## **Technology Stack Outline**

Trenz Electronic USB FX2 FPGA modules are devices that support USB 1.1 and USB 2.0 Hi-Speed communication with a host computer. Low-power downstream ports (capable of sourcing 100 mA or less) are *not* supported. High-power downstream ports (capable of sourcing at least 500 mA) *are* supported.



TE USB FX2 system overview.

This document gives an overview of the USB FX2 technology stack supported by Trenz Electronic FPGA modules equipped with Cypress EZ-USB FX2 microcontroller (currently: TE0300, TE0320 and TE0630).

## Generations

There are two generations of Trenz Electronic USB FX2 FPGA modules. The following table summarizes the main differences.

generation	2	3
hardware	same	same
reference architecture	same	same
firmware	same	same
VID	0x0547	0x0BD0
PID	0x1002	0x0300
device driver family	DEWESoft	Cypress EZ-USB
API(s) family	DEWESoft (C++)	Cypress (C++, .NET)
reference application	DEWESoft (C++)	Trenz Electronic (C++, .NET)
recovery USB firmware tools	Cypress USB Console, Cypress USB Control Center	Cypress USB Console, Cypress USB Control Center
regular USB firmware tools	DEWESoft FUT Open_FUT (generation 2)	Cypress USB Console, Cypress USB Control Center Open_FUT (generation 3) OpenFutNet (generation 3)
recovery FPGA bitstream tool	Xilinx iMPACT	Xilinx iMPACT
regular FPGA bitstream tool	Xilinx iMPACT, DEWESoft FUT, Open_FUT (generation 2)	Xilinx iMPACT, Open_FUT (generation 3) OpenFutNet (generation 3)

Technology stack generation comparison table.

Trenz Electronic modules can be used with both couples of driver/API:

- DEWESoft device driver + DEWESoft API,
- Cypress device drivers + Trenz Electronic API(s),

but not a mix of the two:

- DEWESoft device driver + Trenz Electronic API(s),
- Cypress device driver + DEWESoft API.

Modules of both generations are factory programmed and tested with an open source reference architecture.

## Capabilities

The reference architecture allows users to

- · read and write the module SDRAM,
- read and write the Flash EEPROM,
- read and write the USB microcontroller EEPROM,
- read firmware version,
- reconfigure the FPGA

from a host application.



Sample application block diagram.

Technology Stack Overview (Recovery Mode)



Technology stack block diagram - recovery mode.

Technology Stack Overview (Regular Mode)





Technology stack block diagram - regular mode.

## Licence

The source code of the Trenz Electronic USB FX2 Technology Stack is released on GitHub under the MIT license.