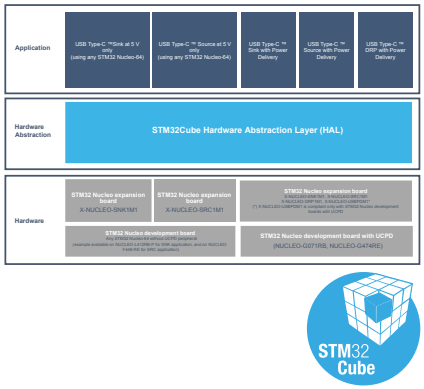
X-CUBE-TCPP

Data brief

USB Type-C™ software expansion for STM32Cube



Product summary	
USB Type-C™ Power Delivery sink software expansion for STM32Cube	X-CUBE-TCPP
USB Type-C™ Power Delivery sink expansion board based on TCPP01-M12 for STM32 Nucleo	X-NUCLEO-SNK1M1
USB Type-C™ Power Delivery DRP expansion board based on TCPP03-M20	X-NUCLEO-DRP1M1
USB Type-C™ Power Delivery source expansion board based on TCPP02-M18 for STM32 Nucleo	X-NUCLEO-SRC1M1
Applications	USB Type-C and Power Delivery

Features

- Demo application example files for sink applications, using:
  - the X-NUCLEO-SNK1M1 USB Type-C™ Power Delivery expansion board connected to any STM32 Nucleo-64 development board (for USB Type-C™ sink at 5 V only without Power Delivery). Example provided for the NUCLEO-L412RB-P
  - the X-NUCLEO-SNK1M1 USB Type-C™ Power Delivery expansion board connected to a NUCLEO-G071RB or NUCLEO-G474RE development board (for USB Type-C™ sink with Power Delivery up to 100 W)
- Demo application example files for source applications using:
  - the X-NUCLEO-SRC1M1 USB Type-C™ Power Delivery expansion board connected to any STM32 Nucleo-64 development board (for USB Type-C™ source without Power Delivery). Example provided for NUCLEO-F446RE
  - the X-NUCLEO-SRC1M1 USB Type-C™ Power Delivery expansion board connected to a NUCLEO-G071RB or NUCLEO-G474RE development board (for USB Type-C™ source with Power Delivery)
- Demo application example files for dual role power applications using:
  - the X-NUCLEO-DRP1M1 USB Type-C Power Delivery expansion board connected to a NUCLEO-G071RB or NUCLEO-G474RE development board for USB Type-C™ DRP with Power Delivery
- Package compatible with STM32CubeMX
- Easy portability across different MCU families, thanks to STM32Cube
- Free user-friendly license terms

Description

The X-CUBE-TCPP software package contains the demo application examples for the USB Type-C™ expansion boards for STM32 Nucleo (X-NUCLEO-SNK1M1, X-NUCLEO-SRC1M1, and X-NUCLEO-DRP1M1) featuring the TCPP01-M12 USB Type-C™ port protection device for sink applications, the TCPP02-M18 USB Type-C™ port protection device for source applications, and the TCPP03-M20 USB Type-C™ Power Delivery device for dual role power (DRP) applications.

For sink applications, the expansion board is plugged onto an STM32 Nucleo development board (any STM32 Nucleo-64 development board, NUCLEO-G071RB, NUCLEO-G474RE, or NUCLEO-L412RB-P) with an STM32 microcontroller that executes the code.

When acting in the sink role, the X-CUBE-TCPP selects the highest and closest power profile to the value indicated by the binary file from the power profiles available on the source.

For source applications, the expansion board is plugged onto an STM32 Nucleo development board (NUCLEO-G071RB, NUCLEO-G474RE or NUCLEO-F446RE) with an STM32 microcontroller that executes the code.

For DRP applications, the expansion board is plugged onto an STM32 Nucleo development board with an STM32 microcontroller that features a USB Type-C™ Power Delivery controller (STM32G0, STM32G4, STM32L5, STM32U5).

The X-CUBE-TCPP can be downloaded from www.st.com or GitHub, where the users can signal bugs and propose new ideas through [Issues] and [Pull Requests] tabs.

1 Detailed description

1.1 What is STM32Cube?

STM32Cube is a combination of a full set of PC software tools and embedded software blocks running on STM32 microcontrollers and microprocessors:

- STM32CubeMX configuration tool for any STM32 device; it generates initialization C code for Cortex-M cores and the Linux device tree source for Cortex-A cores
- STM32CubeIDE integrated development environment based on open-source solutions like Eclipse or the GNU C/C++ toolchain, including compilation reporting features and advanced debug features
- STM32CubeProgrammer programming tool that provides an easy-to-use and efficient environment for reading, writing and verifying devices and external memories via a wide variety of available communication media (JTAG, SWD, UART, USB DFU, I2C, SPI, CAN, etc.)
- STM32CubeMonitor family of tools (STM32CubeMonRF, STM32CubeMonUCPD, STM32CubeMonPwr) to help developers customize their applications in real-time
- STM32Cube MCU and MPU packages specific to each STM32 series with drivers (HAL, low-layer, etc.), middleware, and lots of example code used in a wide variety of real-world use cases
- STM32Cube expansion packages for application-oriented solutions.

1.2 How does this software complement STM32Cube?

This software is based on the STM32CubeHAL, the hardware abstraction layer for the STM32 microcontroller. The package extends STM32Cube by providing a board support package (BSP) for the X-NUCLEO-SNK1M1 USB Type-C Power Delivery sink expansion boards, for the X-NUCLEO-DRP1M1 USB Type-C™ Power Delivery DRP expansion board, and for the X-NUCLEO-SRC1M1 USB Type-C™ Power Delivery source expansion board.

The drivers abstract low-level details of the hardware and allow the applications to access the TCPP01-M12, TCPP03-M20, and the TCPP02-M18 functions in a hardware-independent manner.

The software helps developers to build a very simple USB Power Delivery sink example, starting from STM32CubeMX.

Revision history

Table 1. **Document revision history**

Date	Version	Changes
16-Mar-2021	1	Initial release.
18-Mar-2021	2	Added NUCLEO-G0B1RE support.
07-Apr-2021	3	Changed cover image and description.
08-Jul-2021	4	Updated cover image. Added X-NUCLEO-DRP1M1 compatibility information.
14-Dec-2021	5	Updated all content to add X-NUCLEO-SRC1M1 compatibility information.
09-May-2022	6	Removed references to X-NUCLEO-USBPDM1.
28-Jun-2022	7	Updated cover page image, features, and description.
10-Apr-2024	8	Updated description.