

USB Type-C software expansion for STM32Cube

Application	USB-C Sink at 5 V only (using any STM32 Nucleo-64)	USB-C Sink with Power Delivery	USB-C DRP with Power Delivery
Hardware Abstraction	STM32Cube Hardware Abstraction Layer (HAL)		
Hardware	STM32 Nucleo expansion board X-NUCLEO-SNK1M1	STM32 Nucleo expansion board X-NUCLEO-DRP1M1, X-NUCLEO-SNK1M1, X-NUCLEO-USBPD1, X-NUCLEO-USBPD1M1 (compatible only with STM32 Nucleo development boards with L412)	
	STM32 Nucleo development board Any STM32 Nucleo-64 with L412 (e.g. NUCLEO-L412RB-P)	STM32 Nucleo development board with L412 (NUCLEO-G071RB, NUCLEO-G474RE, NUCLEO-G0B1RE)	



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-C Sink at 5 V only without power delivery) and
 - a NUCLEO-G071RB, NUCLEO-G474RE, NUCLEO-L412RB-P or NUCLEO-G0B1RE development board (for USB-C with power delivery up to 100 W)
- Demo application example files for dual role power and dual role data applications using:
 - the X-NUCLEO-DRP1M1 USB Type-C power delivery expansion board and
 - a NUCLEO-G071RB, NUCLEO-G0B1RE, or NUCLEO-G474RE development board for USB-C with power delivery up to 100 W
- 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 Sink expansion boards for STM32 Nucleo (X-NUCLEO-SNK1M1, X-NUCLEO-USBPD1, X-NUCLEO-DRP1M1) featuring the TCPP01-M12 USB Type-C port protection device for Sink applications and the TCPP03-M20 USB-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 or NUCLEO-G474RE or NUCLEO-L412RB-P) or NUCLEO-G0B1RE with an STM32 microcontroller that executes the code.

For DRP/DRD 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 selects the highest and closest power profile to the value indicated by the binary file from the power profiles available on the source.

The X-CUBE-TCPP can be downloaded from www.st.com or GitHub.

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/X-NUCLEO-USBPD1
USB Type-C power delivery DRP expansion board based on TCPP03-M20	X-NUCLEO-DRP1M1
Applications	USB Type-C and power delivery

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** and **X-NUCLEO-USBPDM1** USB Type-C power delivery Sink expansion boards, and for the **X-NUCLEO-DRP1M1** USB Type-C power delivery DRP expansion board.

The drivers abstract low-level details of the hardware and allow the applications to access the **TCPP01-M12** and **TCPP03-M20** 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.

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