

USB Type-C™ Power Delivery dual role power (DRP) and dual role data (DRD) expansion board based on TCPP03-M20 for STM32 Nucleo



Features

- Support for all USB Type-C™ Power Delivery SPR profiles up to 100 W
- Management of Dual Role Data/Power configuration
- USB 2.0 Dual Role Data compliant according to STM32 USB data capability
- 8/20 μ s surge, overvoltage, overcurrent protection and discharge for V_{BUS}
- Short to V_{BUS} protection for CC1 and CC2 configuration channel pins
- ESD protection (IEC61000-4-2 level 4 \pm 8 kV contact discharge) for CC1, CC2, D+ and D-
- Overvoltage, overcurrent protection and discharge for V_{CONN}
- Common mode filter on D+/D- data lines
- Three power modes to optimize current consumption
- Compliant with Programmable Power Supplies (PPS)
- Free comprehensive development firmware library
- Compliant with STM32 Nucleo-64 boards featuring an STM32 with UCPD
- USB-IF certified (test ID certification: 6408)

Description

The X-NUCLEO-DRP1M1 expansion board allows evaluating the features of TCPP03-M20 and the USB Type-C™ features and protections required for V_{BUS} and CC lines suitable for dual role power (DRP) applications.

The expansion board can be stacked on top of any STM32 Nucleo-64 with Power Delivery (UCPD) peripheral embedded in their microcontrollers.

The X-NUCLEO-DRP1M1 effectively demonstrates the dead battery and Sink operation, thanks to the integrated **ST715PU33R** LDO linear regulator that supplies the connected **STM32 Nucleo** development board. It also demonstrates USB Type-C™ Source operation when a compatible external Source is connected to the board.

Moreover, the expansion board allows Dual Role Data functionalities for sourcing devices.

The X-NUCLEO-DRP1M1 is compliant with the USB Type-C™ and Power Delivery specifications 3.1 standard power range (SPR) and is USB-IF certified as a 100 W DRP solution supporting programmable power supply (PPS).

The companion software package (**X-CUBE-TCPP**) contains the application examples for development boards embedding UCPD-based microcontrollers (**NUCLEO-G071RB** and **NUCLEO-G474RE**) that can be ported to other development boards embedding UCPD-based microcontrollers (for example, **NUCLEO-G0B1RE**).

Product summary	
USB Type-C power delivery dual role power (DRP) and dual role data (DRD) expansion board based on TCPP03-M20	X-NUCLEO-DRP1M1
USB Type-C power delivery sink software expansion for STM32Cube	X-CUBE-TCPP
STM32 Nucleo-64 development board with STM32G071RB MCU	NUCLEO-G071RB
Applications	USB Type C and Power Delivery

1 Schematic diagrams

Figure 1. X-NUCLEO-DRP1M1 schematic diagram (1 of 3)

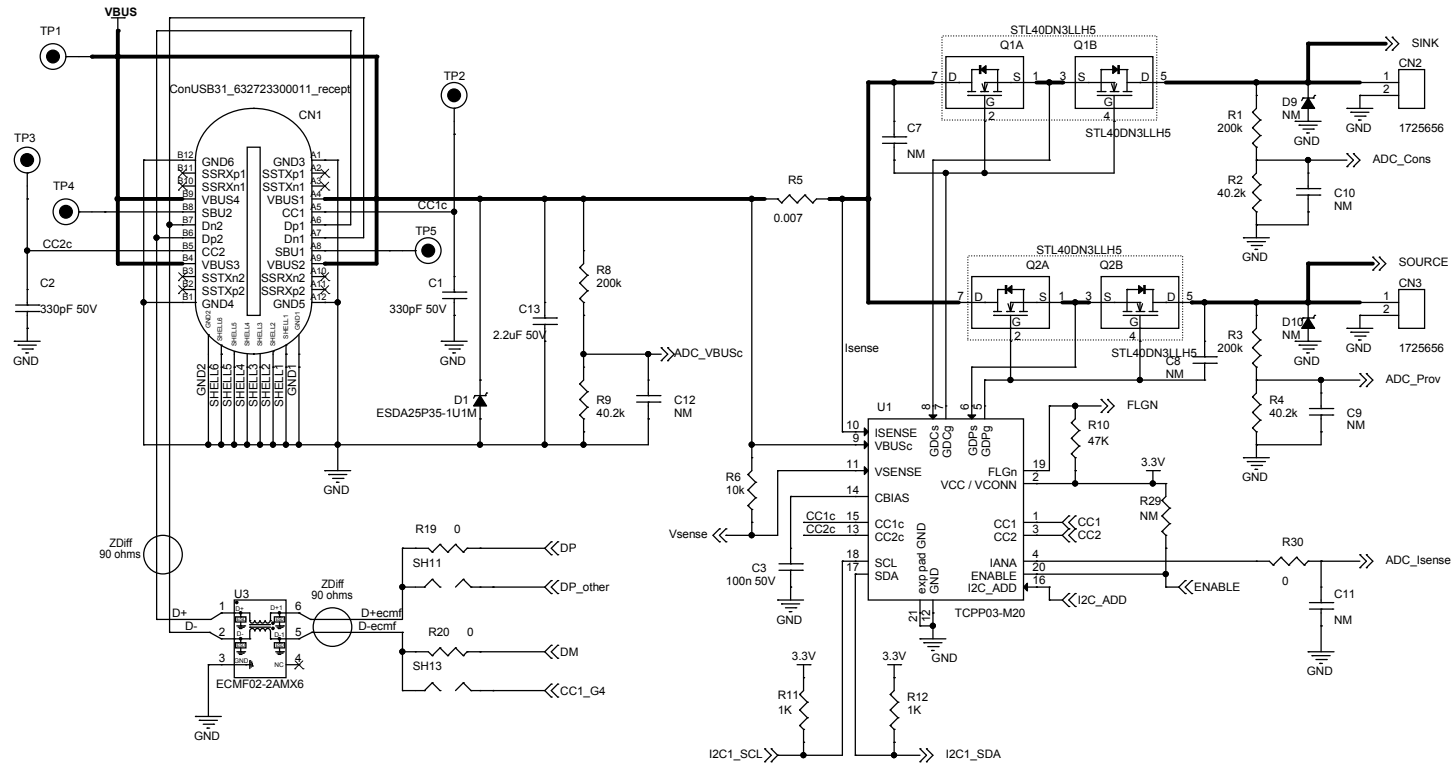


Figure 2. X-NUCLEO-DRP1M1 schematic diagram (2 of 3)

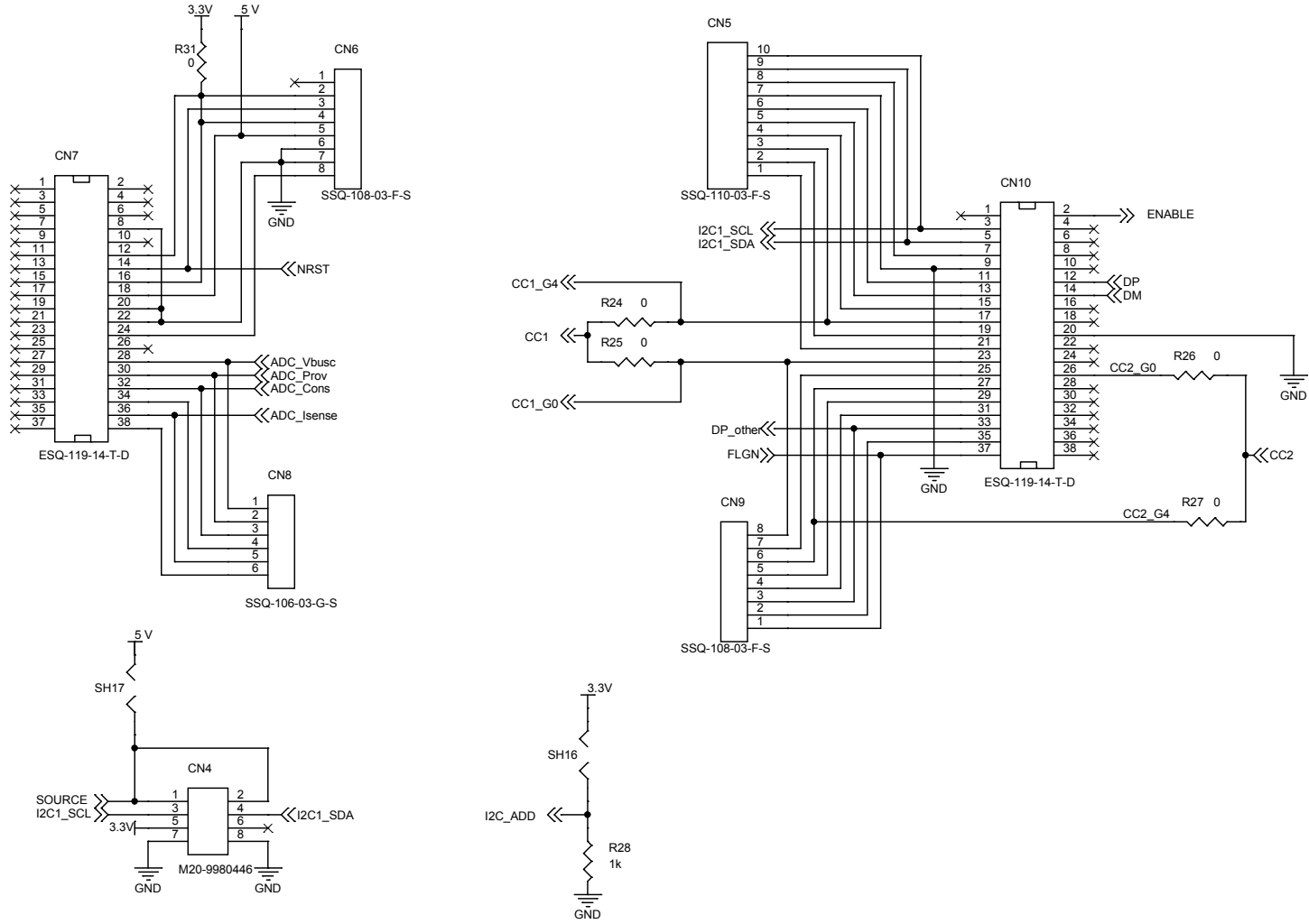
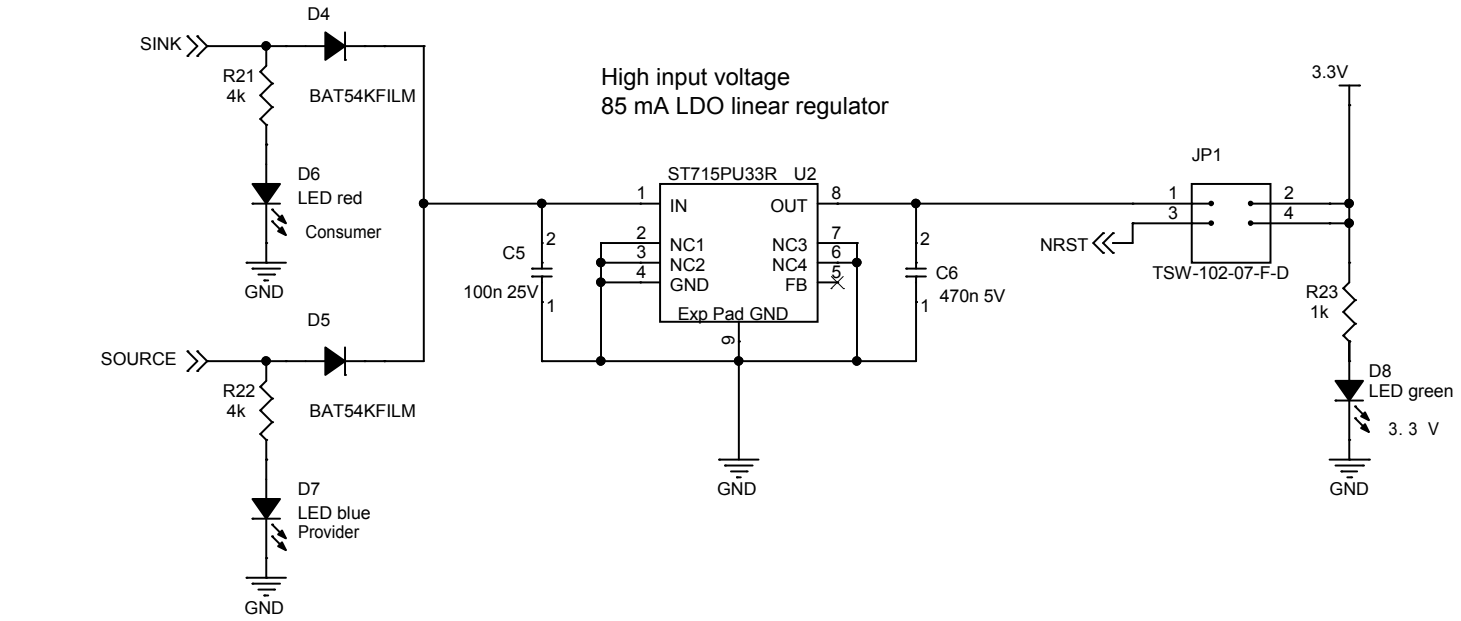


Figure 3. X-NUCLEO-DRP1M1 schematic diagram (3 of 3)



Vsense	Vbus Max	P Max	R0	R13	R14	R15	R16	R17
	22 V	100 W	0	560	732	976	1.3k	2.4k
	17 V	45 W	SH2					
	13 V	36 W	SH3					
	10 V	27 W	SH4					
	6 V	15 W	SH5					



Revision history

Table 1. Document revision history

Date	Revision	Changes
11-Jul-2021	1	Initial release.
18-Feb-2022	2	Updated cover page description.
09-May-2022	3	Updated cover page features.

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