Rev. 2.1.4 — 4 March, 2026 User Guide

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1. Revision History

1.1 v2.1.4

- Updated binary for SEGGER J-Link debug probe firmware for LPCXpresso V2/V3 boards (to ..V20230825).
- Removed reliance on WMIC (deprecated in recent Windows versions).
- Support Linux ARM64 hosts

1.2 v2.1.3

- Updated binary for CMSIS-DAP debug probe firmware (to ..V5_460).
- CMSIS-DAP firmware can now power RT1xxx evaluation boards via the USB debug connection.
- Updated binary for SEGGER J-Link debug probe firmware (to ..V20230502).

1.3 v2.1.2

- Minor changes to reflect product updates.

1.4 v2.1.1

- Minor changes to reflect product updates.

1.5 v2.0.0

- Minor changes to reflect product updates.

1.6 v1.8.2

- Minor additions to reference compatibility with MCUXpresso IDE.

1.7 v1.5.2

- Minor additions to reflect product and script improvements.

1.8 v1.5

- First release of this document detailing the programming of CMSIS-DAP and J-Link firmware added to LPCScrypt version 1.5 release.

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2. Introduction

LPCScrypt is a fast flash and security programming tool for the LPC18xx and LPC43xx series of microcontrollers. It can be used on Windows, Linux and macOS.

The LPC-Link2 stand alone debug probe (and on-board variants) use LPC43xx microcontroller and so may be updated using LPCScrypt.

This document describes the use of scripts provided within LPCScrypt to simplify the programming of debug probe firmware into the standalone LPC-Link2 debug probe, as well as the variant built into the LPCXpresso V2/V3 boards.

Note

Certain RT1xxx evaluation boards also incorporate on-board debug probes based on LPC-Link2 hardware (but with minor differences) and so may be programmed via LPCScrypt. However, if previous versions of LPC-Link2 firmware were programmed onto these boards, the board could no longer be powered via the USB debug connection. Starting with version V5.460 of LPC-Link2 CMSIS-DAP firmware the above limitation is removed, so these boards can now be powered via the USB debug connection.

For more details of these boards/probes, please visit:

http://www.nxp.com/lpc-link2

http://www.nxp.com/pages/:LPCXPRESSO-BOARDS

For more details of using LPCScrypt, please read the LPCScrypt User Guide supplied within the product.

For J-Link, please check the SEGGER website for more information.

Tip

the terms SPIFI and QSPI are used interchangeably within this document

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3. Quick Start

LPCScrypt is supplied with scripts to enable the programming of CMSIS-DAP and J-Link firmware images into LPC-Link2 and LPCXpresso V2/V3 boards.

To make use of this functionality, configure the selected board to DFU Boot, then connect to the host computer via USB.

To install CMSIS-DAP debug firmware, open a command shell and call the program_CMSIS script:

```
<LPCScrypt Install Dir>\scripts\program_CMSIS
```

To install J-Link debug firmware, open a command shell and call the program_JLINK script:

```
<LPCScrypt Install Dir>\scripts\program_JLINK
```

For Windows users, shortcuts to these scripts are available from the LPCScrypt entry on the Start menu.

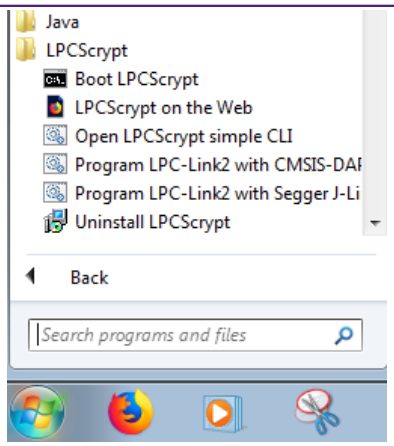

Figure 3.1. Start Menu Shortcuts

Note

File paths in this document use Windows directory separators, on Linux or macOS these must be replaced with '/'

These scripts will boot the LPCScrypt firmware on the selected board and then choose the appropriate firmware image and program it into flash.

Once completed, follow the on-screen instructions to make use of the programmed debug probe.

For more information, please read the following sections for a detailed explanation of this procedure.

Note

The scripts offer the option to repeat the programming sequence to enable multiple debug probes to be programmed in sequence.

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4. Debug Firmware Variants and Drivers

4.1 Firmware Variants

Separate firmware images are available for each LPC-Link2 variant for the following debug probe protocol implementations:

4.1.1 CMSIS-DAP

The CMSIS-DAP debug probe images allow debugging from any compatible toolchain, including IAR EWARM, Keil MDK, as well as NXP's LPCXpresso and MCUXpresso IDE.

As well as providing debug probe functionality, the default CMSIS-DAP image also provides:

- Support for SWO Trace capture from the LPCXpresso IDE and MCUXpresso IDE
- Support for Power Measurement from the LPCXpresso IDE and MCUXpresso IDE
- UART bridge connected to the target processor (LPCXpresso V2/V3 boards only),
- LPCSIO bridge that provides communication to I2C and SPI slave devices (LPCXpresso V3 boards only).

Note
If these additional features are not required, a version supporting debug features only is also provided. For information on script options, see Section 7.2.

Note
MCUXpresso IDE and LPCXpresso IDE do not require a CMSIS-DAP image to be programmed into the debug probe flash, as it will normally be downloaded directly into the probe after power up. However it can use a pre-programmed version if one is present.

4.1.2 Segger J-Link

J-Link is a trademark of SEGGER Embedded Software Solutions. More information about J-Link can be found at:

http://www.segger.com

Important Note
Please ensure that you read SEGGER's licensing terms for these debug probe firmware images before using them.

For information on the use of J-Link with LPC-Link2 and LPCXpresso V2/V3, please see:

https://www.segger.com/lpc-link-2.html

https://www.segger.com/jlink-lpcxpresso-ob.html

Tip
If you intend to use LPC-Link2 with JLink firmware it is recommended that you check the above links to ensure you have the latest firmware version. Newer firmware binaries obtained from SEGGER can be used to update an existing

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LPCScrypt installation by dropping the downloaded binary into the appropriate sub-directory within the probe_firmware directory. At the time of writing this document, version(s) dated 20230502/20230825 are supplied

The J-Link debug probe images allow the LPC-Link2/LPCXpressoV2/V3 board to operate as a J-Link debug probe that works with tool chains that support the J-Link protocol such as MCUXpresso IDE, IAR EWARM, Keil MDK, Rowley CrossWorks, Atollic TrueSTUDIO, OpenOCD compatible tools as well as GDB-based tool chains such as emIDE.

J-Link can also be used with LPCXpresso IDE. For details see:

https://www.segger.com/nxp-lpcxpresso.html

4.2 Drivers

For use with MCUXpresso IDE, no additional drivers are required.

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5. Programming (LPC-Link2)

To program a standalone LPC-Link2, first of all ensure that jumper JP1 is NOT fitted so that the probe will be DFU bootable at power on.

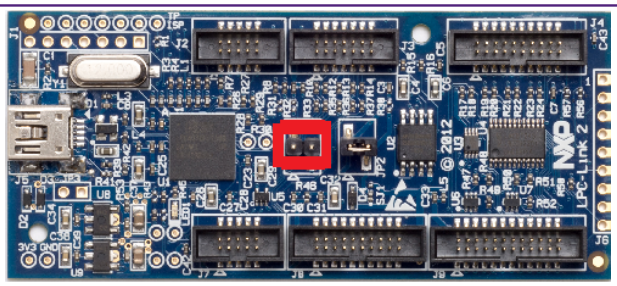

Figure 5.1. LPCLink2 DFU Boot

Then connect the board to your host computer over the debug link USB connector and in a command shell run either:

```
<LPCScrypt Install Dir>\scripts\program_CMSIS
```

or

```
<LPCScrypt Install Dir>\scripts\program_JLINK
```

Note: For Windows users, shortcuts to these scripts are available from the LPCScrypt entry on the Start menu.

The output will be similar to that below:

```
LPCScrypt - CMSIS-DAP firmware programming script v2.1.4 Dec 2025.

Connect an LPC-Link2 or LPCXpresso V2/V3 Board via USB then press Space.

Press any key to continue . . .

Booting LPCScrypt target with "LPCScrypt_221.bin.hdr"
LPCScrypt target booted
.
Programming LPC-Link2 with "LPC432x_CMSIS_DAP_V5_460.bin.hdr"

- LPC-Link2 programmed successfully and has the unique ID: IQCYAWEV
- To use: make link JP1 (nearest USB) and reboot.

Connect Next Board then press Space (or CTRL-C to Quit)

Press any key to continue . . .
```

Note: The script will automatically detect the debug probe type and select the appropriate firmware version.

Tip

the reported unique ID will be displayed for the programmed debug probe when a probe discovery is performed within MCUXpresso IDE

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Once programming is complete, disconnect the board from the host, fit JP1, then reconnect the board to the host computer. You should see the debug probe enumerate on the host's USB system.

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6. Programming (LPCXpressoV2/V3)

Tip

This section also applies to on board LPC-Link2 debug probes embedded in other development boards, such as the LPCXpresso54xxx etc.

To program an LPCXpressoV2/V3 board, first of all ensure that the DFULink jumper **IS** fitted. Normally DFULink can be found between the two USB ports on the left hand side of the board, but please check the information for your actual board to confirm.

- for the LPCXpresso11U68, it is JP3
- for the LPCXpresso54102, it is JP5
- for the LPCXpresso4337, it is JP6

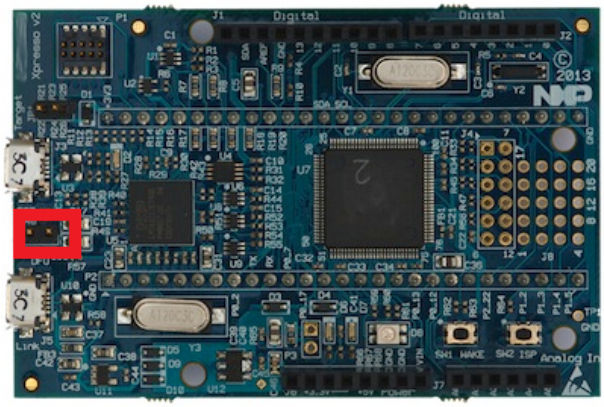

Figure 6.1. LPCXpresso V2 DFU Boot

Then connect the board to your host computer over the debug link USB connector and in a command shell run either:

```
<LPCScrypt Install Dir>\scripts\program_CMSIS
```

or

```
<LPCScrypt Install Dir>\scripts\program_JLINK
```

Note: For Windows users, shortcuts to these scripts are available from the LPCScrypt entry on the Start menu.

The output will be similar to that below:

```
LPCScrypt - CMSIS-DAP firmware programming script v2.1.4 Dec 2025.

Connect an LPC-Link2 or LPCXpresso V2/V3 Board via USB then press Space.

Press any key to continue . . .

Booting LPCScrypt target with "LPCScrypt_221.bin.hdr"
LPCScrypt target booted
.
```


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```
Programming LPCXpresso V2/V3 with "LPC432x_IAP_CMSIS_DAP_V5_460.bin"

- LPCXpresso V2/V3 programmed successfully and has the unique ID: KRA3CQBQ
- To use: remove DFU link and reboot.

Connect Next Board then press Space (or CTRL-C to Quit)

Press any key to continue . . .
```

Note: The script will automatically detect the debug probe type and select the appropriate firmware version.

Tip

the reported unique ID will be displayed for the programmed debug probe when a probe discovery is performed within MCUXpresso IDE

Once programming is complete, disconnect the board from the host, remove the DFULink jumper, then reconnect the board to the host computer. You should see the probe enumerate on the host's USB system.

Warning

if any programming problems are observed, it is recommended to *ISP* reset the development boards target MCU – to prevent the booting of any flash image

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7. Advanced

LPC-Link2 is a dual purpose debug probe and test board. The board contains a single LPC4370 MCU and 1MB of SPIFI flash memory. Where as, LPCXpresso V2/V3 boards, contain a dedicated 43xx debug MCU (connected via the lower left USB port) with internal Flash memory in addition to the target MCU. Since the debug firmware is stored in the flash memory of the debug MCU, different images are required for these board.

7.1 Script steps

This section describes the operations carried out by the `program_CMSIS` and `program_JLINK` scripts.

The scripts perform the following steps:

1. Boots the debug probe with the LPCScrypt firmware.
   - this is performed by calling the script `<LPCScrypt install dir>\scripts\bootLPCScrypt`
   - if this operation succeeds, then the script will continue, otherwise, the script will terminate with an error
2. Tests for successful communication between the host and LPCScrypt
   - `<LPCScrypt install dir>\bin\LPCScrypt print 0x1234` is repeatedly called until sucessful communication is achieved.
   - a '.' is printed for each attempt
3. Identify the debug probe MCU.
   - `<LPCScrypt install dir>\bin\LPCScrypt querypart` is called to return the part name
   - based on the result, the flash type SPIFI or BANKA is selected
4. The appropriate image file is located in the LPCScrypt firmware directory based on the identified debug probe MCU.
   - if this cannot be found an error will be generated and the script will terminate
5. LPCScrypt is called to program the image onto the chosen board.
   - `<LPCScrypt install dir>\bin\LPCScrypt program <path to image> <Flash Device>`
   - if the program operation should fail, an error will be generated and the script will terminate
6. If no error has been generated, the steps will be repeated for the next device to be connected.

Note:

- for LPC-Link2, the firmware is stored in the SPIFI flash memory at 0x14000000, so the board must be configured to boot from SPIFI memory for the CMSIS-DAP or J-Link firmware to be used after programming (by connecting the jumper JP1)
- for LPCXpresso V2/V3 boards, the firmware is stored in flash BankA at 0x1A000000, so the board must be re-configured to boot from BankA for the CMSIS-DAP or J-Link firmware to be used after programming (by removing DFU Link jumper)

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7.2 Script Options

The program_CMSIS script can be called with the argument ‘NB’. If this argument is used, the ‘Non Bridged’ variant of CMSIS-DAP is programmed. This version of firmware provides debug features only – removing the bridged channels such as trace, power measurement and VCOM. The use of this firmware is only recommended if USB bandwidth issues are encountered on your host or if maximum debug performance is required.

The program_CMSIS script can also be called with an argument consisting of a path to a binary file. This option is intended for use when a number of boards require programming with a particular image. This feature can be used with any LPC18xx/LPC43xx MCU but note that if internal flash is available, this will be programmed in preference to SPIFI.

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8. Trouble Shooting

Some potential issues and their solutions are listed below:

8.1 My device fails to DFU boot

For the DFU boot to work, your device should appear as a 'NXP Semiconductors LPC' device when connected to the host.

The following FAQ describes this in more detail:

https://community.nxp.com/message/630577

Note
Due to restrictions with the `dfu-util` utility used by `boot_lpcscrypt`, only one unbooted MCU may be connected. Additionally the supplied script expects a single LPC USB serial (VCOM) port to be connected to the host.

8.2 My device DFU boots but then just prints '.....'

```
Booting LPCScrypt target with "LPCScrypt_xx.bin.hdr"
LPCScrypt target booted
.............................
```

This indicates that the host is unable to establish successful communication with the LPCScrypt Firmware.

- If using Windows, ensure that you have installed the VCOM driver. Refer to the LPCScryptGuide section 'Installing host drivers' for details.
- If using a Linux host, ensure you have installed the correct drivers. Refer to the LPCScryptGuide section 'Installing host drivers' for details.
- Check that you only have a single VCOM device connected to the host via USB.
- If you are using a Virtual Machine (VM), check that the VM has routed the newly enumerated VCOM device to the OS in use.

8.3 My newly programmed debug probe is not recognised by the Host

You may need to install additional Windows drivers in order to make use of your debug probe.

For CMSIS-DAP, the Windows driver package if not already installed – for example by MCUXpresso IDE – can be found at:

https://www.nxp.com/lpc-link2

In addition, there is a small possibility that an incompatible driver may be selected. For more details of this issue and fix, please see the FAQ below:

https://community.nxp.com/message/630660

For J-Link, please check the SEGGER website for more information and to ensure the latest compatible binary is being used.

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