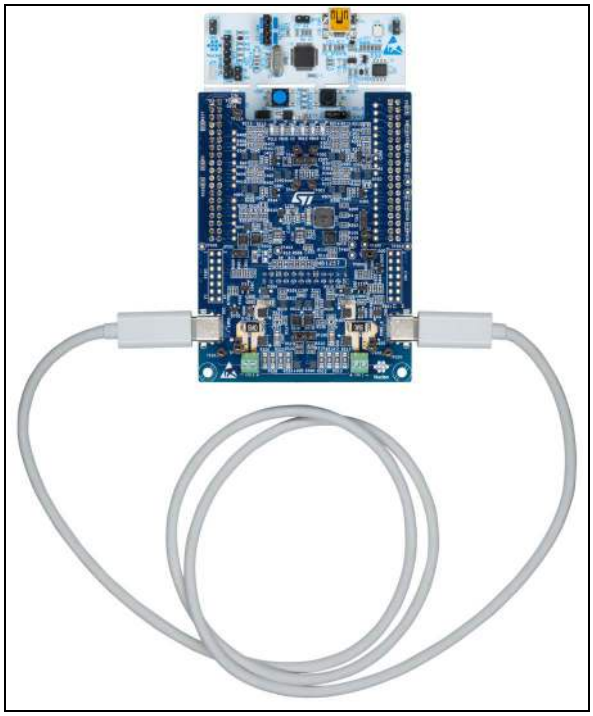
P-NUCLEO-USB001

STM32 Nucleo pack for USB Type-C™ and Power Delivery

Data brief

Features

- Two DRP USB Type-C™ receptacles
- USB 2.0 FS data communication interface as peripheral
- V_{BUS} load and discharge switches
- V_{CONN} switches
- Voltage and current sensing for V_{BUS} monitoring
- EMI filters
- A power connector to interface with external power supply (not supplied)



1. Picture is not contractual.

Description

The STM32 Nucleo pack for USB Type-C™ and Power Delivery (P-NUCLEO-USB001) is a development tool for learning and developing solutions based on USB Type-C™ and USB Power Delivery technologies.

This tool, in association with the certified embedded software solution (X-CUBE-USB-PD), provides the means to control two USB Type-C™ ports using a single STM32F072 32-bit microcontroller, based on ARM® Cortex®-M0.
The X-CUBE-USB-PD is compliant with the USB Type-C 1.2 and USB Power Delivery 2.0 specifications.
A simple analog front-end PHY is used to interface the STM32F072 MCU with the Configuration Channels (CC lines) of the Type-C receptacles and to allow the communication over these lines using the Power Delivery communication protocol.

The P-NUCLEO-USB001 is fully configurable and ready to support different configurations such as Provider, Consumer or DRP.

X-CUBE-USB-PD is compliant with the USB Type-C™ 1.2 and the Power Delivery 2.0 specifications.

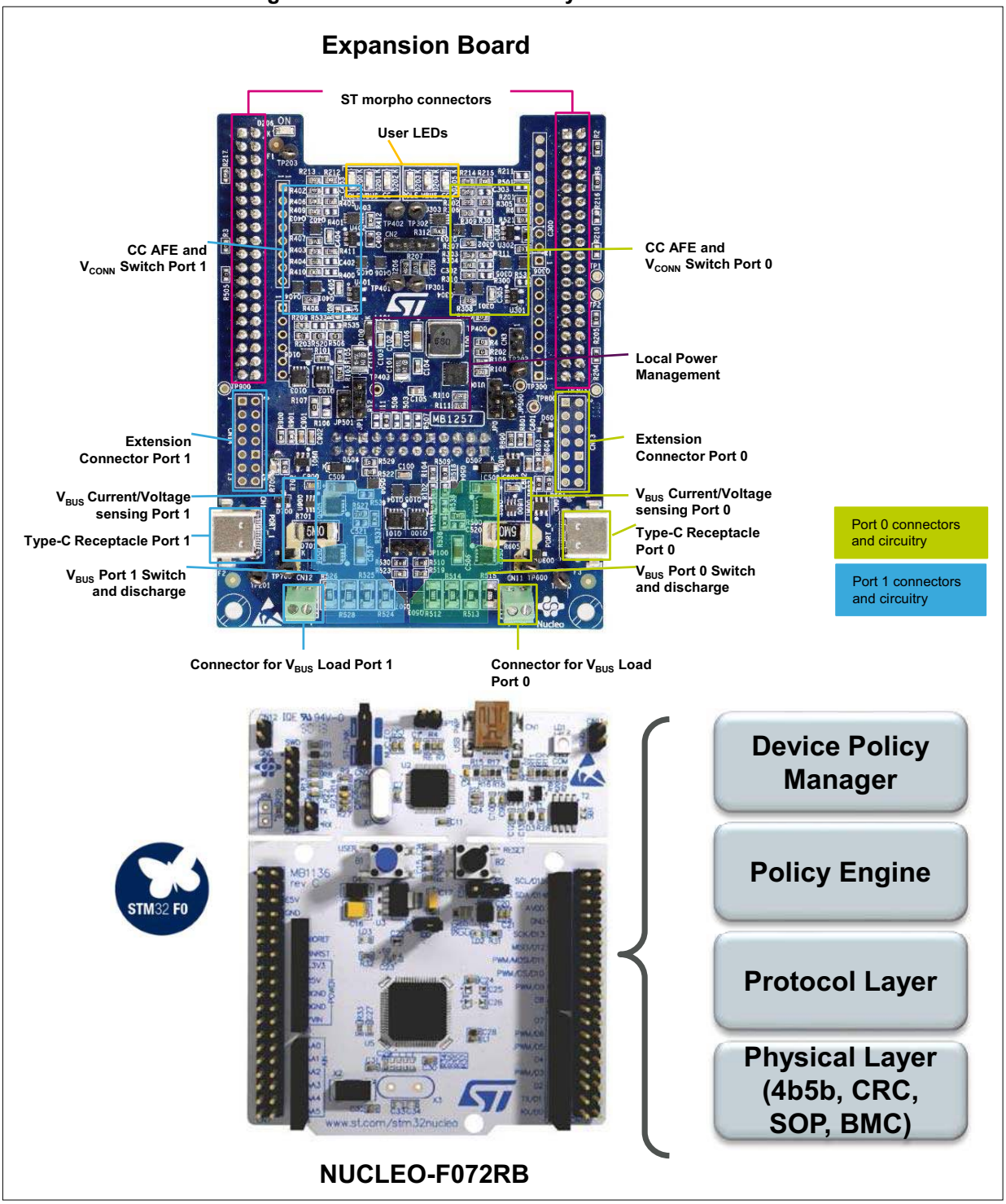
1 P-NUCLEO-USB001 system architecture

The STM32 Nucleo pack for USB Type-C™ and Power Delivery is composed of two main blocks (see *Figure 1: P-NUCLEO-USB001 system architecture*):

- A **control block**: the NUCLEO-F072RB MCU board where the stack is running
- A **USB Type-C™ interface**: the MB1257 expansion board

Note: A certified USB Type-C™ full-featured cable is provided inside the package.

Figure 1. P-NUCLEO-USB001 system architecture



The USB-C and Power Delivery expansion board includes:

- Two DRP USB Type-C™ ports with:
  - Discrete analog front-end PHY for USB Type-C™ configuration and management (Rp, Rd, switches)
  - Voltage and current sensing
  - Dead Battery Management
  - EMI filters
- Dedicated power connector to interface with an external power supply (not included) to provide different profiles and V_{CONN} (5 V)
- On-board power management able to provide internal supply voltages
- Six-status control LEDs
- USB 2.0 interface capability available on Port 0 only acting as UFP
- RoHS compliant
- PCB type and size:
  - Material of PCB: FR4
  - Four-layer layout
- Copper thickness: 35 µm
  - Total dimensions of the expansion board: 74 mm x 98 mm

Note: The integrated Rp value is 4.7 Kohm at 3.3 V to advertise current capability of 3 A at 5 V. User has to change it according to power supply option capabilities.

NUCLEO-F072RB board includes:

- An STM32F072RBT6 32-bit microcontroller based on ARM® Cortex®-M0 with 128 Kbytes of Flash memory,16 Kbytes of SRAM, USB 2.0 FS data interface in LQFP64 package
- Two types of extension resources:
  - Arduino™ Uno Revision 3 connectivity
  - STMicroelectronics ST morpho extension pin headers for full access to all STM32 I/Os
- On-board ST-LINK/V2-1 debugger/programmer with SWD connector
  - selection-mode switch to use the pack as a standalone ST-LINK/V2-1
- Flexible board power supply:
  - USB V_{BUS} on Type-B connector or external source
  - Power management access point
- Three LEDs:
  - USB communication (LD1), user LED (LD2), power LED (LD3)
- Two push-buttons: USER and RESET

- USB re-enumeration capability: three different interfaces are supported on USB
  - Virtual COM port[a]
  - Mass storage
  - Debug port
- Supported by wide choice of Integrated Development Environments (IDEs) including IAR™, Keil®, GCC-based IDEs

Note: The NUCLEO-F072RB board included in the pack has a different configuration respect to the default one. The differences are listed below:

- *Solder bridges SB48, SB49, SB62, SB63 are closed*
- *Solder bridges SB13, SB14, SB15, SB21 are open*
- *0 Ohm resistors R34, R36 are removed*

a. For all the details refer to *STM32 Nucleo pack for USB Type-C™ and Power Delivery with the Nucleo-F072RB board* User manual (UM2050).

2 Revision history

Table 1. Document revision history

Date	Revision	Changes
31-May-2016	1	Initial version.
15-Feb-2017	2	Updated *Description*.