

Firmware/Bitstream Tools Comparison

For new users ([Generation 3 Firmware](#)), the [OpenFutNet](#) tool is recommended.

If the user has a Python 2.7 interpreter installed on Windows OS, he/she could also use the couple Open_FUT (gen 3) + CyControl:

- [Open_FUT for generation 3](#) ([Firmware Update](#) and [FPGA Configuration](#) using a simplified TE_USB_FX2_CyAPI.dll)
- [Cypress USB Control Center](#) ([Implicit Two-Step Recovery Boot](#) uses CyUSB.dll)

See also [TE USB FX2 Software tools](#).

Tool	FPGA Configuration capable?	Generation 2 Firmware Upgrade capable? ⁽¹⁾	Generation 3 Firmware Upgrade capable? ⁽²⁾	It works without Reference Firmware?	Firmware Recovery capable? ⁽³⁾	Remarks
Xilinx iMPACT	 direct or indirect in system programming .mcs file (both Xilinx Flash and third-party SPI Flash can be used)					A Windows OS and a Linux OS version of this tool exists.
DEWESoft Firmware Upgrade Tool	 old .fwu (and .bin) file	 old .fwu (and .bin) file		 Generation 2		Obsolete, not recommended. Only Windows OS (32 bit only) version of this tool exists.
Open_FUT for generation 2	 FPGA Configuration .bit, .mcs file (Xilinx Flash only) or old .fwu (and .bin) file	 .iic file and old .fwu (and .bin) file		 Generation 2		Python 2.7 interpreter required. Only Windows OS (32 bit only) version of this tool exists.
Open_FUT for generation 3	 ⁽⁵⁾ FPGA configuration .bit or a .mcs file (Xilinx Flash only) or old .fwu (and .bin) file		 ⁽⁵⁾ Firmware update .iic file and old .fwu (and .bin) file	 Generation 3		Python 2.7 interpreter required. Only Windows OS version of this tool exists.
CyConsole = Cypress USB Console			 Firmware update .iic file		 implicit two steps recovery boot .iic file	Less easy than CyControl. Only Windows OS version of this tool exists.

CyControl = Cypress USB Control Center	✗	✗	✓ Firmware update .iic file	✓	✓ implicit two steps recovery boot .iic file	Microsoft .NET Framework Version 2.0 required. Only Windows OS version of this tool exists.
OpenFutNet: it is possible to run 3 different procedures	✓ FPGA configuration ⁽⁶⁾ .bit or .mcs file (both Xilinx Flash and third-party SPI Flash can be used)	✗ the explicit two steps recovery boot ⁽⁷⁾ should be used instead	✓ Firmware update ⁽⁶⁾ .iic file	✓ for the explicit two steps recovery boot ⁽⁷⁾ ✗ for the firmware update ⁽⁶⁾ ✗ for the FPGA configuration ⁽⁴⁾	✓ implicit two steps recovery boot ⁽⁷⁾ .iic file	Microsoft .NET Framework Version 4.0.30319 required. Recommended tool. Only Windows OS version of this tool exists.
Linux_FUT	✓ FPGA Configuration .bin only	✓ .bin, but a .iic should also work	✓ .bin, but a .iic should also work	✗	✗ use fx2loader (see also here) for an explicit two step recovery boot instead	libusb library (C API) should be used Only Linux OS version of this tool exists.
fx2loader (see also here)	✗	✗ use explicit two step recovery boot instead	✗ use explicit two step recovery boot instead	✓ ⁽⁸⁾	✓ explicit two step recovery boot	a wrapped libusb library (C API) should be used A Windows OS and a Linux OS version of this tool exists.
fxload (see also here)	✗	✗ use explicit two step recovery boot instead	✗ use explicit two step recovery boot instead	✓ ⁽⁹⁾	✓ explicit two step recovery boot	libusb library (C API) should be used Only Linux OS version of this tool exists.

Firmware/bitstream tools comparison chart

(1) Generation 2 Firmware Upgrade: it requires DEWESoft device driver (VID/PID:0x0547/0x1002) and DEWESoft API.

(2) Generation 3 Firmware Upgrade: it requires TE USB FX2 device driver (VID/PID:0x0BD0/0x0300) and TE API (C++ TE_USB_FX2_CyAPI.dll or .NET TE_USB_FX2_CyUSB.dll).

(3) Firmware Recovery: requires USB generic Cypress device driver, to boot with EEPROM disabled and to enable EEPROM after TE USB FX2 module is inserted into USB port. This is the procedure followed by implicit two step [recovery boot \(TE USB FX2 Firmware Recovery\)](#) (CyConsole and CyControl) and implicit two step [recovery boot](#) (OpenFutNet).

(4) The user can use implicit two step [recovery boot](#) to program the USB FX2 microcontroller's EEPROM with the [Generation 3 firmware](#) required by [firmware are update](#) and [FPGA configuration](#).

(5) Based on simplified TE_USB_FX2_CyAPI.dll

(6) Based on both CyUSB.dll and TE_USB_FX2_CyUSB.dll

(7) Based on CyUSB.dll

(8) To write a new firmware in FX2 microcontroller's RAM, fx2loader does not require a reference firmware but, to write a new firmware in FX2 microcontroller's EEPROM a firmware supporting EEPROM writing should already be running in FX2 microcontroller's RAM.

⁽⁹⁾ To write a new firmware in FX2 microcontroller's RAM, fxload does not require a reference firmware but, to write a new firmware in FX2 microcontroller's EEPROM a firmware supporting EEPROM writing should already be running in FX2 microcontroller's RAM (Vend_Ax.hex is normally used).

Is Reference Firmware required?

The following firmware tools

- [DEWESoft FUT](#) (firmware upgrade tool)
- [Open_FUT for Generation 2](#) ([firmware update](#) and [FPGA configuration](#))
- [Open_FUT for Generation 3](#) ([firmware update](#) and [FPGA configuration](#) using a simplified TE_USB_FX2_CyAPI.dll)
- [OpenFutNet](#) (Generation 3, [firmware update](#) and [FPGA configuration](#) are using both CyUSB.dll and TE_USB_FX2_CyUSB.dll)
- [Linux_FUT](#) (both Generation 2 and Generation 3 firmware are supported)

work only if the [reference firmware](#), or a derived compatible firmware, is running in the module. The reference/derived compatible firmware is necessary because the tools make use of [TE API Commands](#) executed by the USB FX2 microcontroller. These tools are therefore able to update the firmware (EEPROM programming) of the USB FX2 microcontroller and the FPGA configuration file (bitstream, SPI Flash programming).

Note: some [TE API Commands](#) require support from a Xilinx MicroBlaze soft embedded processor (of the [TE reference/derived architecture](#)), but this TE API Commands are not needed for EEPROM and SPI Flash programming.

The following firmware tools

- [Cypress USB Console](#) (implicit two steps [recovery boot \(TE USB FX2 Firmware Recovery\)](#) uses CyAPI.lib)
- [Cypress USB Control Center](#) (implicit two steps [recovery boot \(TE USB FX2 Firmware Recovery\)](#) uses CyUSB.dll)
- [OpenFutNet](#) (implicit two steps [recovery boot](#) uses CyUSB.dll)
- [fx2loader](#) (see also [here](#), explicit two step [recovery boot](#))
- [fxload](#) (see also [here](#), explicit two step [recovery boot](#))

work also if the [reference firmware](#), or a derived firmware, is not running in the module. The reference/derived firmware is not necessary because they do not make use of [TE API Commands](#). Conversely, they directly make use of CyAPI.lib, CyUSB.dll or libusb library.

These tools are only able to update the firmware of the USB FX2 microcontroller, but not the FPGA configuration file (bitstream).