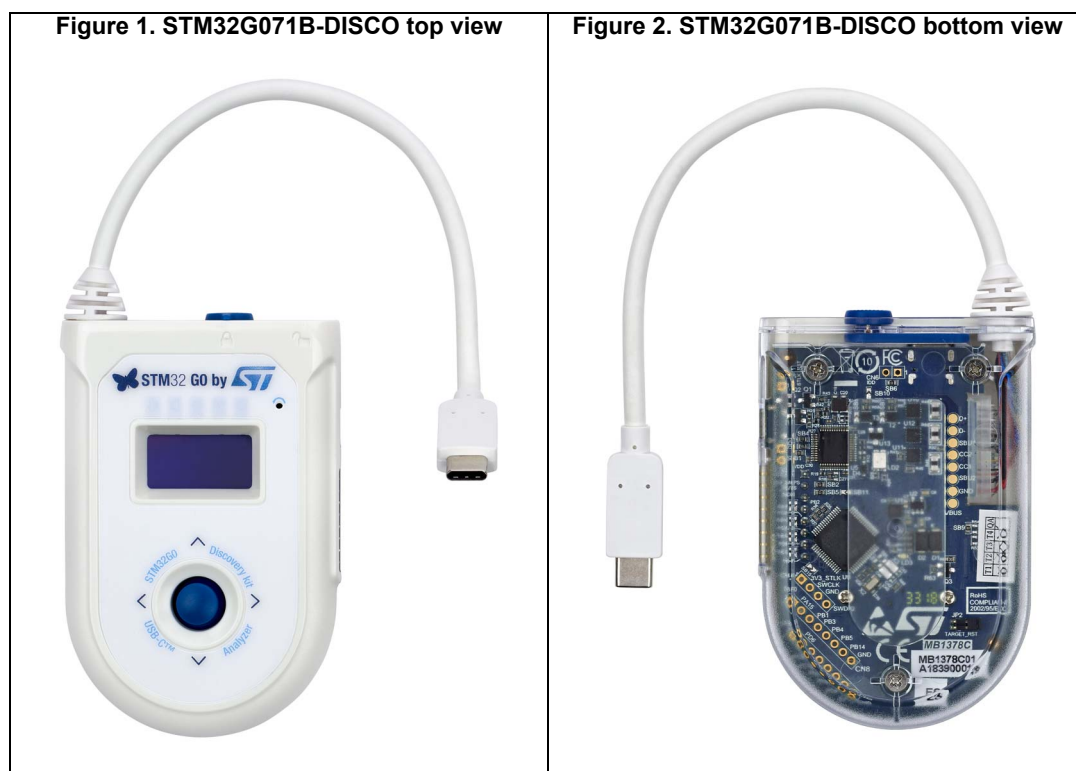STM32G0 Discovery kit for USB Type-C™ and Power Delivery

Introduction

The STM32G071B-DISCO Discovery board is a demonstration and development platform for the STMicroelectronics Arm® Cortex®-M0+ core-based STM32G071RB microcontroller and particularly the USB Type-C™ and Power Delivery controllers. The STM32G071B-DISCO Discovery board is presented in a plastic casing with all necessary interfaces for easy connection to, and interoperability with, other USB Type-C™ devices. The STM32G071B-DISCO Discovery board discovers and displays USB Type-C™ port capabilities such as data role, power role, V_{BUS} and I_{BUS} monitoring. The integrated ST-LINK/V2-1 provides an embedded in-circuit debugger and programmer for the STM32 MCU, allowing SWD debugging support and external GUI trace in the STM32Cube™ USB-PD monitor. All functions are accessible by a 4-way user joystick to glance through menus and information displayed by the 128 x 64 pixels OLED embedded display. An 8-pin user connector gathers all communication signals, with the possibility of additional internal GPIO extensions.

The STM32G071B-DISCO Discovery board comes with the comprehensive free software libraries and examples available with the STM32Cube™ MCU Package.

Figure 1. STM32G071B-DISCO top view	Figure 2. STM32G071B-DISCO bottom view

Pictures are not contractual.

Contents

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1 Features

- STM32G071RB microcontroller featuring 128 Kbytes of Flash memory and 32 Kbytes of RAM in LQFP64 package
- Plastic case
- 1" 128 x 64 pixels OLED LCD module with SPI interface
- USB Type-C™ interface plug cable and receptacle connector accessible by door with reed sensor detection
- 3 bidirectional current and power monitors with I^2C interface to measure V_{BUS}, CC1 and CC2 protected and isolated lines
- On-board DC/DC converter to sustain power supply with V_{BUS} varying from 3 V to 20 V (+/- 5 %)
- 4 user status LEDs about USB Type-C™ configuration
- 3 LEDs for power and ST-LINK communication
- 4-way joystick with selection button
- 1 reset push-button
- Board external connectors:
  - USB Type-C™ plug cable
  - USB Type-C™ receptacle connector
  - 8-pin user extension connector including ADC, SPI, USART and I^2C communication signals
  - USB with Micro-AB (ST-LINK)
- Board internal connectors:
  - 2 x 8-pin GPIOs free pins from microcontroller (accessible internally when case is removed)
  - USB Type-C™ test points for main signals
- Flexible power-supply options: ST-LINK USB V_{BUS} or USB Type-C™ V_{BUS}
- On-board ST-LINK/V2-1 debugger/programmer with USB enumeration capability: mass storage, Virtual COM port and debug port
- Comprehensive free software libraries and examples available with the STM32Cube™ MCU Package
- Support of a wide choice of integrated development environments (IDEs), including IAR™, Keil® and GCC-based IDEs

2 General information

The STM32G071B-DISCO embeds an STM32 32-bit microcontroller based on the Arm[®](a) Cortex[®]-M0+ processor.

arm

3 Product marking

Evaluation tools marked as "ES" or "E" are not yet qualified and are therefore not ready to be used as reference design or in production. Any consequences arising from such usage will not be at STMicroelectronics' charge. In no event will STMicroelectronics be liable for any customer usage of these engineering sample tools as reference designs or in production.

'E' or 'ES' marking examples of location:

- on the targeted STM32 that is soldered on the board (for illustration of STM32 marking, refer to the section *Package information* in the STM32 datasheet at *www.st.com*).
- next to the evaluation tool ordering part number, that is stuck or silkscreen printed on the board

This board features a specific STM32 device version, which allows the operation of any bundled commercial stack/library available. This STM32 device shows a "U" marking option at the end of the standard part number and is not available for sales.

In order to use the same commercial stack in his application, a developer may need to purchase a part number specific to this stack/library. The price of those part numbers includes the stack/library royalties.

4 System requirements

- Windows[®] OS (7, 8 and 10), Linux[®] 64-bit or macOS[®](b)
- USB Type-A to Micro-B cable

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a. Arm is a registered trademark of Arm Limited (or its subsidiaries) in the US and or elsewhere.

b. macOS[®] is a trademark of Apple Inc., registered in the U.S. and other countries.

5 Conventions

Table 1 provides the conventions used for the ON and OFF settings in the present document.

Table 1. ON/OFF conventions

Convention	Definition
Jumper JPx ON	Jumper fitted
Jumper JPx OFF	Jumper not fitted
Solder bridge SBx ON	SBx connections closed by solder or 0 Ohm resistor
Solder bridge SBx OFF	SBx connections left open

6 Development toolchains

- Keil® MDK-ARM[a]
- IAR™ EWARM[a]
- GCC-based IDEs

7 Demonstration software

The demonstration software, included in the STM32Cube MCU Package corresponding to the on-board microcontroller, is preloaded in the STM32 Flash memory for easy demonstration of the device peripherals in standalone mode. The latest versions of the demonstration source code and associated documentation can be downloaded from *www.st.com*.

8 Ordering information

To order the STM32G071B-DISCO Discovery kit, refer to *Table 2*.

Table 2. Ordering information

Order code	Target STM32
STM32G071B-DISCO	STM32G071RB

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a. On Windows only

9 Hardware layout and configuration

The STM32G071B-DISCO Discovery board is designed around the STM32 microcontroller in a 64-pin LQFP package.

Figure 3 shows the connections between the STM32 and the external peripherals (ST-LINK/V2-1, USB Type-C™ connectors, OLED display, current/power monitors, LEDs, joystick, GPIO connectors).

Figure 4 and *Figure 5* show the location of these features on the STM32G071B-DISCO.

Figure 6 shows the PCB mechanical dimensions of the STM32G071B-DISCO Discovery board.

Figure 7 shows the mechanical dimensions of the STM32G071B-DISCO Discovery board with casing.

Figure 3. Hardware block diagram
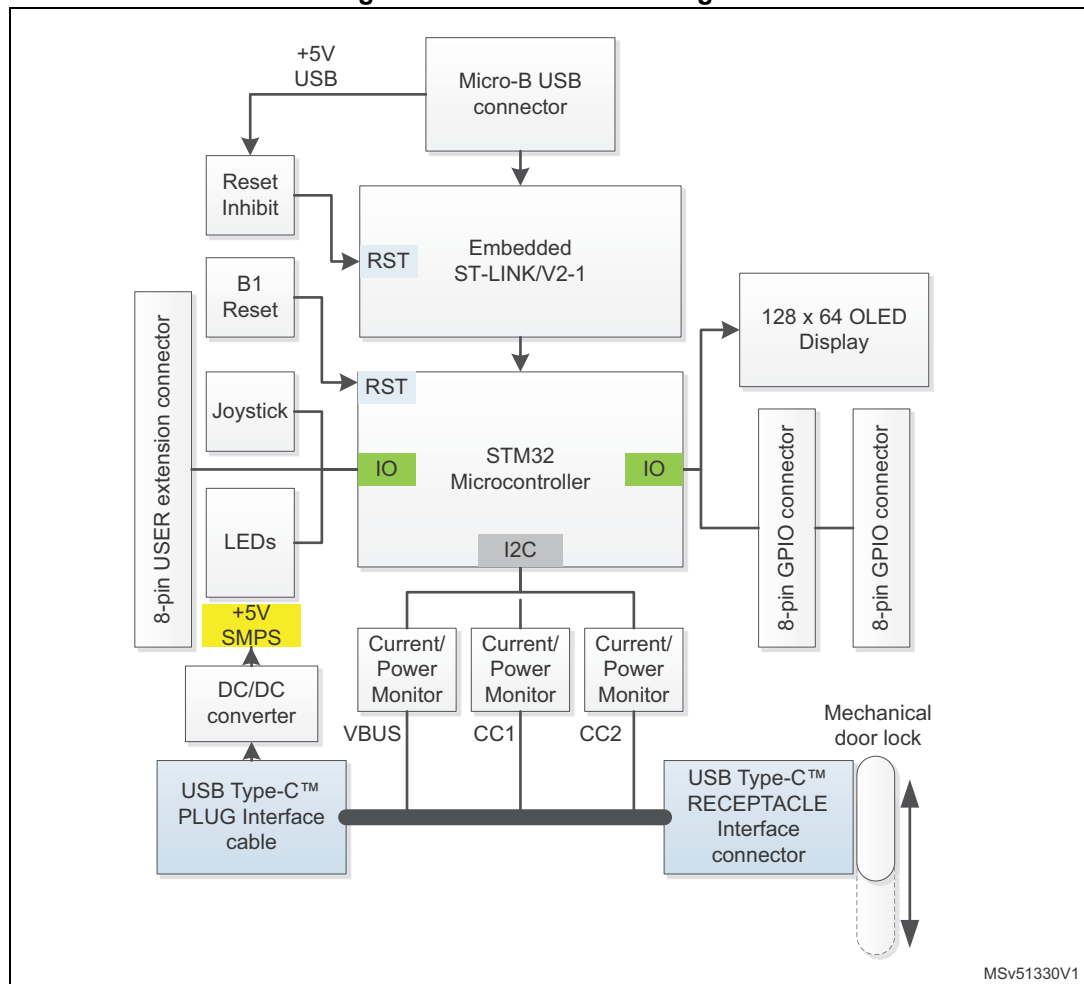
9.1 STM32G071B-DISCO Discovery board layout

Figure 4. Top layout

USB Type-C™ Plug interface cable

USB Type-C™ Receptacle interface

SW1 reed sensor

Plastic casing

Reset button

ST-LINK USB micro-B interface

128 x 64 pixels OLED display

8-pin USER extension connector

DC/DC converter VBUS to 5V SMPS

4-way joystick with selection button

8-pin GPIO internal connectors

MSv51331V1

Figure 5. Bottom layout

JP1 ST-LINK Reset

CN6 IDD power
consumption
measurement

STM32F103
ST-LINK

LD2 ST-LINK com
LED

STM32G071RBT6
microcontroller

8-pin GPIO
internal connectors

USB Type-C™ line
test points

LD3 ST-LINK
Fault

JP2 target Reset

MSv51332V1

9.2 STM32G071B-DISCO Discovery mechanical drawing

Figure 6. STM32G071B-DISCO board mechanical dimensions (top view)
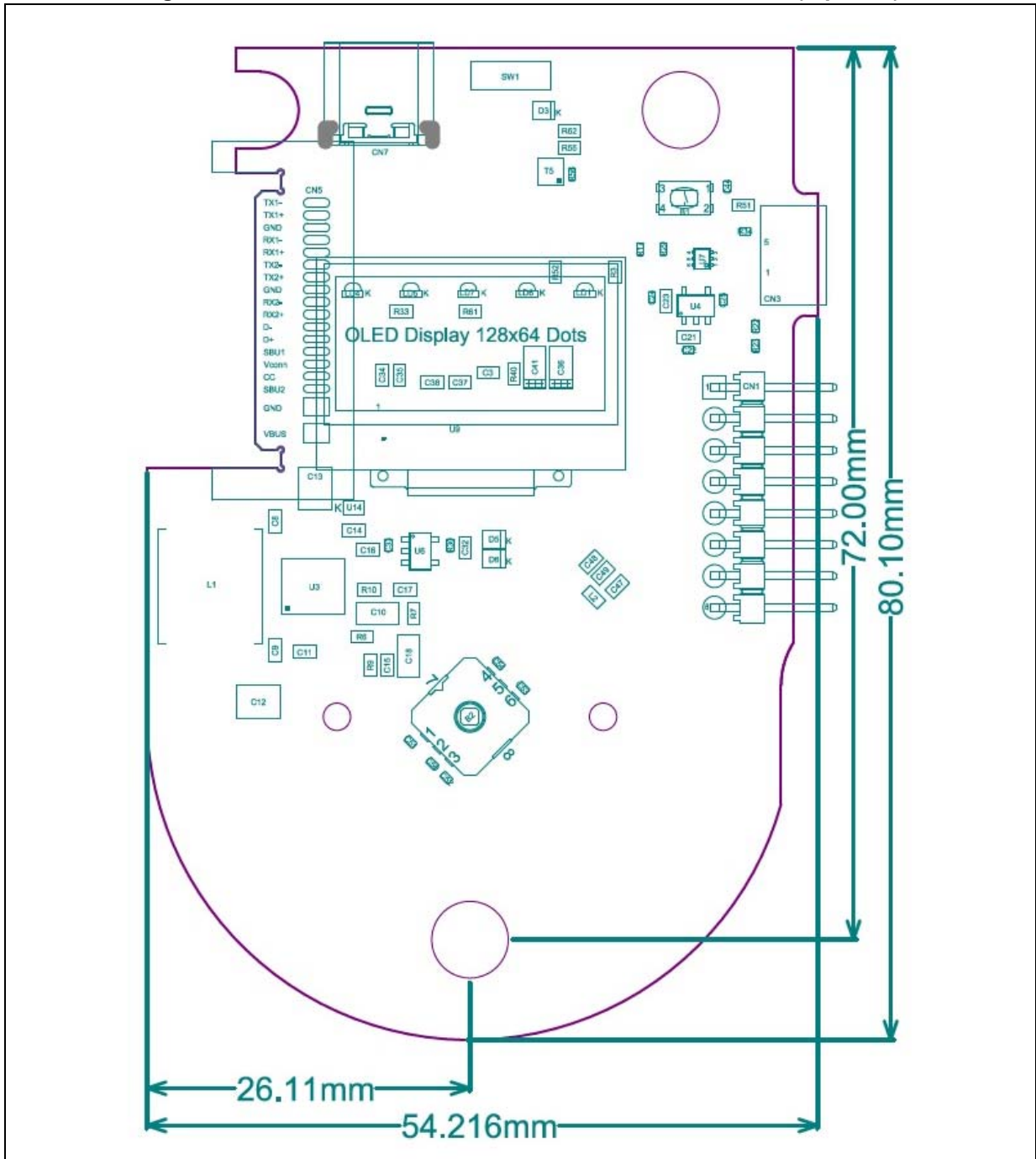
Figure 7. Mechanical drawing with casing
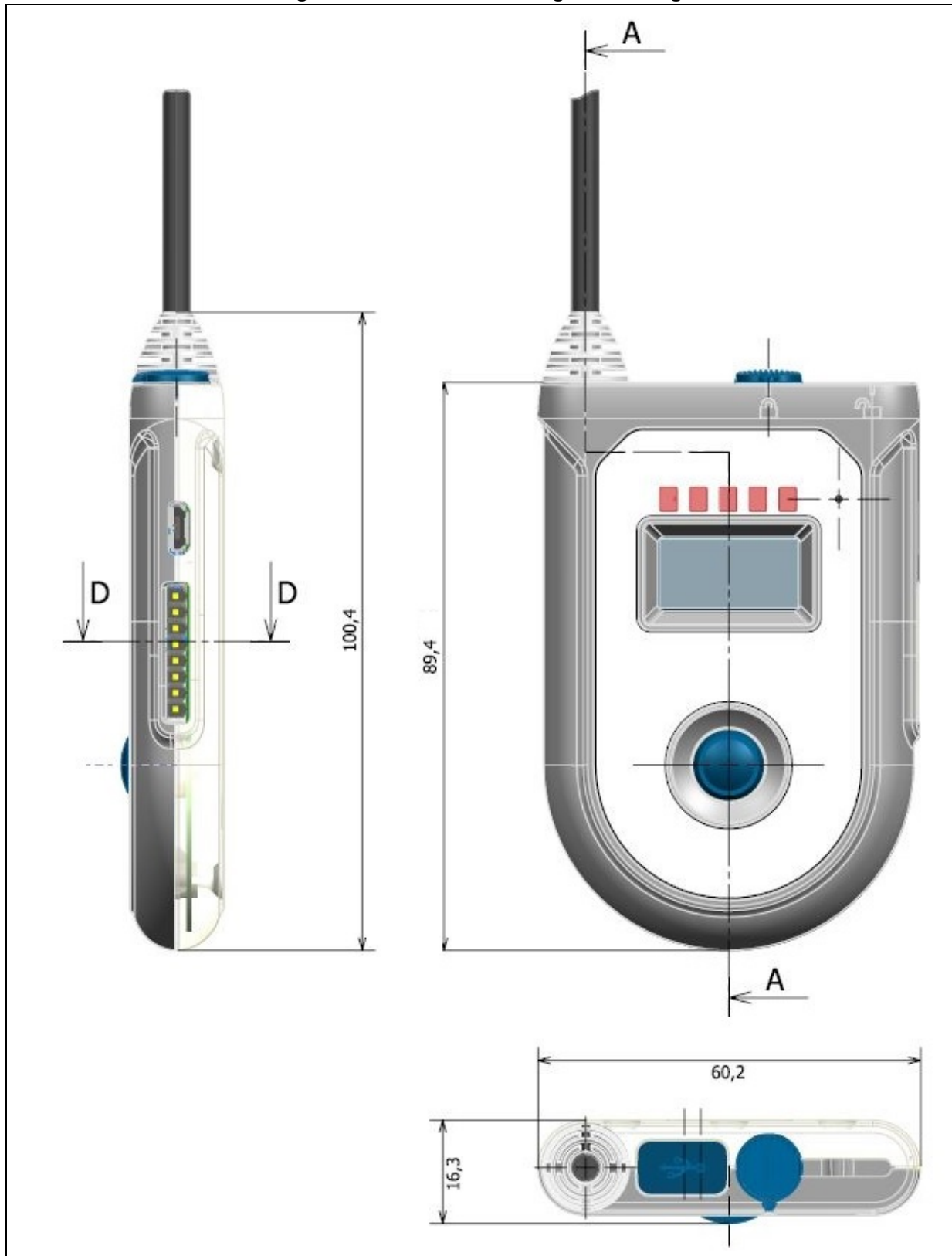
9.3 Embedded ST-LINK/V2-1

The ST-LINK/V2-1 programming and debugging tool is integrated on the STM32G071B-DISCO Discovery board. Compared to ST-LINK/V2 the changes are listed below.

The new features supported on ST-LINK/V2-1 are:

• USB software re-enumeration

• Virtual COM port interface on USB

• Mass storage interface on USB

• USB power management request for more than 100 mA power on USB

These features are no more supported on ST-LINK/V2-1:

• SWIM interface

• Application voltage lower than 3 V

For all general information concerning debugging and programming features common between V2 and V2-1 refer to *ST-LINK/V2 in-circuit debugger/programmer for STM8 and STM32 User manual (UM1075)*.

9.3.1 Drivers

Before connecting the STM32G071B-DISCO to a Windows® (7, 8, 10) PC via USB, a driver for ST-LINK/V2-1 must be installed. It is available from the *www.st.com* website.

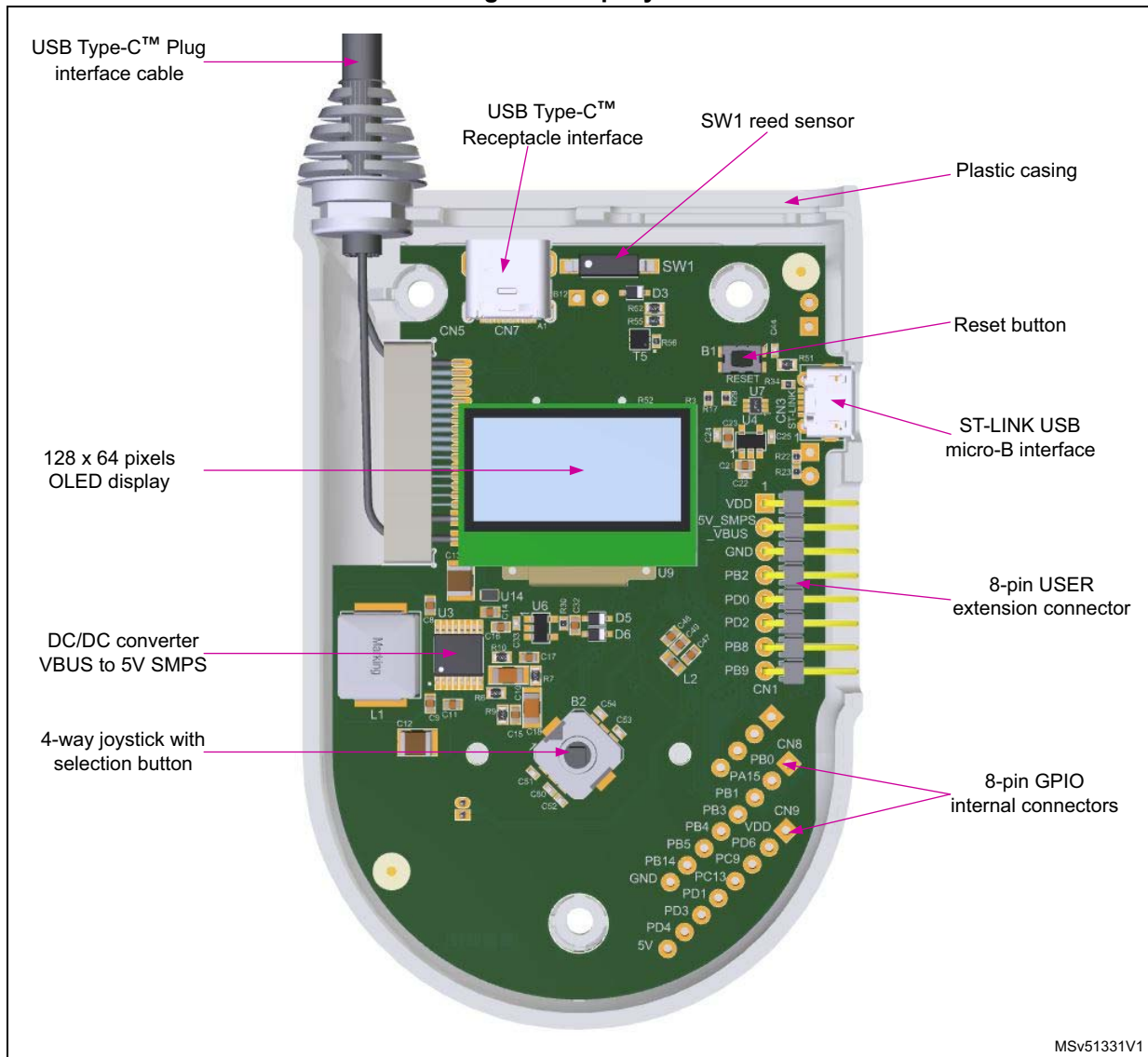If the STM32G071B-DISCO Discovery kit is connected to the PC before the driver is installed, there is a possibility that the Windows® device manager reports some USB devices found on the STM32G071B-DISCO as *Unknown*. To recover from such a situation, after installing the dedicated driver downloaded from *www.st.com*, the association of the STM32G071B-DISCO *Unknown* USB device to the dedicated driver must be updated in the device manager manually.

Note: *It is recommended to proceed using the USB Composite Device line, as shown in Figure 8.*

Figure 8. USB Composite Device
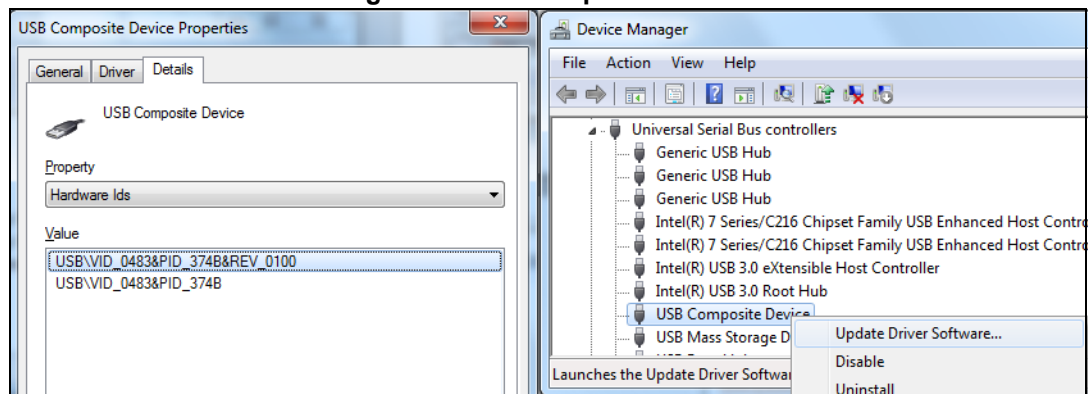
9.3.2 ST-LINK/V2-1 firmware upgrade

The ST-LINK/V2-1 embeds a firmware upgrade mechanism for in-situ upgrade through the USB port. As the firmware may evolve during the lifetime of the ST-LINK/V2-1 product (for example new functionality, bug fixes, support for new microcontroller families), it is

recommended to visit the *www.st.com* website before starting to use the STM32G071B-DISCO board and periodically, to stay up-to-date with the latest firmware version.

9.4 Power supply

The STM32G071B-DISCO Discovery board is designed to be powered either by a ST-LINK/V2-1 connected to a PC or by the USB Type-C™ connectors connected to a USB Type-C™ device. The power supply is automatically managed and there is no need to configure the STM32G071B-DISCO Discovery board. The source of power supply can be known by the microcontroller by the two signals STLK_ON and SMPS_ON corresponding respectively to the ST-LINK/V2-1 source and 5 V generated by the DC/DC converter since the board is power supplied by USB Type-C™ connection.

When the STM32G071B-DISCO Discovery board is only connected to a USB Type-C™ device, the V_{BUS} power supply may vary from 3 V to 20 V (+/- 5%) and the embedded SMPS circuitry is able to generate the necessary 5 V internal power supply from the whole V_{BUS} input range.

As soon as the power supply is present on the board by one of the above power sources, the green LD1 LED POWER 5V is lit on the front panel.

To program/debug the STM32G071RB microcontroller, the STM32G071B-DISCO Discovery board must be connected with the ST-LINK/V2-1 connector to a PC, otherwise the ST-LINK/V2-1 microcontroller is forced to a RESET state while the power source is not provided by the ST-LINK/V2-1 connector. This feature is managed by the ST-LINK inhibition circuitry (Q1 and Q2 transistors).

9.5 Clock references

Up to 3 clock sources can be used as described below:
- MCO clock from U5 STM32F103CB ST-LINK/V2-1 microcontroller (default configuration)
- X2, 32 KHz crystal for the STM32G071RB microcontroller
- X3, 8 MHz oscillator for the STM32G071RB microcontroller

9.6 Reset Source

The general reset of the STM32G071B-DISCO board is active low. The reset sources are:
- Reset button B1
- Embedded ST-LINK/V2-1 (with JP2 and SB4 fitted)

9.7 USB Type-C™ V_{BUS} DC/DC converter to 5 V

The STM32G071B-DISCO Discovery board can be directly power supplied by V_{BUS} from USB Type-C™ devices. In that case, V_{BUS} may vary from 3 to 20V (+/- 5%) and the internal 5 V is generated to supply the STM32 microcontroller and the 128 x 64 pixels OLED display respectively with two embedded 3.3V and 3.6V LDO regulators. The DC/DC converter is able to provide a total source current up to 500mA. It can be controlled and enabled by the EN_SMPS pin from the STM32G071RB microcontroller.

9.8 128 x 64 pixels OLED display

The STM32G071B-DISCO Discovery board uses a white 128 x 64 pixels OLED panel matrix, high contrast, SPI driven, to display messages and user menus. It is interactively controlled by the STM32G071RB microcontroller and gives status about USB Type-C™ modes and operating context.

9.9 IDD power consumption measurement

The user can measure IDD power consumption of the STM32G071RB microcontroller by connecting an ammeter between pins 1 and 2 from CN6. CN6 connector is not fitted by default but must be added by users. To be able to measure the power consumption of the microcontroller, SB6 must be removed beforehand.

9.10 4-way user joystick with selection button

All menus and configuration can be performed with the 4-way user joystick UP, DOWN, LEFT, RIGHT and validation keys.

9.11 Power current sensing ICs

The STM32G071B-DISCO Discovery board can monitor the current/power consumptions of the USB Type-C™ lines CC1, CC2 and V_{BUS}. These high accuracy sensors are directly controlled by an I^2C communication bus with the STM32G071RB microcontroller. They monitor both shunt voltage drops and bus supply voltage via a 15mOhm shunt resistor serially mounted respectively with the CC1, CC2 and V_{BUS} lines.

9.12 USB Type-C™ operating modes and connections

The STM32G071B-DISCO Discovery board can be connected different ways. There are 3 operating modes as described here below:

- Standalone mode (or Sink mode): STM32G071B-DISCO Discovery board is connected to a single external device with its USB Type-C™ Plug interface. It mainly displays source capabilities of the external device.
- Spy mode: STM32G071B-DISCO Discovery board is connected to two USB Type-C™ external devices via its Plug and Receptacle interfaces. This is a non-intrusive connection giving information about devices roles and power characteristics.
- Advanced user mode: STM32G071B-DISCO Discovery board is connected to two USB Type-C™ external devices via its Plug and Receptacle interfaces and the connection to the ST-LINK/V2-1 allows advanced debug mode and interfacing with ST USB PD GUI.

9.13 USB Type-C™ Receptacle mechanical door lock

The user can connect the STM32G071B-DISCO Discovery board in standalone mode to a single USB Type-C™ device with the USB Plug cable. In that case, the USB Type-C™ receptacle mechanical door must be locked. A detection reed sensor (SW1) is connected to the STM32 microcontroller to identify if the mechanical door is locked or not. This

determines the operating mode in which the system is configured. When the mechanical door is unlocked, this allows connections of a USB Type-C™ connector on the receptacle side. A little magnet is located into the mechanical plastic door (shown below). Please notice that once the board has been removed out of its casing, the simulation of the magnet action can be performed by fitting SB16 (door locked corresponds to SB16 fitted and door unlocked to SB16 not fitted).

Figure 9 illustrates the positions of the mechanical door according to the locked and unlocked modes.

Figure 9. Mechanical door system
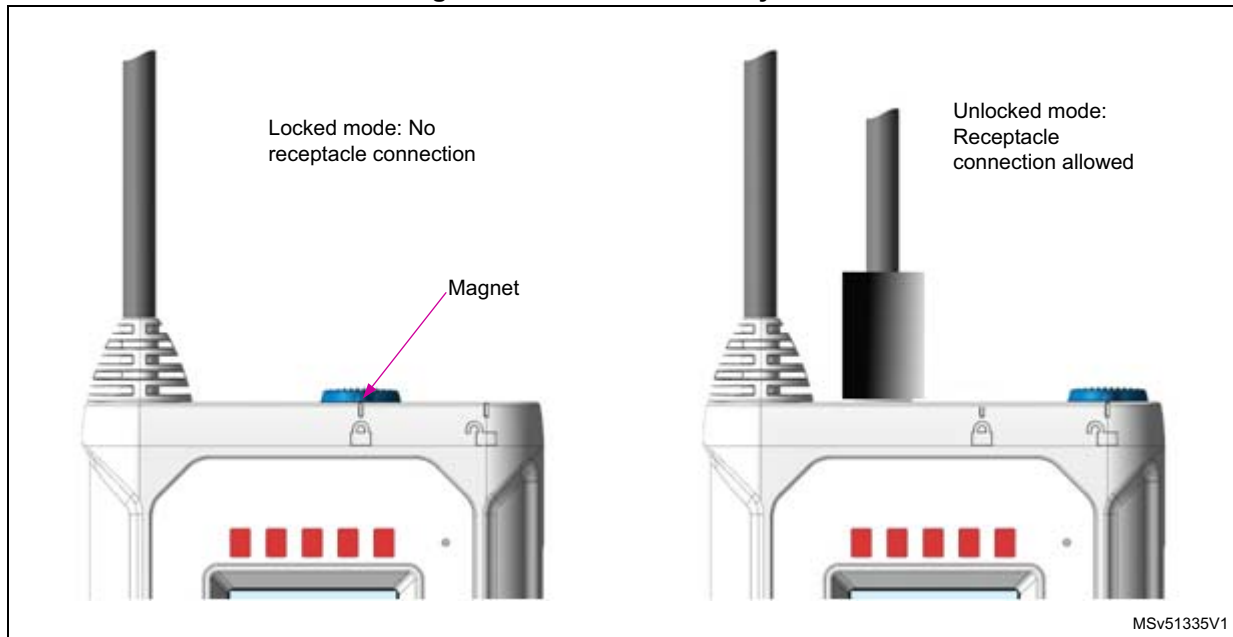
9.14 Virtual COM port

The serial interface USART3 (or USART4) is directly available as a virtual COM port of the PC, connected to the ST-LINK/V2-1 USB connector CN1. The virtual COM port settings are configured as: 115200 b/s, 8 bits data, no parity, 1 stop bit, no flow control.

9.15 Buttons and LEDs

The RESET button B1 is located on the top side of the STM32G071B-DISCO Discovery board and can be accessed by inserting a pointed instrument to press the button through the casing hole. See the *Figure 10* below. This action resets the STM32G071RB microcontroller.

Five LEDs are located on the front panel of the STM32G071B-DISCO Discovery board and their description is given in the *Table 3* with LEDs located on the bottom side of the PCB.

Figure 11 describes the pictogram of the front panel and the associated LEDs.

Figure 10. Accessing the RESET button B1
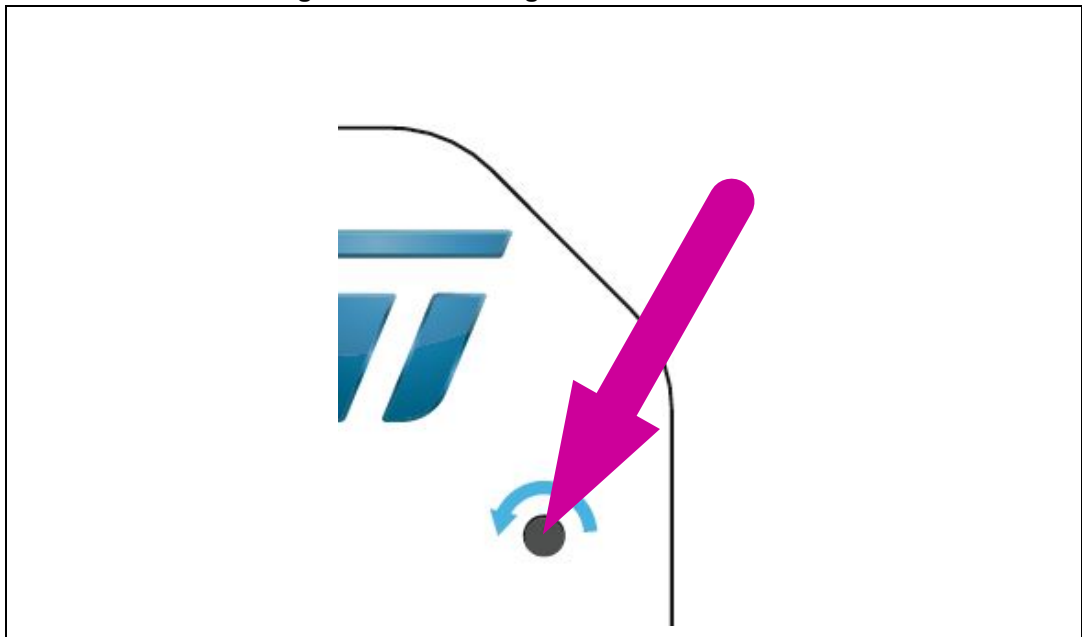
Table 3. LEDs assignment and functions

Reference	Color	Name	Location	Function
LD1	Green	POWER 5V	Top	5 V present onto the board
LD2	Red/Green	ST-LINK COM	Bottom	ST-LINK communication with host PC
LD3	Red	ST-LINK FAULT	Bottom	ST-LINK Fault overcurrent
LD4	Orange	SINK mode	Top	Attached to a power source
LD5	Orange	SOURCE mode	Top	Attached to a device as source
LD6	Green	SPY mode	Top	SPY mode active
LD7	Green	CC	Top	CC1 active line

Figure 11. LEDs and pictograms in front panel
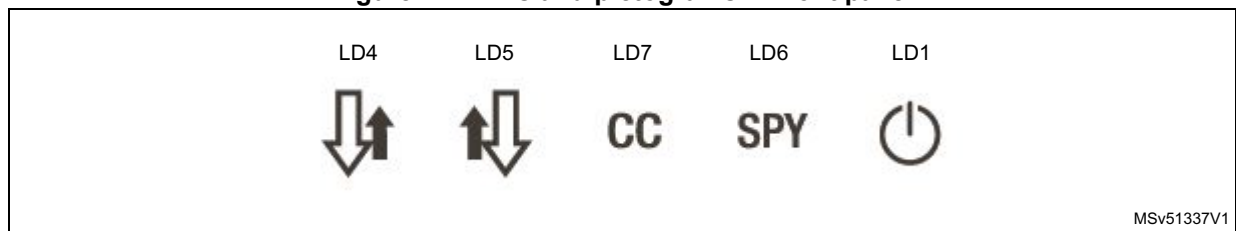
10 Connectors

10.1 CN1 User connectivity

CN1 is an 1x8-pin, 2.54mm pitch connector located on the right side of the STM32G071B-DISCO Discovery board. A description is given below in the *Table 4*. The default pins assignment is shown on the second column of this table.

An alternate function, when available, can be selected by fitting a corresponding solder bridge described in the right column.

For example, users want to use DAC1_OUT1 functionalities of PA4 instead of USBPD2 features of PD2 (for pin 6 of CN1). In that case, SB12 must be fitted. Please notice that SB12 fitting shorts PD2 and PD4 (see schematics for details), and then it is necessary to configure PD2 as an input floating pin to avoid any GPIO conflict.

Another example, SPI2 signals are required on CN1 for external communication with the STM32G071B-DISCO Discovery board. Then SB12 and SB13 must be fitted to allow SPI2_CLK and CPI2_MOSI available on CN1.

Table 4. User connectivity CN1

Pin number	Default assignment	Alternate function	AF when SBxx fitted
1	VDD	N/A	-
2	5V_SMPS_VBUS	N/A	-
3	GND	N/A	-
4	PB2/SPI2_MISO/ADC_IN10	PA5/DAC1_OUT2/ADC_IN5	SB11
5	PD0/USBPD2_CC1	PB13/SPI2_CLK	SB13
6	PD2/USBPD2_CC2	PA4/DAC1_OUT1/ADC_IN4/SPI2_MOSI	SB12
7	PB8/I2C1_SCL/USART3_TX	N/A	-
8	PB9/I2C1_SDA/USART3_RX	N/A	-

10.2 CN5 USB Type-C™ Plug cable

CN5 is a 24-pin cable compatible with Universal Serial Bus Type-C™ specifications and shown in *Figure 12*. The pinout is described in *Table 5* and *Table 6*.

Figure 12. CN7 USB Type-C™ 24-pin connector
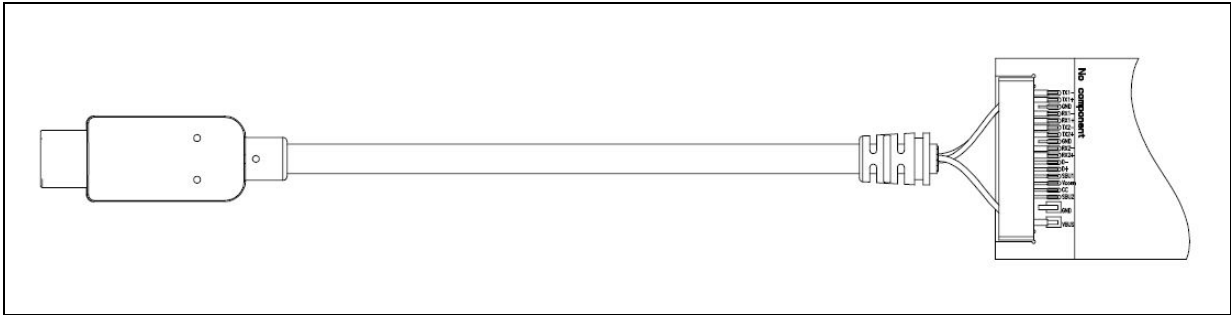
Table 5. CN5 USB Type-C™ Plug cable

Pin number	Assignment
A1	GND
A2	TX1_P
A3	TX1_N
A4	VBUS
A5	CC
A6	DP1
A7	DM1
A8	SBU1
A9	VBUS
A10	RX2_N
A11	RX2_P
A12	GND
B1	GND
B2	TX2_P
B3	TX2_N
B4	VBUS
B5	VCONN
B6	NC
B7	NC
B8	SBU2
B9	VBUS
B10	RX1_N
B11	RX1_P
B12	GND

Table 6. CN5 USB Type-C™ Plug cable pinout

A12	A11	A10	A9	A8	A7	A6	A5	A4	A3	A2	A1
GND	RX2_P	RX2_N	VBUS	SBU1	DM1	DP1	CC	VBUS	TX1_N	TX1_P	GND
GND	TX2_P	TX2_N	VBUS	VCONN	-	-	SBU2	VBUS	RX1_N	RX1_P	GND
B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12

10.3 CN7 USB Type-C™ Receptacle connector

CN7 is a 24-pin connector compatible with Universal Serial Bus Type-C™ specifications and shown in *Figure 13*. Please notice that the mechanical door system must be unlocked to be able connecting a USB Type-C™ cable on CN7. The pinout is described in *Table 7* and *Table 8*.

Figure 13. CN7 USB Type-C™ 24-pin connector
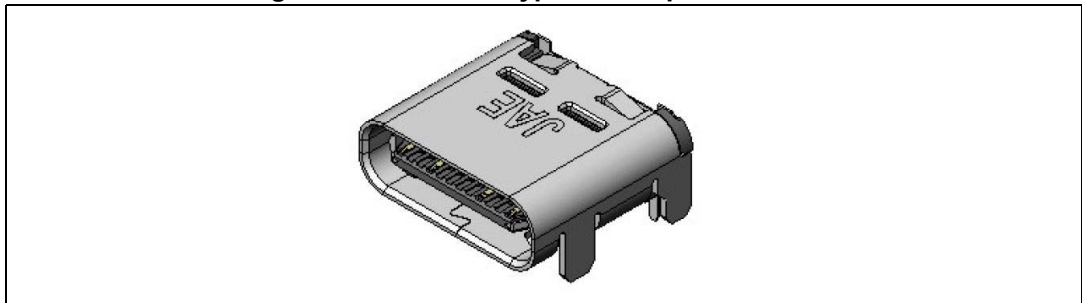
Table 7. CN7 USB Type-C™ Receptacle connector

Pin number	Assignment
A1	GND
A2	TX1_P
A3	TX1_N
A4	VBUS
A5	CC1
A6	DP1
A7	DM1
A8	SBU1
A9	VBUS
A10	RX2_N
A11	RX2_P
A12	GND
B1	GND
B2	TX2_P
B3	TX2_N

Table 7. CN7 USB Type-C™ Receptacle connector (continued)

Pin number	Assignment
B4	VBUS
B5	CC2
B6	DP2
B7	DM2
B8	SBU2
B9	VBUS
B10	RX1_N
B11	RX1_P
B12	GND

Table 8. CN7 USB Type-C™ Receptacle connector pinout

A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12
GND	TX1_P	TX1_N	VBUS	CC1	DP1	DM1	SBU1	VBUS	RX2_N	RX2_P	GND
GND	RX1_P	RX1_N	VBUS	SBU2	DM2	DP2	CC2	VBUS	TX2_N	TX2_P	GND
B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1

10.4 CN8 GPIO extension 1

CN8 connector is not fitted by default. CN8 is 2.54 pitch with 1x8-pin connector. The description is given in *Table 9*.

Table 9. CN8 GPIO extension 1

Pin number	Assignment
1	PB0
2	PA15
3	PB1
4	PB3
5	PB4
6	PB5
7	PB14
8	GND

10.5 CN9 GPIO extension 2

CN9 connector is not fitted by default. CN9 is 2.54 pitch with 1x8-pin connector. The description is given in *Table 10*.

Table 10. CN9 GPIO extension 2

Pin number	Assignment
1	VDD
2	PD6
3	PC9
4	PC13
5	PD1
6	PD3
7	PD4
8	5V

10.6 USB Type-C™ tests points

Signals of USB Type-C™ can be monitored on tests points located on the bottom side of the PCB. The tests points location is described in *Figure 14*.

Figure 14. USB Type-C™ tests points location
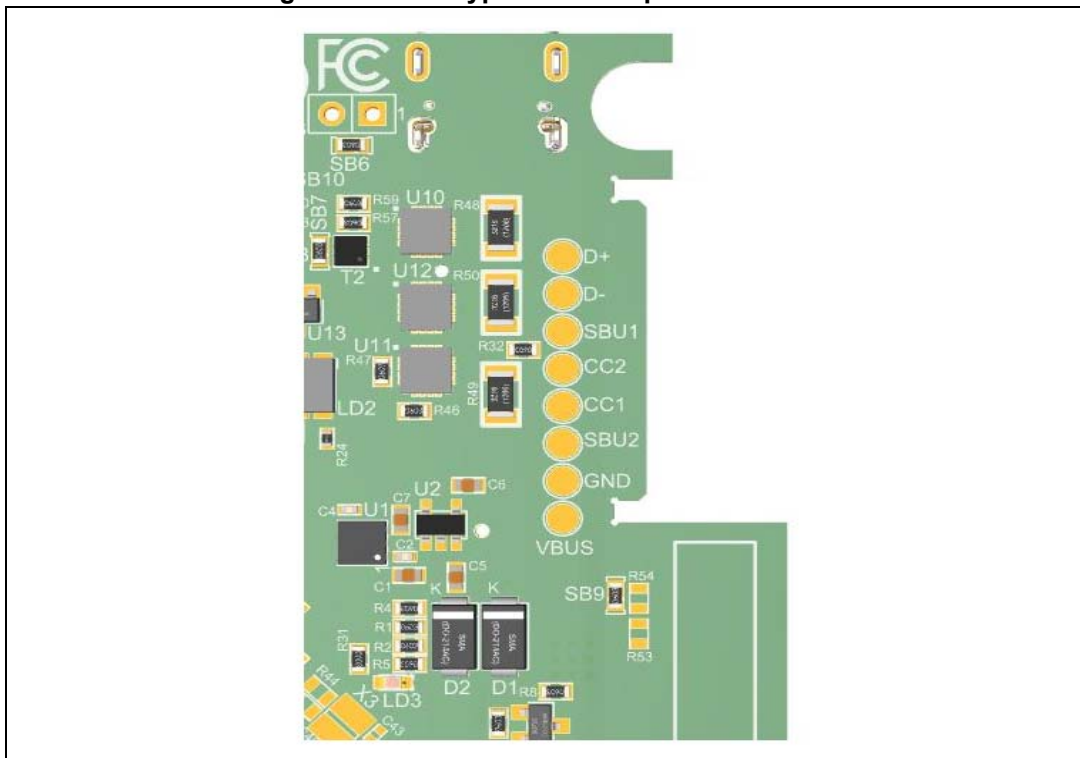
11 Jumpers and solder bridges

11.1 Jumpers

Here below are described in *Table 11* the jumper functions and their default status:

Table 11. Jumpers and description

Jumper Name	Status[1]	Function	Status
JP1	ON	ST-LINK RESET	ST-LINK forced to RESET (no ST-LINK operation)
	OFF		**ST-LINK standard operation**
JP2	**ON**	RESET TARGET MCU	**ST-LINK RESET connected to TARGET MCU**
	OFF		ST-LINK RESET not connected to TARGET MCU

1. Default status shown in bold

11.2 Solder bridges

Here below are described in *Table 12* the solder bridges functions and their default status:

Table 12. Solder bridges and description

SB Name	Status[1]	Function	Status
SB1	**ON**	ST-LINK Power Supply	**ST-LINK Power Supply ON**
	OFF		ST-LINK Power Supply OFF
SB2	**ON**	SWDIO TARGET MCU	**ST-LINK SWDIO connected to TARGET MCU**
	OFF		ST-LINK SWDIO not connected to TARGET MCU
SB3	**ON**	SWCLK TARGET MCU	**ST-LINK SWCLK connected to TARGET MCU**
	OFF		ST-LINK SWCLK not connected to TARGET MCU
SB4	**ON**	HW RESET TARGET MCU	**ST-LINK RESET connected to TARGET MCU**
	OFF		ST-LINK RESET not connected to TARGET MCU
SB5	**ON**	MCO TARGET MCU	**ST-LINK MCO connected to TARGET MCU**
	OFF		ST-LINK MCO not connected to TARGET MCU
SB6	**ON**	3V3 to TARGET MCU VDD	**3V3 connected to TARGET MCU VDD**
	OFF		3V3 not connected to TARGET MCU VDD[2]
SB7	ON	CC2 Line bypass	CC2 Line permanently connected to MCU
	OFF		**CC2 Line connection to MCU controlled by T2**
SB8	ON	CC1 Line bypass	CC1 Line permanently connected to MCU
	OFF		**CC1 Line connection to MCU controlled by T3**

Table 12. Solder bridges and description (continued)

SB Name	Status[1]	Function	Status
SB9	**ON**	LTC3114 Converter mode	**Burst Mode control pin active**
	OFF		PWM Mode control pin active
SB10	ON	RD CC1	RD CC1 (R56) permanently ON
	OFF		**RD CC1 (R56) controlled by T5**
SB11	ON	PA5 connected to CN1	PA5 connected to CN1
	OFF		**PA5 not connected to CN1**
SB12	ON	PA4 connected to CN1	PA4 connected to CN1
	OFF		**PA4 not connected to CN1**
SB13	ON	PB13 connected to CN1	PB13 connected to CN1
	OFF		**PB13 not connected to CN1**
SB14	ON	USBPD2 DBCC1 Dead Battery mode Enabled	USBPD2 DBCC1 Dead Battery mode Enabled
	OFF		**USBPD2 DBCC1 Dead Battery mode Disabled**
SB15	ON	USBPD2 DBCC2 Dead Battery mode Enabled	USBPD2 DBCC1 Dead Battery mode Enabled
	OFF		**USBPD2 DBCC1 Dead Battery mode Disabled**
SB16	ON	SW1 Reed Sensor bypass	SW1 is shorted (reed sensor permanently ON)
	OFF		**Standard operation SW1 controlled by magnet**

1. Default status shown in bold

2. SB6 must be OFF to allow power consumption measurement on CN6

12 STM32G071B-DISCO known limitations

The STM32G071B-DISCO embeds an internal DC/DC converter on the V_{BUS} line with high input filtering capacitors. When the Discovery is disconnected from the USB Type-C™ source device (Standalone or Sink Mode), the internal V_{BUS} signal drops exponentially but it may take some time to V_{BUS} to reach the 0 V voltage level. For some USB Type-C™ devices which are sensitive to that condition before delivering again the V_{BUS} as a source device and then expecting to have V_{BUS} line near GND voltage level, the starting up of the STM32G071B-DISCO can be delayed until the V_{BUS} and USB Type-C™ communication protocol have started. Consequently, even if the Discovery has been connected to the USB Type-C™ source device, the V_{BUS} power supply can be delivered later and then the Discovery remains OFF until the V_{BUS} from the source appears.

13 Federal Communications Commission (FCC) and Industry Canada (IC) Compliance Statements

13.1 FCC Compliance Statement

13.1.1 Part 15.19

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

13.1.2 Part 15.105

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

13.1.3 Part 15.21

Any changes or modifications to this equipment not expressly approved by STMicroelectronics may cause harmful interference and void the user's authority to operate this equipment.

13.2 IC Compliance Statement

13.2.1 Compliance Statement

Industry Canada ICES-003 Compliance Label: CAN ICES-3 (A)/NMB-3(A).

13.3 Déclaration de conformité

Étiquette de conformité à la NMB-003 d'Industrie Canada: CAN ICES-3 (A)/NMB-3(A).

14 Removal of the transparent backside cover for access to electronics

Completely unscrew the three screws as described *Figure 15* below. All the jumpers, connectors, solder bridges and tests points can be accessed on the bottom side of the printed circuit board.

Figure 15. Transparent backside cover removal
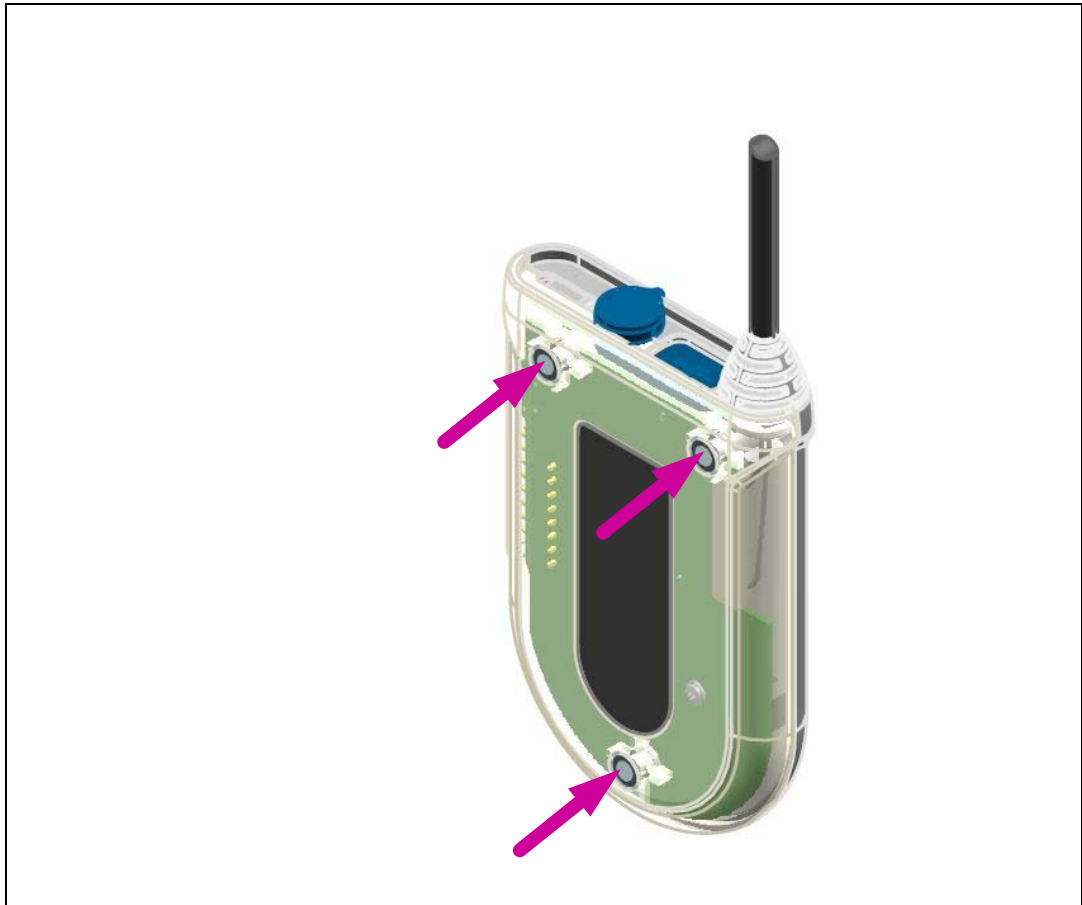
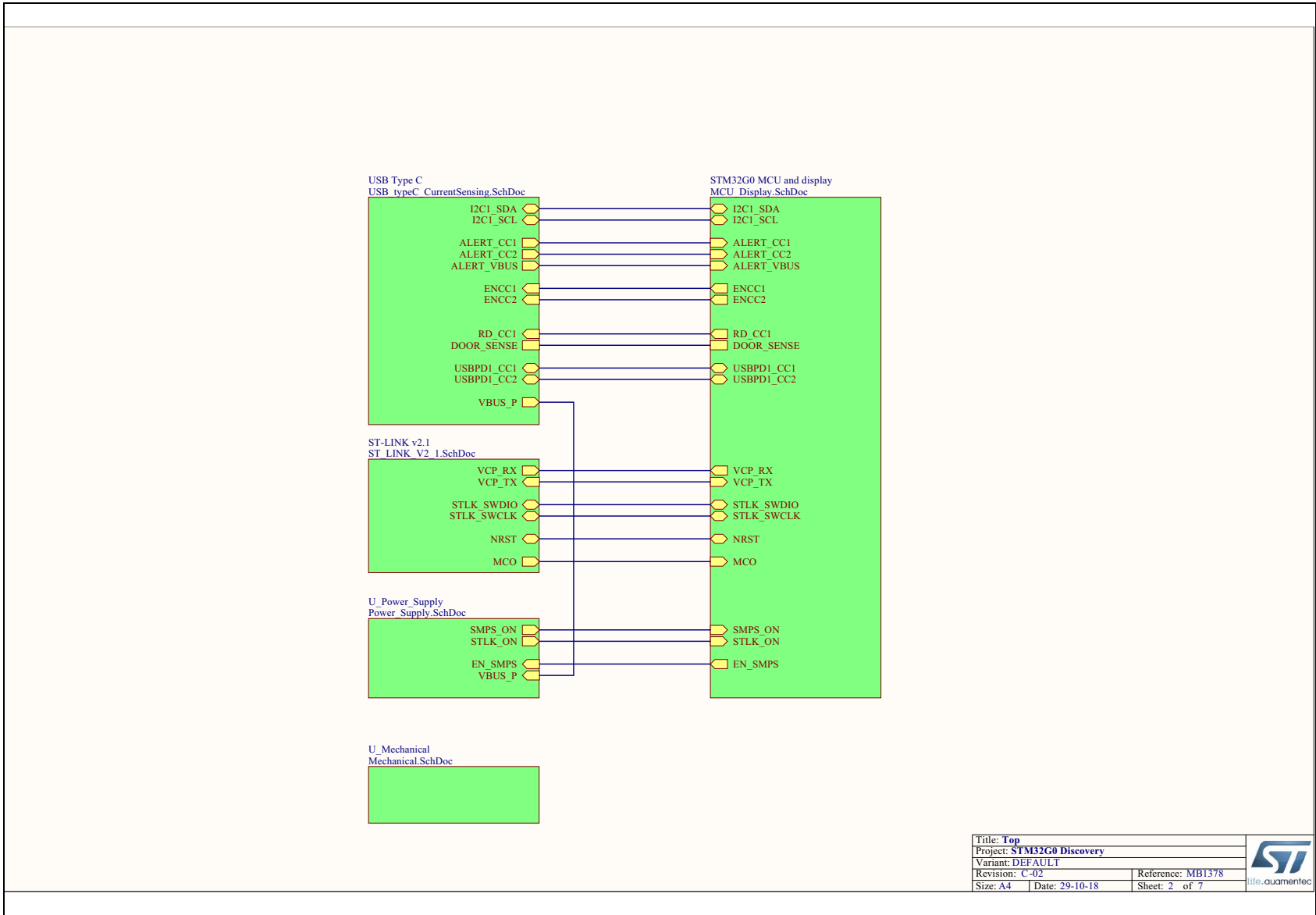# Appendix A   Electrical schematics

This chapter provides design schematics for the STM32G071B-DISCO key features to help users to implement these features in application designs:

- *Figure 16: Overall schematics for the board on page 30*
- *Figure 17: MCU and display on page 31*
- *Figure 18: USB Type-C current sensing on page 32*
- *Figure 19: Power Supply on page 33*
- *Figure 20: ST-LINK V2.1 on page 34*

Figure 16. Overall schematics for the board

USB Type C
USB_typeC_CurrentSensing.SchDoc

STM32G0 MCU and display
MCU_Display.SchDoc

I2C1_SDA
I2C1_SCL

ALERT_CC1
ALERT_CC2
ALERT_VBUS

ENCC1
ENCC2

RD_CC1
DOOR_SENSE

USBPD1_CC1
USBPD1_CC2

VBUS_P

ST-LINK v2.1
ST_LINK_V2_1.SchDoc

VCP_RX
VCP_TX

STLK_SWDIO
STLK_SWCLK

NRST

MCO

U_Power_Supply
Power_Supply.SchDoc

SMPS_ON
STLK_ON

EN_SMPS
VBUS_P

U_Mechanical
Mechanical.SchDoc

I2C1_SDA
I2C1_SCL

ALERT_CC1
ALERT_CC2
ALERT_VBUS

ENCC1
ENCC2

RD_CC1
DOOR_SENSE

USBPD1_CC1
USBPD1_CC2

VCP_RX
VCP_TX

STLK_SWDIO
STLK_SWCLK

NRST

MCO

SMPS_ON
STLK_ON

EN_SMPS

Title: **Top**
Project: **STM32G0 Discovery**
Variant: DEFAULT
Revision: C-02   Reference: MB1378
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life.augmented

Figure 17. MCU and display

Figure 18. USB Type-C current sensing

All SBs and test points on bottom side

USB TYPE-C PLUG & RECEPTACLE CONNECTION AND SHUNT FOR CURRENT SENSING

POWER/CURRENT SENSING ICs

USB CC LINES OVERVOLTAGE/PROTECTION AND ISOLATION

USB TYPE-C TEST POINTS

ALL USB TYPE-C paired signals routed for 10Gbps

TRAP DOOR MAGNETIC DETECTION GPIO

Title: **USB TypeC Current Sensing**
Project: **STM32G0 Discovery**
Variant: DEFAULT
Revision: C-02   Reference: MB1378
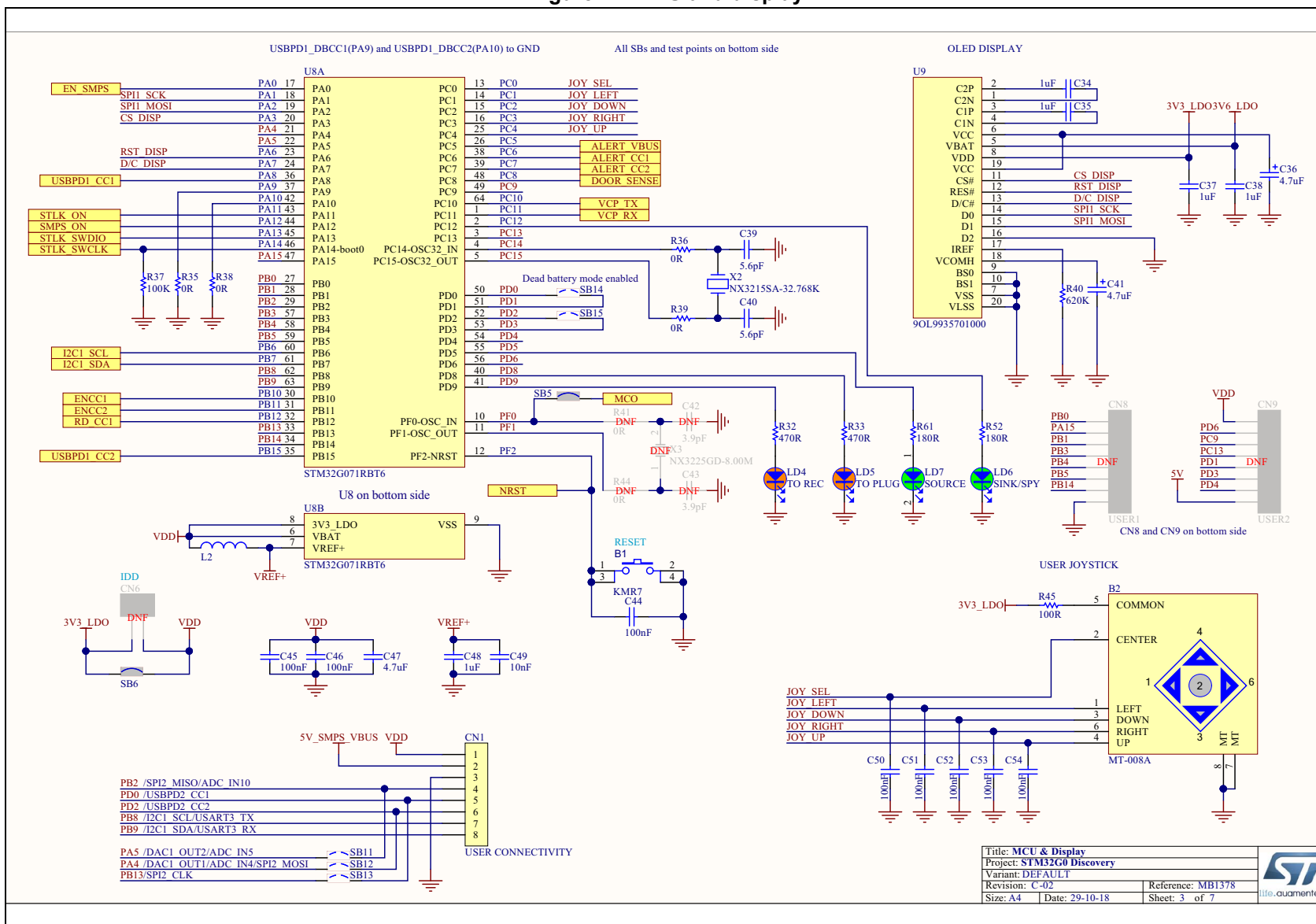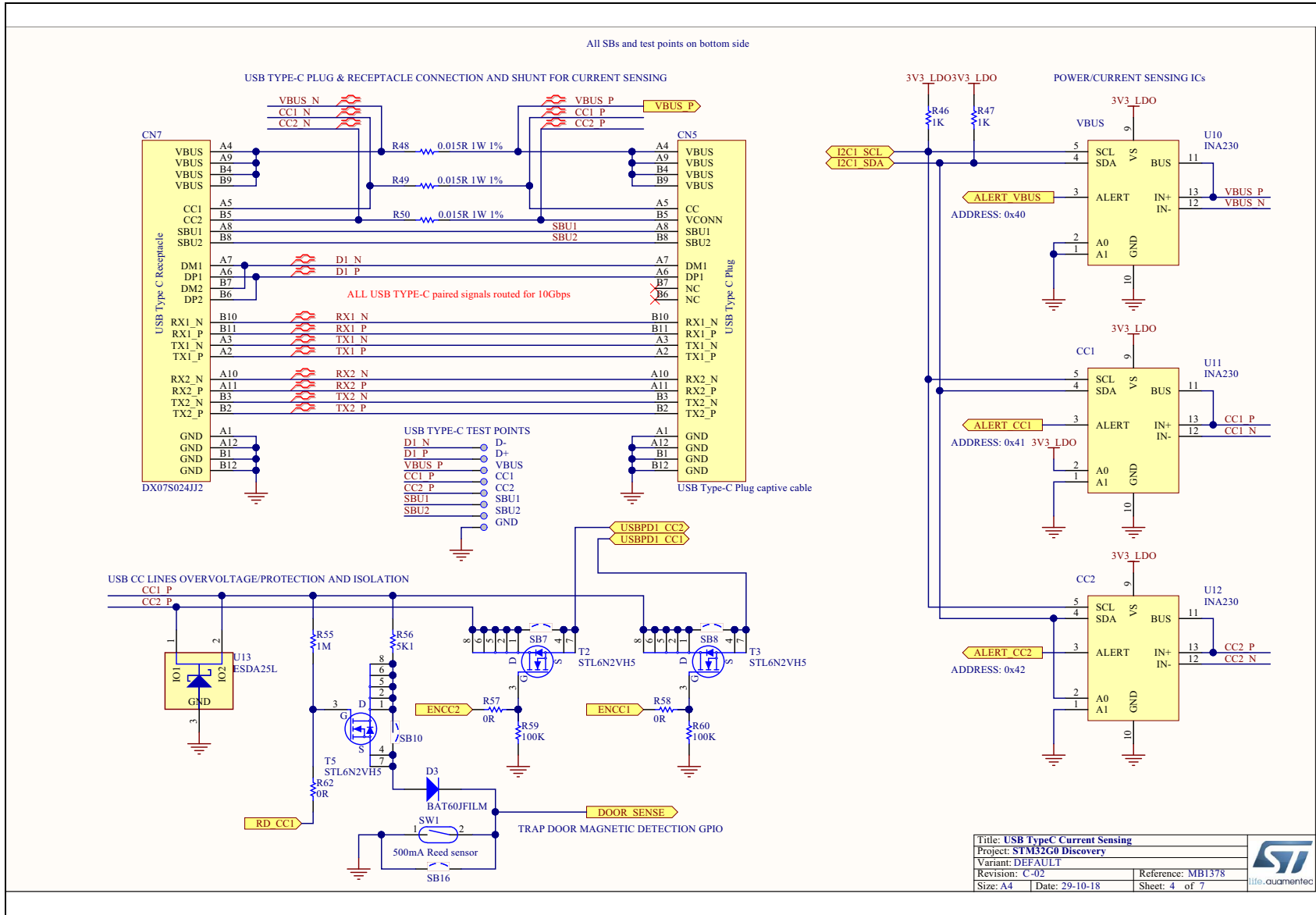Size: A4   Date: 29-10-18   Sheet: 4 of 7

Figure 19. Power Supply

Electrical schematics

Electrical schematics

UM2401

Figure 20. ST-LINK V2.1

ST-LINK MCU

All SBs and test points on bottom side

ST-LINK POWER 3V3 / 150mA

ST-LINK USB CONNECTOR

U5 on bottom side

STLINK_LED

ST-LINK DFU

ST LINK Inhibition circuitry

ST LINK USB Power switch 5V / 1.2A

ESD PROTECTION SHOULD BE CLOSE TO THE CONNECTOR

Must be on a border of the PCB.

Title: **ST-LINK V2.1**
Project: **STM32G0 Discovery**
Variant: DEFAULT
Revision: C-02
Reference: MB1378
Size: A4   Date: 29-10-18   Sheet: 6 of 7

15 Revision history

Table 13. Document revision history

Date	Revision	Changes
14-Dec-2018	1	Initial version

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