Discovery kit with STM32N657X0 MCU

Introduction

The STM32N6570-DK Discovery kit is a complete demonstration and development platform for the Arm® Cortex®-M55 core-based STM32N657X0H3Q microcontroller.

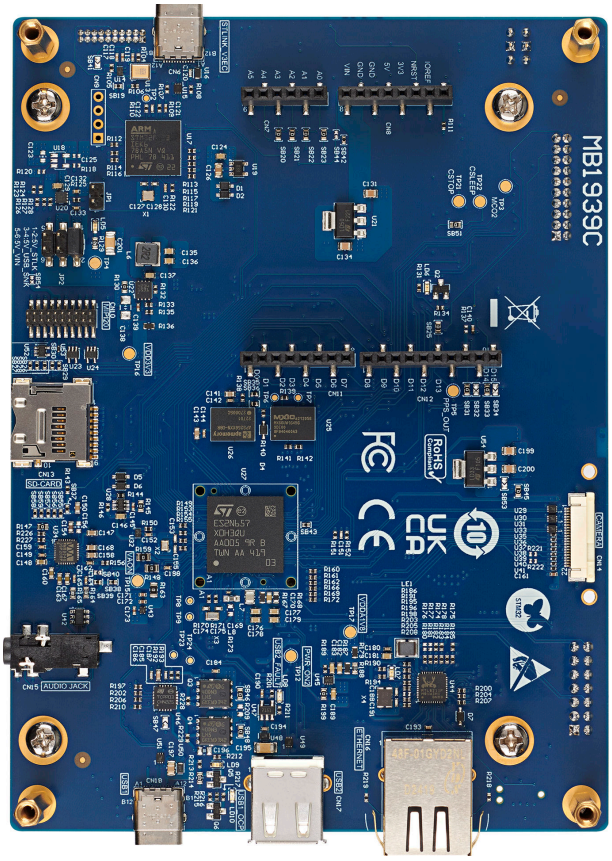
The STM32N6570-DK Discovery kit includes a full range of hardware features that help the user evaluate many peripherals, such as USB Type-C®, Octo-SPI flash memory and Hexadeca-SPI PSRAM devices, Ethernet, camera module, LCD, microSD™, audio codec, digital microphones, ADC, flexible extension connectors, and user button. The four flexible extension connectors feature easy and unlimited expansion capabilities for specific applications such as wireless connectivity, analog applications, and sensors.

The STM32N657X0H3Q microcontroller features one USB 2.0 high-speed/full-speed Device/Host/OTG controller, one USB 2.0 high-speed/full-speed Device/Host/OTG controller with UCPD (USB Type-C® Power Delivery), one Ethernet with TSN (time-sensitive networking), four I²Cs, two I3Cs, six SPIs (of which four I²S-capable), two SAIs, with four DMIC support, five USARTs, five UARTs (ISO78916 interface, LIN, IrDA, up to 12.5 Mbit/s), one LPUART, two SDMMCs (MMC version 4.0, CE-ATA version 1.0, and SD version 1.0.1), three CAN FD with TTCAN capability, JTAG and SWD debugging support, and Embedded Trace Macrocell™ (ETM).

The STM32N6570-DK Discovery kit integrates an STLINK-V3EC embedded in-circuit debugger and programmer for the STM32 MCU, with a USB Virtual COM port bridge and the comprehensive MCU Package.

Figure 1. STM32N6570-DK top view

Figure 2. STM32N6570-DK bottom view



Pictures are not contractual.

1 Features

- STM32N657X0H3Q Arm® Cortex®-M55-based microcontroller featuring ST Neural-ART Accelerator, H264 encoder, NeoChrom 2.5D GPU, and 4.2 Mbytes of contiguous SRAM, in a VFBGA264 package
- 5" LCD module with capacitive touch panel
- USB Type-C® with USB 2.0 HS interface, dual-role-power (DRP)
- USB Type-A with USB 2.0 HS interface, host, 0.5 A max
- 1-Gbit Ethernet with TSN (time-sensitive networking) compliant with IEEE-802.3-2002
- SAI audio codec
- One MEMS digital microphone
- 1-Gbit Octo-SPI flash memory
- 256-Mbit Hexadeca-SPI PSRAM
- Two user LEDs
- User, tamper, and reset push-buttons
- Board connectors:
  - USB Type-C®
  - USB Type-A
  - Ethernet RJ45
  - Camera
  - microSD™ card
  - LCD
  - Stereo headset jack including analog microphone input
  - Audio MEMS daughterboard expansion connector
  - ARDUINO® Uno R3 expansion connector
  - STMod+ expansion connector
- On-board STLINK-V3EC debugger/programmer with USB re-enumeration capability: Virtual COM port, and debug port
- Comprehensive free software libraries and examples available with the STM32CubeN6 MCU Package
- Support of a wide choice of Integrated Development Environments (IDEs) including IAR Embedded Workbench®, MDK-ARM, and STM32CubeIDE
- Handled by STM32CubeMonitor-UCPD (STM32CubeMonUCPD) software tool.

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

2 Ordering information

To order the STM32N6570-DK Discovery kit, refer to Table 1. Additional information is available from the datasheet and reference manual of the target STM32.

Table 1. Ordering information

Order code	Board references	Target STM32
STM32N6570-DK	• MB1280[1] • MB1854[2] • MB1860[3] • MB1939[4]	STM32N657X0H3Q

1. *STMod+ fan-out expansion board*
2. *Camera module daughterboard*
3. *LCD daughterboard*
4. *Main board*

2.1 Codification

The meaning of the codification is explained in Table 2.

Table 2. Codification explanation

STM32XXYYZ-DK	Description	Example: STM32N6570-DK
XX	MCU series in STM32 32-bit Arm Cortex MCUs	STM32N6 series
YY	MCU product line in the series	STM32N657
Z	STM32 flash memory size: • 0 for 0-1 Kbyte	0 Kbyte
-DK	Toolkit type: • Discovery kit	Discovery kit

3 Development environment

3.1 System requirements

- Multi-OS support: Windows® 10, Linux® 64-bit, or macOS®
- USB Type-A or USB Type-C® to USB Type-C® cable

Note: *macOS® is a trademark of Apple Inc., registered in the U.S. and other countries and regions.*

Linux® is a registered trademark of Linus Torvalds.

Windows is a trademark of the Microsoft group of companies.

3.2 Development toolchains

- IAR Systems® - IAR Embedded Workbench®(1)
- Keil® - MDK-ARM(1)
- STMicroelectronics - STM32CubeIDE

1. *On Windows® only.*

3.3 Demonstration software

The demonstration software, included in the STM32Cube MCU Package corresponding to the on-board microcontroller, is preloaded in the on-board 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*.

3.4 CAD resources

All board design resources, including schematics, CAD databases, manufacturing files, and the bill of materials, are available from the STM32N6570-DK product page at *www.st.com*.

4 Conventions

Table 3 provides the conventions used for the ON and OFF settings in the present document.

Table 3. ON/OFF convention

Convention	Definition
Jumper JPx ON	Jumper fitted
Jumper JPx OFF	Jumper not fitted
Jumper JPx [1-2]	Jumper fitted between pin 1 and pin 2
Solder bridge SBx ON	SBx connections closed by 0 Ω resistor
Solder bridge SBx OFF	SBx connections left open
Resistor Rx ON	Resistor soldered
Resistor Rx OFF	Resistor not soldered
Capacitor Cx ON	Capacitor soldered
Capacitor Cx OFF	Capacitor not soldered

5 Safety recommendations

5.1 Targeted audience

This product targets users with at least basic electronics or embedded software development knowledge such as engineers, technicians, or students. This board is not a toy and is not suited for use by children.

5.2 Handling the board

This product contains a bare printed circuit board and like all products of this type, the user must be careful about the following points:

- The connection pins on the board might be sharp. Be careful when handling the board to avoid hurting yourself
- This board contains static-sensitive devices. To avoid damaging it, handle the board in an ESD-proof environment.
- While powered, do not touch the electric connections on the board with your fingers or anything conductive. The board operates at a voltage level that is not dangerous, but components might be damaged when shorted.
- Do not put any liquid on the board and avoid operating the board close to water or at a high humidity level.
- Do not operate the board if dirty or dusty.

6 Quick start

This section describes how to start development quickly using the STM32 Discovery board.

Before installing and using the product, accept the evaluation product license agreement from the *www.st.com/epla* webpage.

For more information on the STM32N6570-DK Discovery kit and demonstration software, visit the STM32N6570-DK webpage.

6.1 Getting started

Follow the sequence below to configure STM32N6570-DK and launch the demonstration application (refer to Figure 4 and Figure 5 for component location):

1. To identify correctly all device interfaces from the host PC, install the discovery USB driver available on the STM32N6570-DK webpage, before connecting the board.
2. Check that the jumper JP2 is set on STLK (shunt [1-2]). Set SW1 and SW2 to 'L'.
3. Connect a USB Type-A(1) or USB Type-C® to USB Type-C® cable (not included) from the STM32N6570-DK Discovery board (CN6) to a PC to power the board. The 5V power LED (LD5) lights up.
4. The LCD daughterboard displays a welcome menu, indicating the demonstration application software startup.
5. The demonstration application software and its user manual, as well as other software examples for exploring STM32N6 features are available at STM32N6570-DK.
6. Develop an application using the available examples.

1. *When using Type-A to USB Type-C® cable, the power supply is limited to around 550 mA, very close to the consumption of the board. Used with the MB1854 camera module, the board fails to start because the power supply is not enough through the Type-A to USB Type-C® cable.*

7 Hardware layout and configuration

The STM32N6570-DK Discovery kit is designed around the STM32N657X0H3Q microcontroller, in VFBGA264 package. The hardware block diagram in Figure 3 illustrates the connection between the microcontroller and the peripherals. Figure 4 and Figure 5 help to locate these features on the STM32N6570-DK Discovery board.

7.1 Hardware block diagram and board layout

Figure 3. Hardware block diagram

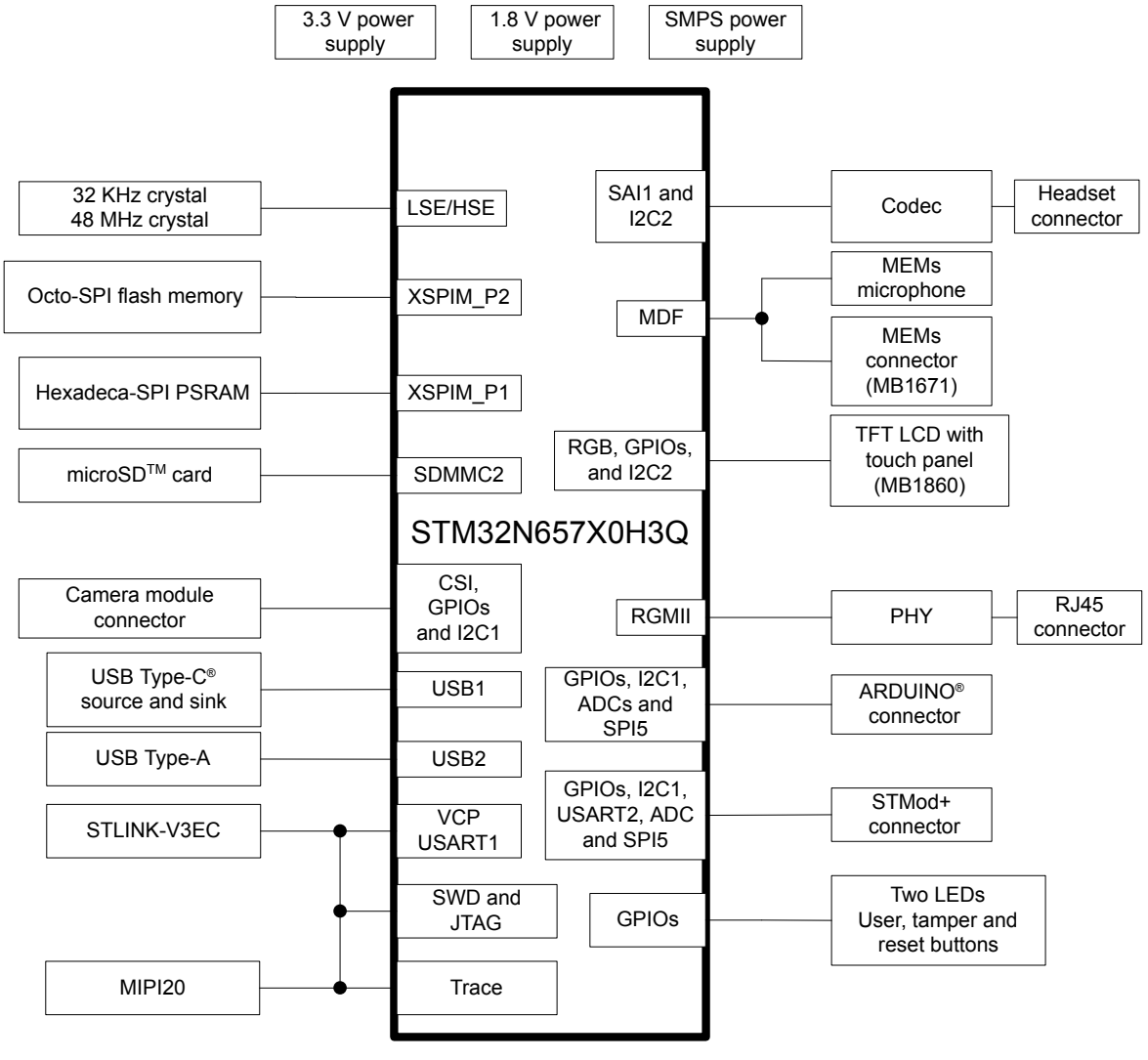
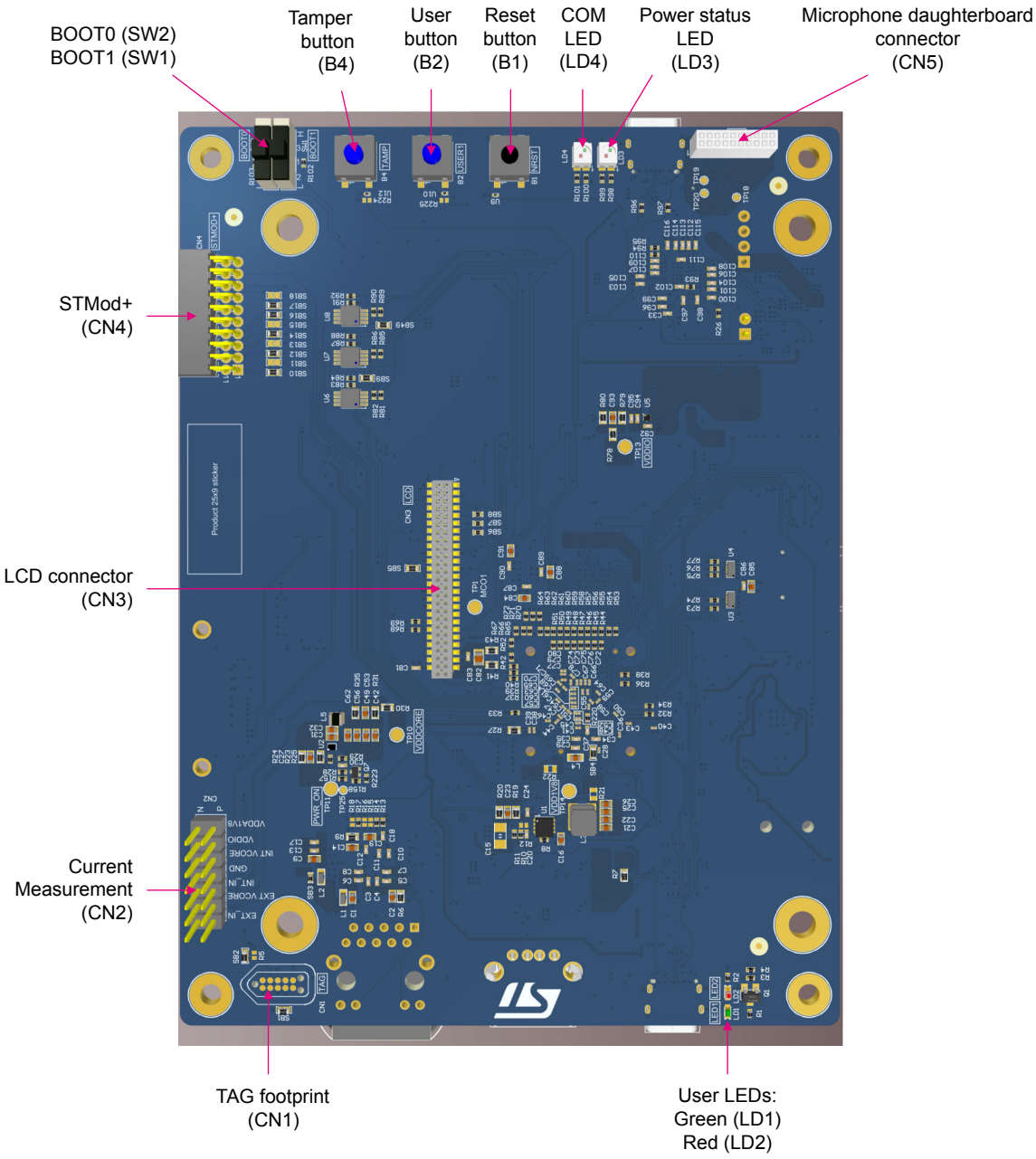
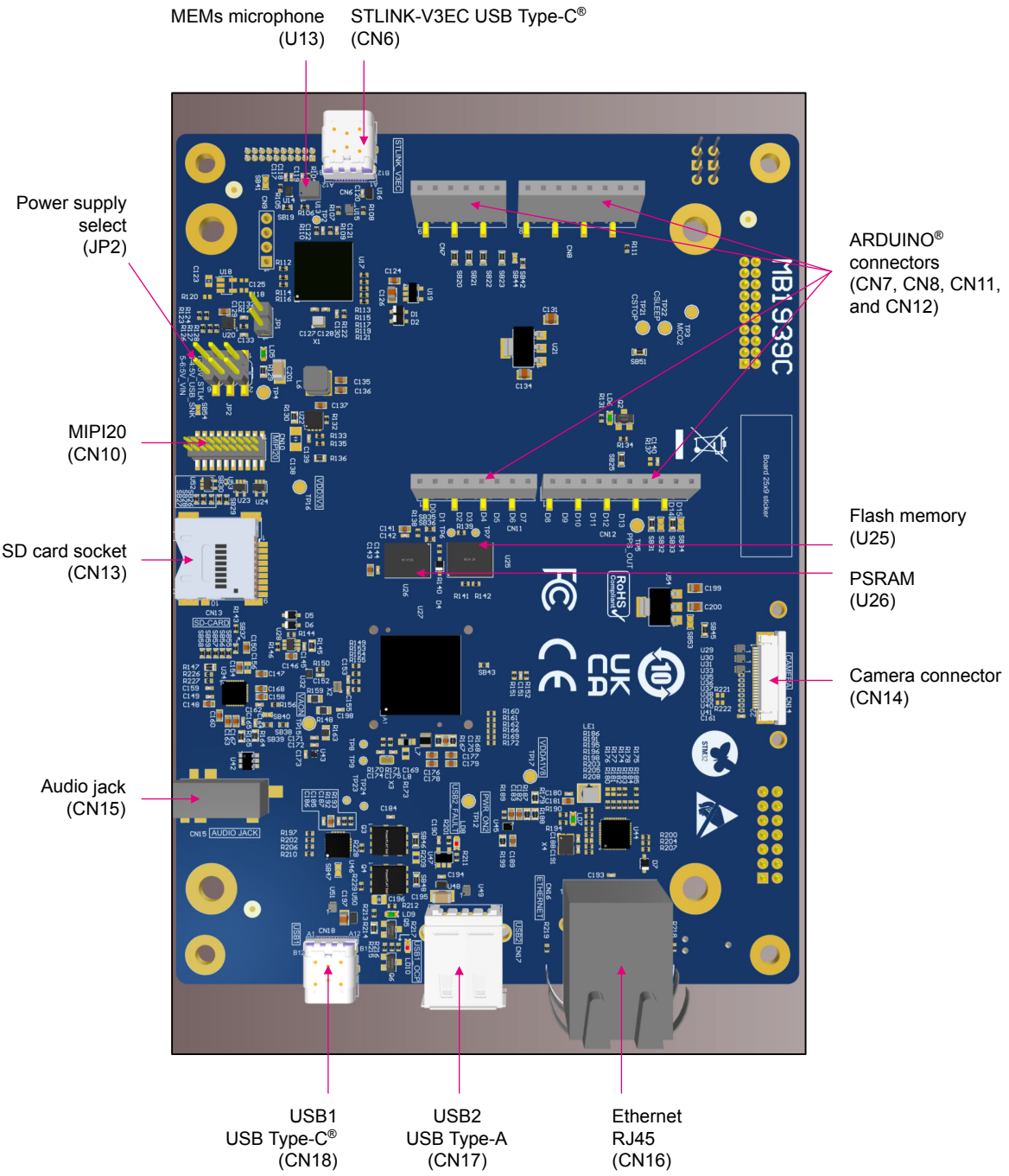


Figure 4. STM32N6570-DK PCB layout top view



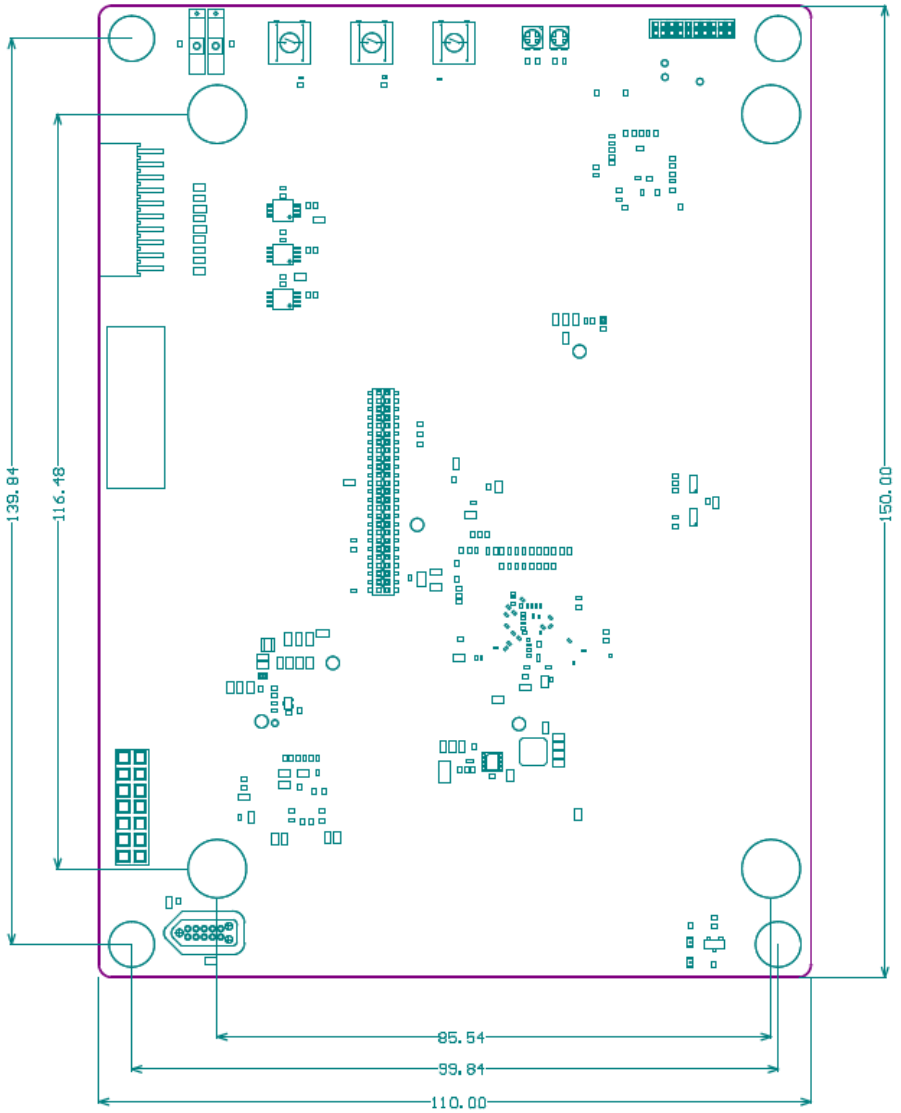
DT59549V1

Figure 5. STM32N6570-DK PCB layout bottom view



7.2 Mechanical drawing

Figure 6. **Board mechanical drawing (in millimeters)**



7.3 Embedded STLINK-V3EC

STLINK-V3EC is the embedded version of STLINK-V3 included in the design of the Discovery board. It allows access to the programming, debugging, and monitoring functions of the STM32 through the USB STLK connector (CN6).

The STLINK-V3EC facility for debugging and programming is integrated into the STM32N6570-DK Discovery kit.

The embedded STLINK-V3E supports JTAG/SWD and VCP for STM32 devices.

Features supported in STLINK-V3EC:

- 5 V power supplied by the USB Type-C® connector (CN6)
- USB 2.0 high-speed-compatible interface
- JTAG and Serial Wire Debug (SWD) interface
- MIPI20 compatible connector (CN10)
- COM status LED (LD4), which blinks during communication with the PC
- Power status LED (LD3), which identifies the status of current output to the board

Table 4 describes the USB Type-C® connector (CN6) pinout.

Table 4. USB Type-C® connector (CN6) pinout

Pin	Pin name	Signal name	STLINK-V3E STM32 pin	Function
A4, A9, B4, B9	VBUS	VBUS_STLK	-	VBUS power
A6, B6	DP	STLK_USB_P	PB15	DP
A7, B7	DM	STLK_USB_N	PB14	DM
A5	CC1	STLK_UCPD_CC1_C	PC3	Pull-down by 5.1 kΩ
B5	CC2	STLK_UCPD_CC2_C	PC4	Pull-down by 5.1 kΩ
A1, A12, B1, B12	GND	GND	GND	GND

7.3.1 STLINK-V3E drivers

The installation of drivers is not mandatory since Windows 10® but allocates an ST-specific name to the ST-LINK COM port in the system device manager.

For detailed information on the ST-LINK USB drivers, refer to the technical note *Overview of ST-LINK derivatives* (TN1235).

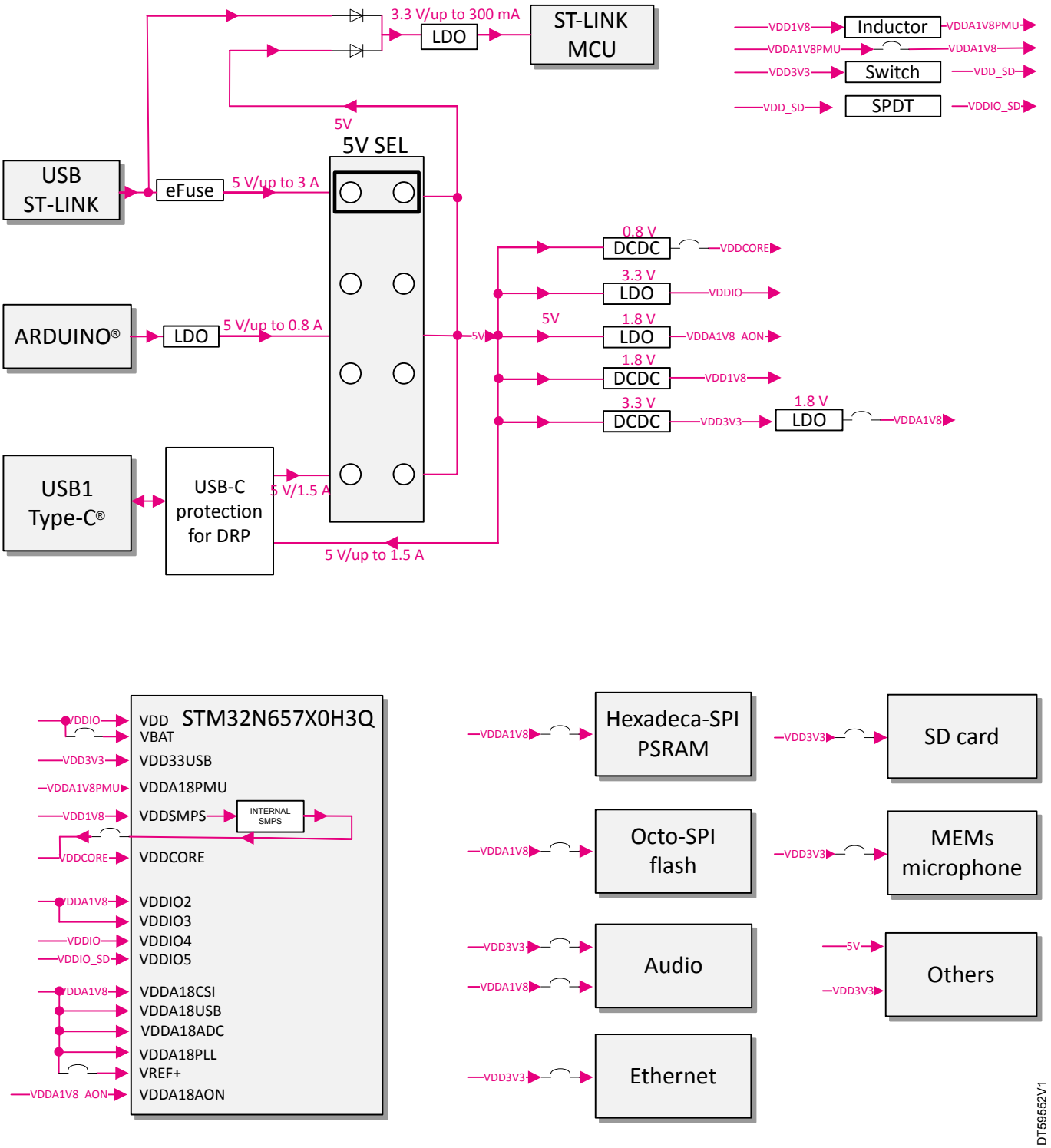
7.3.2 STLINK-V3EC firmware upgrade

STLINK-V3EC embeds a firmware upgrade (stsw-link007) mechanism through the USB-C® port. The firmware might evolve during the lifetime of the STLINK-V3EC product (for example to add new functionalities, fix bugs, and support new microcontroller families). Therefore, it is recommended to keep the STLINK-V3EC firmware up to date before using the STM32N6570-DK Discovery board. The latest version of this firmware is available from the *www.st.com* website.

7.4 Power supply

Figure 7 describes the power architecture and the maximum voltage and current limits, under which functions can be safely used on the STM32N6570-DK product. In any case, ensure the total power budget of the application always conforms to the selected 5 V power source mode, if not malfunction can occur. For detailed configuration, refer to the relevant function description and technical application notes.

Figure 7. Power diagram



7.4.1 Power source selection

The STM32N6570-DK product is designed to be powered by a 5 V DC power supply. It is possible to configure the Discovery board with JP2 headers to use any of the four sources described in Table 5 for the 5 V DC power supply.

Table 5. 5 V power configurations

Reference	Jumper(1)	Function	Comment
JP2	**5V_STLK**	5 V is supplied from USB STLK (CN6)	• 5 V (+/- 5%) • 3.5 A embedded overcurrent protection • Up to 3 A capable
	USB_SNK	5 V is supplied from USB1 (CN18)	• 5 V (+/- 5% at current < 500 mA) • Up to 3 A (check USB Type-C® VBUS constraints in that case)
	5V_VIN	5 V is supplied from ARDUINO® connector (CN8)	• 5 V (+/- 5%) • Up to 0.8 A capable

1. *The default setting is in bold*

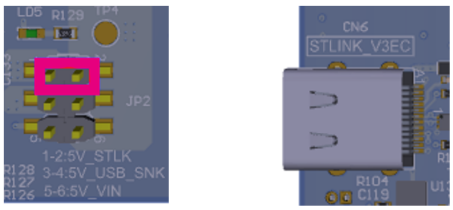
7.4.2 STLK (for compatibility with legacy USB Host port)

Figure 8 shows the selection of 5 V from 5V_STLK on JP2 [1-2], with a power source connected to USB ST-LINK (CN6). It is the default setting.

The STLK ST-LINK USB Type-C® connector (CN6) can power the STM32N6570-DK Discovery kit, but the host PC only provides 100 mA to the ST-LINK circuit until the end of USB enumeration. At the end of the USB enumeration, the STM32N6570-DK Discovery kit asks for a 2 A current to the host PC.

If the USB enumeration succeeds, a power switch powers the board with up to 3.2 A current. This power switch also features a 550 mA, 1.66 or 3.2 A current limitation to protect the PC in case of overcurrent on the board.

Figure 8. STLK (JP2) from USB STLK (CN6)



7.4.3 User USB1

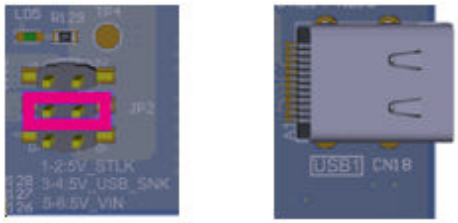
Figure 9 shows the selection of 5 V DC power from USER USB1 on JP2, with a power source connected to the USB Type-C® connector (CN18). The LED (LD9) lights up. A power switch with a protective circuit protects the STM32N6570-DK Discovery kit from overvoltage on VBUS. The USB Type-C® VBUS nominal voltage must be in the 5 V +/- 5% range.

The following constraints apply to USB Type-C® host types to be used:

- USB 2.0 or USB 3.x legacy hosts might be used if they can provide 500 mA without data communication. In practice, today nearly all these ports deliver 500 mA without data communication.

  It is preferable to use USB ports showing charging port marking in that case (⚡), as they enable higher currents.
- Any other USB Type-C® source type can supply and start up the STM32N6570-DK board, up to 3 A. When powered through USB1(CN18), LED (LD9) lights up.

Figure 9. **USB1 (JP2) from USB Type-C® (CN18)**



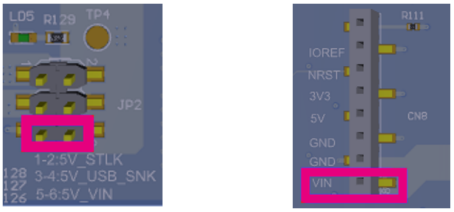
7.4.4 5V_IN

Figure 10 shows the selection of 5 V DC power from 5V_IN on JP2, with a power source connected to external VIN on CN8 pin 8. VIN is then used by an embedded LDO to generate the 5V_VIN power supply.

In this case, the STM32N6570-DK product must be powered by a power supply unit or by auxiliary equipment complying with the standard EN 62368-1:2014+A11:2017 and be safety extralow voltage (SELV) with limited power capability.

Note: There is no input current protection in this configuration. The recommended maximum current to be drawn from this 5V_IN pin is 800 mA (depending on VIN source voltage and capability).

Figure 10. **5V_IN (JP2) from VIN (CN8)**



7.4.5 MCU power supply: Internal or external SMPS

Internal SMPS configuration: Using the internal SMPS

External SMPS default configuration: Using an external SMPS. The output power could be configured to two modes:

- Nominal mode: PWR_LP = 0, VDDCORE = 0.81 V
- Overdrive mode: PWR_LP = 1, VDDCORE = 0.89 V

Table 6. **Internal or external SMPS configuration**

Solder bridges[1]	Internal SMPS	External SMPS (default configuration)
R12	ON	**OFF**
R21	ON	**OFF**
R173	ON	**OFF**
R22	ON	**OFF**
R179	OFF	**ON**
R30	OFF	**ON**

1. *The default setting is in bold.*

7.4.6 Consumption measurement

Using CN2 pins to measure the current of the MCU powers.

- The pin 1/pin 2 pair can measure the input current for an external SMPS (R23 OFF)
- The pin 3/pin 4 pair can measure the current of VDDCORE when in external SMPS mode (R31 OFF)
- The pin 5/pin 6 pair can measure the input current for the internal SMPS (R19 OFF)
- The pin 9/pin 10 pair can measure the current of VDDCORE when in internal SMPS mode (R167 OFF)
- The pin 11/pin 12 pair can measure the current of VDDIO (R79 OFF)
- The pin 13/pin 14 pair can measure the current of VDDA1V8 (R187 OFF)

The user can measure the current of VDD33USB through R159.

The user can measure the current of VDDA18AON through R163.

7.5 Clock sources

Four clock sources are available on the STM32N6570-DK board, as described below:

- X1 24 MHz crystal for the STLINK-V3EC
- X2 48 MHz crystal for the STM32N657X0H3Q HSE system clock
- X3 32.768 kHz crystal for the STM32N657X0H3Q embedded RTC
- X4 25 MHz crystal for Ethernet

7.6 Reset sources

The general reset of the STM32N6570-DK board is active LOW. The reset sources include:

- Reset button (B1)
- Embedded STLINK-V3EC
- ARDUINO® Uno shield board through ARDUINO® connector (CN8 pin 3)
- MIPI20 (CN10)
- TAG connector (CN1)

The general reset is connected to the following peripheral reset functions:

- Octo-SPI flash memory
- microSD™ power
- Ethernet

7.7 Boot options

BOOT0 and BOOT1 pins determine the boot mode as shown in Table 7. For more details, refer to the RM0486 reference manual available at *www.st.com*.

Table 7. Boot modes

BOOT0	BOOT1	Boot source #1
-	1	Development boot
0	0	Flash boot
1	0	Serial boot

On the board, BOOT0 and BOOT1 might be configured manually by pushing the mechanical parts: SW1(BOOT1) and SW2(BOOT0).

7.8 TFT color LCD 800x480 pixels

The STM32N6570-DK board includes a 5-inch 800x480 LCD-TFT board (MB1860), which is connected to the RGB interface of STM32N657X0H3Q through a 50-pin connector (CN3). The MB1860 LCD daughterboard uses a TFT LCD with the driving system, white LED backlight, and capacitive touch panel.

The touch-panel controller interfaces with STM32N657X0H3Q via the bidirectional I2C2 bus: SCL (PD14) and SDA (PD4). The I^2C write-read address is `0xBA/0xBB`.

Warning: *LCD_R3 (PB4) and LCD_R5 (PA15) are multiplexed with JTAG.*

7.9 USB1 USB Type-C® (HS, DRP)

The STM32N6570-DK board supports a USB HS 2.0 interface on the USB Type-C® receptacle connector (CN18). It offers compatibility with USB Type-C® revision 1.3, USB PD 3.0, PPS, and USB BC 1.2 on the USB Type-C® receptacle connector (CN18).

CN18 can be used as a DRP (dual-role port). Its VBUS can be managed to supply other platforms as a Provider or be supplied as a Consumer. The embedded UCPD protection manages DRP functions. It is compatible with VBUS current up to 1.5 A and VBUS 5 V only.

By default, the embedded UCPD protection manages the dead battery (DB) feature of this USB connector. It communicates with MCU via the bidirectional I2C2 bus: SCL (PD14) and SDA (PD4). The I^2C write/read address is `0x68/0x69`.

The red LED (LD10) indicates the USB OCP status.

The green LED (LD9) lights up when one of the following events occurs:

- The source path is open, and STM32N6570-DK provides up to 1.5 A 5 V power to CN18.
- VBUS1 is powered by another USB host when the STM32N6570-DK board works as a Sink device.

7.10 USB2 Type-A (HS, host only)

USB2 is used as a host at high speed, and the current is limited to 0.5 A maximum. The USB2 connector (CN17) is a USB Type-A connector.

The red LED (LD8) indicates the power fault status of USB2.

7.11 Octo-SPI flash memory

The Octo-SPI flash memory has the following characteristics: 1-Gbit, 1.8 V, 200 MHz, DTR, read while writing. It is connected to the OCTOSPI interface of the STM32N657X0H3Q microcontroller on the STM32N6570-DK board.

Note: Since the NRST (system reset) is at 3.3 V level, while the reset of the flash memory is 1.8 V in this design, a diode (D4) is used to adapt the reset signals.

7.12 Hexadeca-SPI PSRAM

The Hexadeca-SPI PSRAM has the following characteristics: 256 Mbits, 1.8 V, 200 MHz, DDR. It is connected to the Hexadeca-SPI interface of the STM32N657X0H3Q microcontroller on the STM32N6570-DK board.

7.13 Ethernet

The STM32N6570-DK board supports 10/100/1000-Mbit Ethernet communication with a PHY and integrates an RJ45 connector (CN16). The Ethernet PHY is connected to the STM32N657X0H3Q microcontroller via an RGMII interface.

The 25 MHz clock of the PHY is generated from the X4 crystal.

7.14 microSD™ card

A slot (CN13) for microSD™ card (UHS-I supported) is available on the STM32N6570-DK board and is connected to the SDMMC2 interface of STM32N657X0H3Q.

The uSD_Detect signal (PN12) manages the microSD™ card detection. When a microSD™ card is inserted into the slot, the uSD_Detect signal level is LOW, otherwise, it is HIGH.

The SD_SEL signal (connected to PO5) manages the power selection (1.8/3.3 V).

The system reset (NRST) and PWR_SD_EN(PQ7) signals enable or disable the power switch. PWR_ON pulls up these two signals.

7.15 Audio

STM32N6570-DK features audio characteristics such as:

- An audio codec with an SAI interface and a 3.5 mm audio jack connector (for stereo earphones and one analog microphone)
- A digital MEMS microphone and microphone daughterboard connector

7.15.1 Audio codec

An audio codec is driven through the I2C2 interface (100 kHz). The I^2C write/read address is `0x34/0x35`.

An SAI interface transfers audio data. A dedicated I/O (Audio_INT, PB1, active LOW) is used for the IRQ interrupt.

Warning: *The SAI signals are multiplexed with trace signals.*

7.15.2 MEMS microphone

A digital MEMS microphone (U13) is ON on the bottom side of the STM32N6570-DK main board.

A microphone daughterboard connector (CN5) is implemented close to U13, to support the STEVAL-MIC008A MEMS microphone daughterboard. Only two microphones (left and right channels) on these boards can be supported due to only one data signal on CN5.

By default, U13 is connected to the data signal of SAI_PDM on the STM32N657X0H3Q microcontroller. When a microphone daughterboard is plugged into CN5, the data signal is switched to the microphone daughterboard automatically (through U14).

Note that a second reserved data pin (PE12) in CN5 pin5 is multiplexed with the ARDUINO® connector.

7.16 Camera module

STM32N6570-DK features a CSI camera module (with ToF and IMU) (MB1854) through CN14.

Refer to B-CAMS-IMX for more details.

This camera module daughterboard provides a compelling hardware set to handle several computer vision scenarios and use cases. It features a high-resolution 5-Mpx CMOS RGB image sensor, an inertial motion unit, and a ToF sensor. It can be used with any STM32 board featuring a MIPI CSI-2® interface with a 22-pin FFC connector to enable full-featured computer vision on STM32 microcontrollers and microprocessors easily.

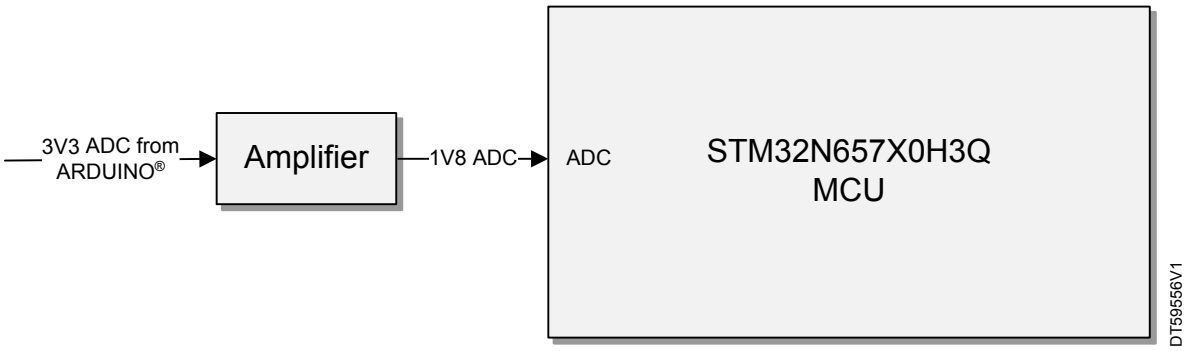
7.17 ARDUINO®

STM32N6570-DK features ARDUINO® Uno R3.

Note: The analog level limit is 1.8 V while digital I/O is up to 3.3 V in the MCU pins. Thus, to avoid any risk of damaging the MCU pins, an amplifier is used to down the voltage level for each analog pin.
This implements two functions (analog and digital) in the ARDUINO® pins (A0–A5), connecting two pins (one analog and one digital I/O) to each ARDUINO® pin (A0–A5). The basic logic is shown in Figure 11.

Note: There is a possibility to get the wake-up feature for D4 through SB44 (OFF by default).

Figure 11. **ADC ARDUINO® input voltage adaptation**



Warning: *USB1 ISENSE shares the same ADC with ARDUINO® ADC0 (A0).*
STMod+ shares the same ADC (CN4 pin13) with ARDUINO® ADC5 (A5).

7.18 STMod+

STM32N6570-DK features STMod+.

Note: For the ADC pin in the STMod+ connector, the same solution as for ARDUINO® A0 to A5 pins is adapted, connecting two pins (one analog and one digital I/O) to the ADC pin.

Warning: *STMod+ function causes the loss of an SPI on CN4 pin9 due to the lack of available SPI resources.*
STMod+ shares the same ADC (CN4 pin13) with ARDUINO® ADC5 (A5)

7.19 Virtual COM port

The serial interface UART1 (PE5/PE6) that supports the bootloader is directly available as a Virtual COM port of the PC connected to the STLINK-V3EC USB connector (CN6). The VCP configuration is the following:

- 115200 bit/s
- 8-bit data
- Even parity
- One-stop bit
- No flow control

7.20 TAG

One TAG interface footprint (CN1) is reserved on the STM32N6570-DK board, which can be used for the board debugging and programming.

Warning: *The JNRST(PB4) and MCU.JTDI(PA15) are multiplexed with LCD signals.*

7.21 MIPI20

One MIPI20 connector (CN10) is on the STM32N6570-DK board, which can be used for the board debugging and programming.

Warning: *The trace signals (PB0, PB6, PB7, PE3, and PG7) are multiplexed with audio SAI signals.*

7.22 Buttons and LEDs

The black button (B1) on the top side is the reset of the STM32N657X0H3Q microcontroller.
The blue button (B2) on the top side is used as the user1 button (wake-up-alternate function).
The blue button (B4) on the top side is used as a tamper button.

When the black button (B1) is pressed, the logic state is LOW, otherwise, the logic state is HIGH.

The LD2 LED might be used for BOOTFAILEDN signal with LED for boot ROM failure detection.

Table 8 summarizes the different buttons and LEDs of the STM32N6570-DK Discovery kit and their function:

Table 8. Button and LED control ports

Reference	Color	Function	Description
B1	Black	Reset button	Resets the board.
B2	Blue	User1 button	Supports the wake-up and tamper features (PC13).
B4	Blue	Tamper button	PE0
LD1	Green	User LED	Active HIGH (PO1)
LD2	Red	User LED	Active LOW (PG10) (Might indicate BOOTFAILEDN)
LD3	Tricolor (orange/green/red)	STLINK-V3EC power status	Power status:(1) • OFF: Target not powered by ST-LINK • Orange: Requested power higher than USB power budget • Green: Requested power lower or equal to USB power budget • Red: Overcurrent detected • Blinking red: Internal error
LD4	Bicolor (red/green)	STLINK-V3EC COM	Green when communication is ongoing
LD5	Green	User 5 V	5 V ON
LD6	Green	ARDUINO® D13	Active HIGH (PE15)
LD7	Green	Ethernet LED2	Ethernet status
LD8	Red	USB2 FAULT	USB2 fault
LD9	Green	USB1 5V	VBUS1 is present
LD10	Red	USB1 OVP	It indicates USB1 OVP status.

1. *For detailed information on the power status LED, refer to the technical note Overview of ST-LINK derivatives (TN1235), section 7.*

8 Board connectors

8.1 TAG connector (CN1)

The TAG connector footprint (CN1) is used to connect the STM32N657X0H3Q microcontroller for programming or debugging the board.

Figure 12. TAG connector (CN1)

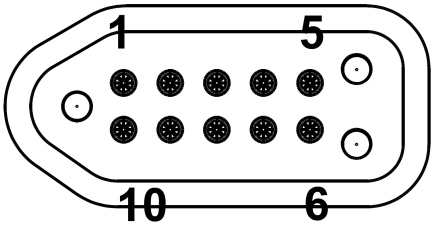
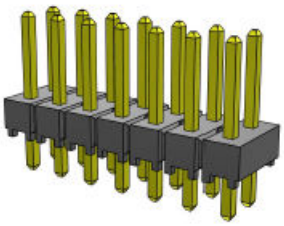


Table 9. TAG connector (CN1) pinout

Pin number	Description	Pin number	Description
1	VDDIO (3V3)	10	NRST
2	JTMS (PA13)	9	JNRST (PB4)
3	GND	8	JTDI (PA15)
4	JTCK (PA14)	7	NC
5	GND	6	JTDO (PB5)

8.2 Consumption measurement connector (CN2)

Figure 13. Consumption measurement connector (CN2) top view



The CN2 connector is used to measure the consumption of MCU powers.

Table 10. Consumption measurement connector (CN2) pinout

Pin number	Description	Pin number	Description
1	External SMPS input power_P	2	External SMPS input power_N
3	External SMPS output power (VDDCORE)_P	4	External SMPS output power (VDDCORE)_P
5	Internal SMPS input power_P	6	Internal SMPS input power (VDDCORE)__N
7	GND	8	GND
9	Internal SMPS output power (VDDCORE)_P	10	Internal SMPS output power (VDDCORE)_P
11	VDDIO_P	12	VDDIO_N
13	VDDA1V8_P	14	VDDA1V8_N

8.3 TFT LCD connector (CN3)

The CN3 connector is designed to connect the 5-inch TFT LCD touchscreen board.

Figure 14. TFT LCD connector (CN3) top view

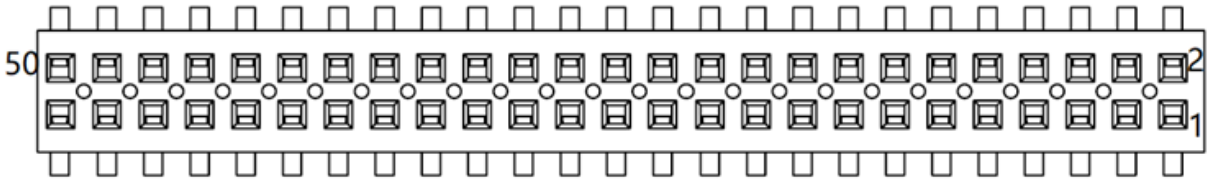


Table 11. TFT LCD connector (CN3) pinout

MCU port	Signal name	Pin number		Signal name	MCU port
-	GND	1	2	GND	-
PG0	LCD_R0	3	4	LCD_G0	PG12
PD9	LCD_R1	5	6	LCD_G1	PG1
PD15	LCD_R2	7	8	LCD_G2	PA1
PB4(1)	LCD_R3	9	10	LCD_G3	PA0
PH4	LCD_R4	11	12	LCD_G4	PB15
PA15(2)	LCD_R5	13	14	LCD_G5	PB12
PG11	LCD_R6	15	16	LCD_G6	PB11
PD8	LCD_R7	17	18	LCD_G7	PG8
-	GND	19	20	GND	-
PG15	LCD_B0	21	22	LCD_DE	PG13
PA7	LCD_B1	23	24	LCD_ON/OFF	PQ3
PB2	LCD_B2	25	26	LCD_HSYNC	PB14
PG6	LCD_B3	27	28	LCD_VSYNC	PE11
PH3	LCD_B4	29	30	GND	-
PH6	LCD_B5	31	32	LCD_CLK	PB13
PA8	LCD_B6	33	34	GND	-
PA2	LCD_B7	35	36	NRST	PE1
-	GND	37	38	I2C1_SDA	PD4
PQ4	CTP_INT	39	40	I2C1_SCL	PD14
-	NC	41	42	NC	-
PQ6	LCD_BL_CTRL	43	44	NC	-
-	5V	45	46	NC	-
-	GND	47	48	NC	-
-	GND	49	50	3V3	-

1. *PB4 is multiplexed with JNRST.*
2. *PA15 is multiplexed with JTDI.*

8.4 STMod+ connector (CN4)

The standard 20-pin STMod+ connector is available on the STM32N6570-DK board to increase compatibility with external boards and modules from the ecosystem of microcontrollers. STMod+ includes UART or SPI interface signals for communication with the host MCU and the dedicated solder bridges allow configuring the external board to be controlled by the UART2 or SPI5 serial interface of the STM32N657X0 MCU.

Figure 15. STMod+ connector (CN4) front view

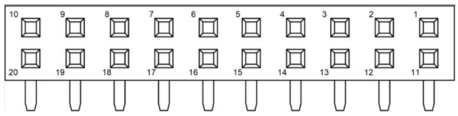


Table 12. STMod+ connector (CN4) configuration

Solder bridge	Setting[1]	Description
SB10, SB12, SB14, SB17	**ON**	UART2 connected to STMod+
SB11, SB13, SB15, SB18	**OFF**	SPI5 disconnected to STMod+
SB10, SB12, SB14, SB17	OFF	UART7 disconnected to STMod+
SB11, SB13, SB15, SB18	ON	SPI5 connected to STMod+
SB16	ON	SB16 ON to enable the ADC (Share ARDUINO® A5)

1. *The default configuration is in bold.*

By default, it is designed to support an ST-dedicated fan-out board to connect different modules or board extensions from different manufacturers.

The STMod+ fan-out expansion board also embeds a 3.3 V regulator and I^2C level shifters. For more detailed information on the fan-out board, refer to the user manual *STMod+ fan-out expansion board for STM32 Discovery kits and Evaluation boards* (UM2695).

For details about the STMod+ interface, refer to the technical note *STMod+ interface specification* (TN1238).

Table 13. STMod+ connector (CN4) pinout

Pin number	Description	Pin number	Description
1	SPI5_CS (PA3)/USART2_CTS (PG5)	11	INT (PC11)
2	SPI5_MOSI (PG2)/USART2_TX (PD5)	12	RESET (PB3)
3	SPI5_MISO (PH8)/USART2_RX (PF6)	13	ADC (PB10) (share ARDUINO® A5) or I/O(PC9) (1)(2)
4	SPI5_SCK (PE15)/USART2_RTS (PG14)	14	PWM (PC7)
5	GND	15	+5 V
6	+5 V	16	GND
7	I2C1_SCL (PH9)	17	GPIO (PD13)
8	SPI5_MOSIs (PH7)	18	GPIO (PF1)
9	I/O (PC6) (missing MISO signal)(3)	19	GPIO (PB8)
10	I2C1_SDA (PC1)	20	GPIO (PG9)

1. *Since for ADC, the level of MCU is 1.8 V, while for digital I/O the level of MCU pins is 3.3 V.*
2. *STMod+ shares the same ADC (CN4 pin13) with ARDUINO® ADC5 (A5).*
3. *Losing one SPI for CN4 pin9 due to no spare SPI resource.*

Note: On the STM32N6570-DK board, signals on STMod+ are shared with ARDUINO® connectors. The user must make sure that nothing is connected to ARDUINO® connectors.

8.5 Microphone connector (CN5)

The microphone connector (CN5) connects the STEVAL-MIC008A MEMS microphone daughterboard.

Figure 16. Microphone connector (CN5)

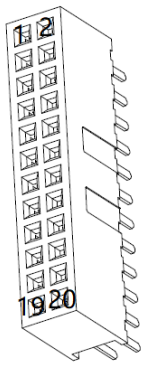


Table 14. Microphone connector (CN5) pinout

Pin number	Description	Pin number	Description
1	GND	2	VDD_MIC (3.3 V)
3	NC	4	PDM clock (CK-PE2)
5	PDM data reserved (PE12)(1)	6	PDM data (D1-PE8)
7	NC	8	NC
9	NC	10	Microphone board detection
11	NC	12	VDD_MIC (3.3 V)
13	NC	14	NC
15	NC	16	NC
17	NC	18	NC
19	VDD_MIC (3.3 V)	20	GND

1. *PE12 is a second data, reserved through solder bridge SB41 (OFF by default). PE12 is multiplexed with ARDUINO® A2 pin.*

8.6 STLINK-V3EC USB Type-C® connector (CN6)

The USB connector (CN6) is used to connect the embedded STLINK-V3EC to the PC for programming and debugging purposes.

Figure 17. STLINK-V3EC connector (CN6) front view

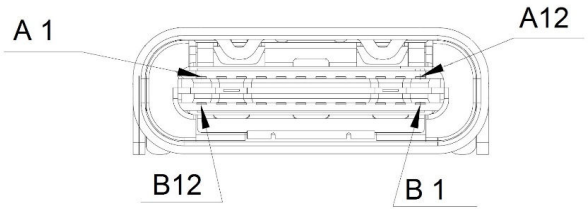


Table 15. STLINK-V3EC connector (CN6) pinout

Pin number	Description	Pin number	Description
A1	GND	B1	GND
A2	NC	B2	NC
A3	NC	B3	NC
A4	VBUS_STLK	B4	VBUS_STLK
A5	CC1 (STLINK MCU PC3)	B5	CC2 (STLINK MCU PC4)
A6	D+ (STLINK MCU PB15)	B6	D+ (STLINK MCU PB15)
A7	D- (STLINK MCU PB14)	B7	D- (STLINK MCU PB14)
A8	NC	B8	NC
A9	VBUS_STLK	B9	VBUS_STLK
A10	NC	B10	NC
A11	NC	B11	NC
A12	GND	B12	GND

8.7 ARDUINO® Uno V3 connectors (CN7, CN8, CN11, and CN12)

The ARDUINO® Uno V3 connectors ((CN7, CN8, CN11, and CN12) are female connectors compatible with the ARDUINO® Uno revision 3 standard. Most shields designed for ARDUINO® Uno V3 fit the STM32N6570-DK board.

Important: *The STM32 microcontroller I/Os are 3.3 V compatible instead of 5 V for ARDUINO® Uno*

Table 16. **ARDUINO® Uno V3 connectors pinout**

Left connectors					Right connectors				
Connector	Pin number	Pin name	MCU pin	SoC function	SoC function	MCU pin	Pin name	Pin number	Connector
					I2/3C1_SCL	PH9	D15	10	CN12 Digital
					I2/3C1_SDA	PC1	D14	9	
					AVDD	-	AREF	8	
					Ground	-	GND	7	
CN8 Power	1	-	-	5V_IN test	SPI5_SCK	PE15	D13	6	
	2	IOREF	-	3.3 V ref	SPI5_MISO	PH8	D12	5	
	3	RESET	NRST	RESET	TIM14_CH1 or SPI5_MOSI	PG2	D11	4	
	4	+3V3	-	3.3 V output	TIM16_CH1 or SPI_CS	PA3	D10	3	
	5	+5V	-	5 V output	TIM1_CH4	PE14	D9	2	
	6	GND	-	Ground	-	PE7	D8	1	
	7	GND	-	Ground					
	8	VIN	-	Power input	-	PD6	D7	8	CN11 Digital
					TIM1_CH3	PE13	D6	7	
CN7 Analog	1	A0	PA5 or PD7(1)	ADC12_INP18(PA5)	TIM1_CH2N	PE10	D5	6	
	2	A1	PA9 or PC10(1)	ADC12_INP10(PA9)	-	PH5	D4	5	
	3	A2	PA10 or PE12(1)	ADC12_INP11(PA10)	TIM1_CH1	PE9	D3	4	
	4	A3	PA12 or PD11(1)	ADC12_INP13(PA12)	-	PD0	D2	3	
	5	A4	PF3/PC12(1) or PC1(2)	ADC12_INP16(PF3) or I2C1_SDA(PC1)	USART2_TX	PD5	D1	2	
	6	A5	PB10/PH2(1) or PH9(2)	ADC12_INP8(PB10) or I2C1_SCL(PH9)	USART2_RX	PF6	D0	1	

1. *Since for ADC, the level of MCU pins is 1.8 V, while for digital I/Os the level of MCU pins is 3.3 V.*
2. *By default, the I2C1 function is disabled with the configuration: SB32 and SB34 OFF, SB31 and SB33 ON. To get the I2C1 function, the configuration must be: SB32 and SB34 ON, SB31 and SB33 OFF.*

8.8 MIPI20 connector (CN10)

The MIPI20 debug connector (CN10) is implemented to program and debug the STM32N657X0 microcontroller.

Figure 18. MIPI20 connector (CN10) top view

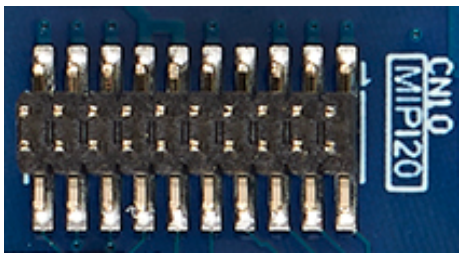


Table 17. MIPI20 connector (CN10) pinout

Pin number	Description	Pin number	Description
1	VDDIO	2	SWDIO(PA13)
3	GND	4	SWCLK(PA14)
5	GND	6	SWO(PB5)
7	-	8	JTDI(PA15)(1)
9	GND	10	NRST
11	GND(2)	12	TRACECLK(PG7)(3)
13	GND(2)	14	TRACED0(PE3)(3)
15	GND	16	TRACED1(PB0)(3)
17	GND	18	TRACED2(PB6)(3)
19	GND	20	TRACED3(PB7)(3)

1. *JTDI is multiplexed with LCD signal.*
2. *Through SB54 to GND. By default, SB54 is OFF.*
3. *Trace signals are multiplexed with audio SAI signals.*

8.9 microSD™ card connector (CN13)

microSD™ cards with 4 Gbytes or more capacity can be inserted in the receptacle (CN13). Four data bits of the SDMMC2 interface, CLK, and CMD signals of the STM32N657X0H3Q are used to communicate with the microSD™ card. The SD_Detect signal detects the card insertion. When a microSD™ card is inserted, the SD_Detect level is LOW, otherwise, it is HIGH.

Note: There are also some control signals to manage the power of the SD card: SD_SEL (PO5), PWR_SD_EN (PQ7), and NRST.

Figure 19. microSD™ connector (CN13) top view

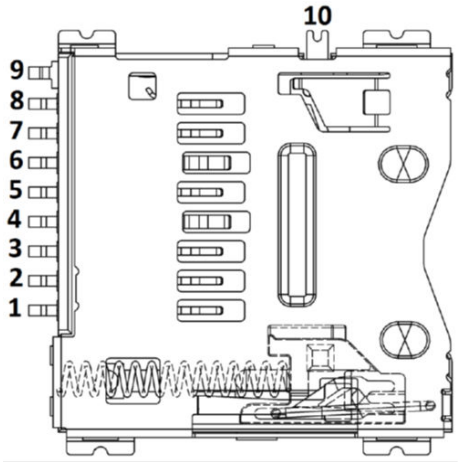


Table 18. microSD™ connector (CN13) pinout

Pin number	Description	Pin number	Description
1	SDMMC2_D2 (PC0)	6	GND
2	SDMMC2_D3 (PE4)	7	SDMMC2_D0 (PC4)
3	SDMMC2_CMD (PC3)	8	SDMMC2_D1 (PC5)
4	VDD_SD	9	GND
5	SDMMC2_CK (PC2)	10	SD_Detect (PN12)

8.10 Camera module connector (CN14)

A CSI camera module (with ToF and IMU) is supported thanks to the 22-pin dedicated ZIF connector (CN14). The camera module adaptor board MB1854 can be connected to the STM32N6570-DK Discovery board through flexible cable.

Figure 20. Camera module connector (CN14) top view

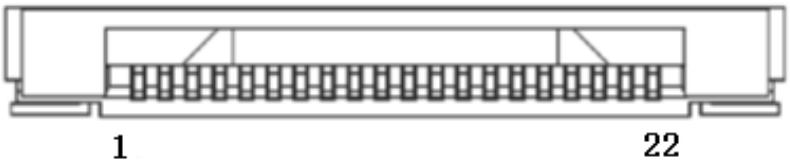


Table 19. Camera module connector (CN14) pinout

Pin number	Description	Pin number	Description
1	GND	12	TOF_INT(PQ0)
2	CSI_D0_N	13	GND
3	CSI_D0_P	14	IMU_INT1(PQ1)
4	GND	15	IMU_INT2(PQ2)
5	CSI_D1_N	16	GND
6	CSI_D1_P	17	NRST_CAM(PC8)
7	GND	18	EN_MODULE(PD2)
8	CSI_CLK_N	19	GND
9	CSI_CLK_P	20	I2C1_SCL(PH9)
10	GND	21	I2C1_SDA(PC1)
11	TOF_LPn(PQ5)	22	VDD_CAM(1)

1. *There is an LDO (3.3 V) reserved for VDD_CAM. Through SB53. By default, SB53 is OFF.*

8.11 Audio jack (CN15)

A 3.5 mm stereo audio jack is available on the STM32N6570-DK board to support stereo earphones and an analog microphone.

Figure 21. Audio jack (CN15) top view

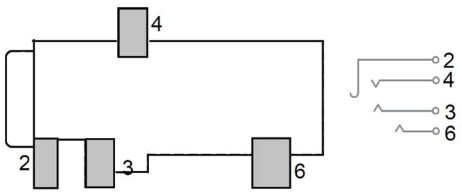
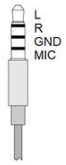


Table 20. Audio jack (CN15) pinout

Pin number	Description	Stereo headset with microphone pinning
6	OUT_Left	
4	OUT_Right	
3	GND	
2	MIC_IN	

8.12 Ethernet RJ45 connector (CN16)

The STM32N6570-DK board supports 10/100/1000 Mbit/s Ethernet communications with PHY, and the integrated RJ45 connector (CN16). The Ethernet PHY is connected to the STM32N657X0H3Q microcontroller through an RGMII interface.

The PHY 25 MHz clock is generated from the X4 crystal.

Figure 22. Ethernet RJ45 connector (CN16) front view

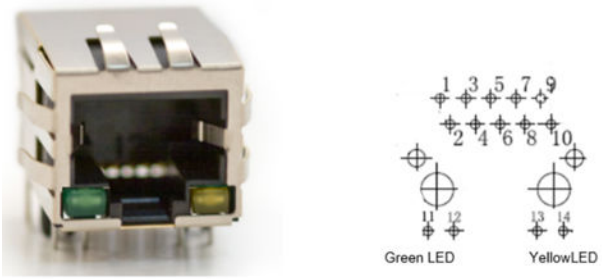


Table 21. Ethernet RJ45 connector (CN16) pinout

Pin number	Description	Pin number	Description
1	TX1+	8	TX3-
2	TX1-	9	TX4+
3	TX2+	10	TX4-
4	TX2-	11	GA
5	CT1	12	GC
6	CT2	13	YA
7	TX3+	14	YC

8.13 User USB2 Type-A connector (CN17)

CN17 is a USB Type-A connector (host). For more details, refer to Section 7.10.

Figure 23. User USB2 Type-A connector (CN17) front view

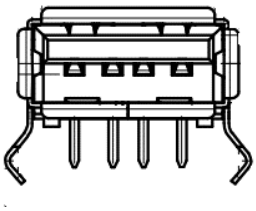


Table 22. User USB2 Type-A connector (CN17) pinout

Pin number	Description
1	VBUS2
2	2_HSDM
3	2_HSDP
4	GND

8.14 User USB1 USB Type-C® connector (CN18)

CN18 is a USB Type-C® connector (DRP). For more details, refer to Section 7.9.

Figure 24. User USB1 USB Type-C® connector (CN18) front view

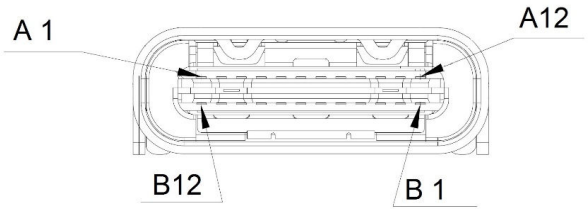


Table 23. User USB1 USB Type-C® connector (CN18) pinout

Pin number	Description	Pin number	Description
A1	GND	B1	GND
A2	NC	B2	NC
A3	NC	B3	NC
A4	VBUS1	B4	VBUS1
A5	CC1	B5	CC2
A6	D+	B6	D+
A7	D-	B7	D-
A8	NC	B8	NC
A9	VBUS1	B9	VBUS1
A10	NC	B10	NC
A11	NC	B11	NC
A12	GND	B12	GND

9 STM32N6570-DK I/O assignment

Table 24. **STM32N6570-DK I/O assignment**

Pin number	Pin name	On-board peripheral signals	ARDUINO® signals	STMod+ signals
U10	PA0	LCD_G3	-	-
P9	PA1	LCD_G2	-	-
T8	PA2	LCD_B7	-	-
R14	PA3	-	D10-TIM16_CH1/SPI_CS	P1-SPI_CS
U14	PA4	USB1_EN	-	-
R8	PA5	-	A0-ADC2 INP18(1)	-
P8	PA6	BOOT1	-	-
R12	PA7	LCD_B1	-	-
U8	PA8	LCD_B6	-	-
P7	PA9	-	A1-ADC1/2 INP10(1)	-
R7	PA10	-	A2-ADC1/2 INP11(1)	-
T7	PA11	USB1_OCP	-	-
U7	PA12	-	A3-ADC1/2 INP13(1)	-
U6	PA13(JTMS/SWDIO)	MCU.SWDIO	-	-
T6	PA14(JTCK/SWCLK)	MCU.SWCLK	-	-
P12	PA15(JTDI)	PA15	-	-
E15	PB0	SAI1_FS_A	-	-
R11	PB1	AUDIO_INT	-	-
C16	PB2	LCD_B2	-	-
F13	PB3	-	-	P12-RST
T12	PB4(NJTRST)	LCD_R3	-	-
U12	PB5(JTDO/TRACESWO)	MCU.SWO	-	-
E17	PB6	SAI1_CLK_A	-	-
E16	PB7	SAI1_SD_A	-	-
D16	PB8	-	-	P19-GPIO
D15	PB9	PWR_USB2_EN	-	-
U11	PB10	-	A5-ADC1/2 INP8(1)	P13-ADC1/2 INP8(1)
P10	PB11	LCD_G6	-	-
R10	PB12	LCD_G5	-	-
C15	PB13	LCD_CLK	-	-
B17	PB14	LCD_HSYNC	-	-
D17	PB15	LCD_G4	-	-
C10	PC0	SD_D2	-	-
A9	PC1	-	D14-I2C1/I3C1_SDA	P10-I2C1_SDA
D9	PC2	SD_CK	-	-
E10	PC3	SD_CMD	-	-
A10	PC4	SD_D0	-	-

Pin number	Pin name	On-board peripheral signals	ARDUINO® signals	STMod+ signals
B10	PC5	SD_D1	-	-
B9	PC6	-	-	P9-GPIO(2)
C9	PC7	-	-	P14-TIM3_CH2
D7	PC8	NRST_CAM	-	-
C7	PC9	-	-	P13-GPIO(1)
A8	PC10	-	A1D(1)	-
B8	PC11	-	-	P11-INT
C8	PC12	-	A4D(1)	-
F3	PC13	USER1	-	-
D1	PC14-OSC32_IN(OSC32_IN)	PC14	-	-
C1	PC15-OSC32_OUT(OSC32_OUT)	PC15	-	-
D13	PD0	-	D2	-
A14	PD1	ETH_MDC	-	-
C12	PD2	EN_MODULE	-	-
E13	PD3	ETH_MDINT	-	-
B15	PD4	I2C2_SDA	-	-
D14	PD5	-	D1-USART2_TX	P2-USART2_TX
D12	PD6	-	D7	-
E12	PD7	-	A0D(1)	-
E14	PD8	LCD_R7	-	-
H14	PD9	LCD_R1	-	-
A13	PD10	UCPD1_INT	-	-
G14	PD11	-	A3D(1)	-
C13	PD12	ETH_MDIO	-	-
C17	PD13	-	-	P17-GPIO
C14	PD14	I2C2_SCL	-	-
B14	PD15	LCD_R2	-	-
F16	PE0	TAMP	-	-
F17	PE1	LCD_NRST	-	-
F15	PE2	CK	-	-
F14	PE3	SAI1_SD_B	-	-
D10	PE4	SD_D3	-	-
C11	PE5	MCU.VCP_TX	-	-
D11	PE6	MCU.VCP_RX	-	-
B13	PE7	-	D8	-
A15	PE8	D1	-	-
A16	PE9	-	D3-TIM1_CH1	-
B16	PE10	-	D5-TIM1_CH2N	-
E11	PE11	LCD_VSYNC	-	-
B12	PE12	-	A2D(1)	-

Pin number	Pin name	On-board peripheral signals	ARDUINO® signals	STMod+ signals
A11	PE13	-	D6-TIM1_CH3	-
B11	PE14	-	D9-TIM1_CH4	-
A12	PE15	-	D13-SPI5_SCK	P4-SPI5_SCK
R3	PF0	ETH_GTX_CLK	-	-
P4	PF1	-	-	P18-GPIO
N4	PF2	ETH_CLK125	-	-
M2	PF3	-	A4-ADC1 INP16(1)	-
L2	PF4	EXT_SMPS_MODE	-	-
M3	PF5	ETH_CLK	-	-
L5	PF6	-	D0-USART2RX	P3-USART2_RX
M1	PF7	ETH_RX_CLK	-	-
N3	PF8	ETH_RXD2	-	-
P1	PF9	ETH_RXD3	-	-
L4	PF10	ETH_RX_DV	-	-
P3	PF11	ETH_TX_EN	-	-
T1	PF12	ETH_TXD0	-	-
R2	PF13	ETH_TXD1	-	-
N2	PF14	ETH_RXD0	-	-
N1	PF15	ETH_RXD1	-	-
R13	PG0	LCD_R0	-	-
R9	PG1	LCD_G1	-	-
T11	PG2	-	D11-TIM14_CH1/SPI5_MOSI	P2-SPI5_MOSI
R1	PG3	ETH_TXD2	-	-
P2	PG4	ETH_TXD3	-	-
M4	PG5	-	-	P1-USART2_CTS
L3	PG6	LCD_B3	-	-
L1	PG7	SAI1_MCLK_A	-	-
T14	PG8	LCD_G7	-	-
T13	PG9	-	-	P20-GPIO
T10	PG10	LED2	-	-
U13	PG11	LCD_R6	-	-
T9	PG12	LCD_G0	-	-
U9	PG13	LCD_DE	-	-
P6	PG14	-	-	P4-USART2_RTS
R6	PG15	LCD_B0	-	-
A7	PH0-OSC_IN(PH0)	PH0	-	-
B7	PH1-OSC_OUT(PH1)	PH1	-	-
E7	PH2	-	A5D(1)	-
B1	PH3	LCD_B4	-	-
F4	PH4	LCD_R4	-	-

Pin number	Pin name	On-board peripheral signals	ARDUINO® signals	STMod+ signals
F5	PH5	-	D4	-
B2	PH6	LCD_B5	-	-
D2	PH7	-	-	P8-SPI5_MOSI
C2	PH8	-	D12-SPI5_MISO	P3-SPI5_MISO
D8	PH9	-	D15-I2C1/I3C1_SCL	P7-I2C1_SCL
P17	PN0	OCTOSPI_DQS	-	-
R17	PN1	OCTOSPI_NCS	-	-
T17	PN2	OCTOSPI_IO0	-	-
R15	PN3	OCTOSPI_IO1	-	-
N17	PN4	OCTOSPI_IO2	-	-
R16	PN5	OCTOSPI_IO3	-	-
P15	PN6	OCTOSPI_CLK	-	-
T16	PN7	UCPD1_VSENSE	-	-
P16	PN8	OCTOSPI_IO4	-	-
T15	PN9	OCTOSPI_IO5	-	-
U15	PN10	OCTOSPI_IO6	-	-
U16	PN11	OCTOSPI_IO7	-	-
P14	PN12	SD_DET	-	-
M17	PO0	HEXASPI_NCS	-	-
K16	PO1	LED1	-	-
K17	PO2	HEXASPI_DQS0	-	-
M16	PO3	HEXASPI_DQS1	-	-
N16	PO4	HEXASPI_CLK	-	-
K15	PO5	SD_SEL	-	-
G17	PP0	HEXASPI_IO0	-	-
H16	PP1	HEXASPI_IO1	-	-
J17	PP2	HEXASPI_IO2	-	-
J16	PP3	HEXASPI_IO3	-	-
H15	PP4	HEXASPI_IO4	-	-
J14	PP5	HEXASPI_IO5	-	-
G16	PP6	HEXASPI_IO6	-	-
G15	PP7	HEXASPI_IO7	-	-
L16	PP8	HEXASPI_IO8	-	-
N14	PP9	HEXASPI_IO9	-	-
N15	PP10	HEXASPI_IO10	-	-
L15	PP11	HEXASPI_IO11	-	-
J15	PP12	HEXASPI_IO12	-	-
K14	PP13	HEXASPI_IO13	-	-
L17	PP14	HEXASPI_IO14	-	-
H17	PP15	HEXASPI_IO15	-	-
E5	PQ0	TOF_INT	-	-

Pin number	Pin name	On-board peripheral signals	ARDUINO® signals	STMod+ signals
E4	PQ1	IMU_INT1	-	-
E3	PQ2	IMU_INT2	-	-
D3	PQ3	LCD_ON/OFF	-	-
D4	PQ4	LCD_INT	-	-
D5	PQ5	TOF_LPn	-	-
A2	PQ6	LCD_BL_CTRL	-	-
G5	PQ7	PWR_SD_EN	-	-

1. *ADC is in the 1.8 V power domain. I/O is in the 3.3 V power domain. For ADC pins in ARDUINO® and STMod+ connectors, each pin is connected to two pins (ADC and I/O) of the MCU.*
2. *P9 of the STMod+ connector misses the SPI feature. This is a limitation.*

10 STM32N6570-DK product information

10.1 Product marking

The product and each board composing the product are identified with one or several stickers. The stickers, located on the top or bottom side of each PCB, provide product information:

- Main board featuring the target device: product order code, product identification, serial number, and board reference with revision.

  Single-sticker example:

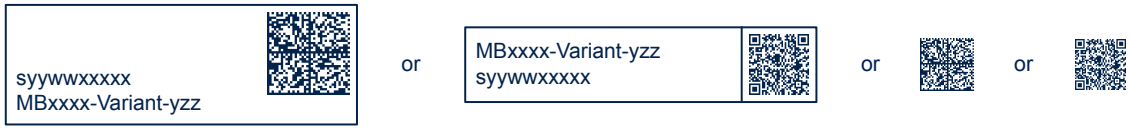
  

  Dual-sticker example:

- Other boards if any: board reference with revision and serial number.

  Examples:

On the main board sticker, the first line provides the product order code, and the second line the product identification.

On all board stickers, the line formatted as *"MBxxxx-Variant-yzz"* shows the board reference *"MBxxxx"*, the mounting variant *"Variant"* when several exist (optional), the PCB revision *"y"*, and the assembly revision *"zz"*, for example B01. The other line shows the board serial number used for traceability.

Products and parts labeled as *"ES"* or *"E"* are not yet qualified or feature devices that are not yet qualified. STMicroelectronics disclaims any responsibility for consequences arising from their use. Under no circumstances will STMicroelectronics be liable for the customer's use of these engineering samples. Before deciding to use these engineering samples for qualification activities, contact STMicroelectronics' quality department.

"ES" or *"E"* marking examples of location:

- On the targeted STM32 that is soldered on the board (for an illustration of STM32 marking, refer to the STM32 datasheet *Package information* paragraph at the *www.st.com* website).
- Next to the ordering part number of the evaluation tool that is stuck, or silk-screen printed on the board.

Some boards feature 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.

To use the same commercial stack in their applications, the developers might need to purchase a part number specific to this stack/library. The price of those part numbers includes the stack/library royalties.

10.2 STM32N6570-DK product history

Table 25. **Product history**

Order code	Product identification	Product details	Product change description	Product limitations
STM32N6570-DK	DK32N6570$CR1	MCU: • STM32N657X0H3Q silicon revision "B" MCU errata sheet: • *STM32N6xxx device errata* (ES0620) Boards: • MB1280-3V3-C01 (STMod+ fan-out expansion board) • MB1854-CSI-B01 (camera module daughterboard) • MB1860-RK050HR18C-B01 (LCD daughterboard) • MB1939-N6570-C02 (main board)	Initial revision	No limitation

10.3 Board revision history

Table 26. **Board revision history**

Board reference	Board variant and revision	Board change description	Board limitations
MB1280 (STMod+ fan-out expansion board)	3V3-C01	Initial revision	No limitation
MB1854 (camera module)	CSI-B01	Initial revision	No limitation
MB1860 (LCD daughterboard)	RK050HR18C-B01	Initial revision	No limitation
MB1939 (main board)	N6570-C02	Initial revision	P9 of the STMod+ connector misses the SPI feature.

11 Federal Communications Commission (FCC) and ISED Canada Compliance Statements

11.1 FCC Compliance Statement

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.

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.

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.

Responsible party (in the USA)

Francesco Doddo
STMicroelectronics, Inc.
200 Summit Drive | Suite 405 | Burlington, MA 01803
USA
Telephone: +1 781-472-9634

11.2 ISED Compliance Statement

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

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

12 CE conformity

12.1 Warning

EN 55032 / CISPR32 (2012) Class A product

Warning: this device is compliant with Class A of EN55032 / CISPR32. In a residential environment, this equipment may cause radio interference.

Avertissement : cet équipement est conforme à la Classe A de la EN55032 / CISPR 32. Dans un environnement résidentiel, cet équipement peut créer des interférences radio.

13 UKCA Compliance Statement

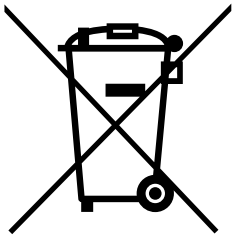
SIMPLIFIED UK DECLARATION OF CONFORMITY

Hereby, the manufacturer STMicroelectronics, declares that the radio equipment type “STM32N6570-DK” is in compliance with the UK Radio Equipment Regulations 2017 (UK S.I. 2017 No. 1206). The full text of the UK Declaration of Conformity is available at the following internet address: *www.st.com*.

14 Product disposal

Disposal of this product: WEEE (Waste Electrical and Electronic Equipment)

(Applicable in Europe)



This symbol on the product, accessories, or accompanying documents indicates that the product and its electronic accessories should not be disposed of with household waste at the end of their working life.

To prevent possible harm to the environment and human health from uncontrolled waste disposal, please separate these items from other type of waste and recycle them responsibly to the designated collection point to promote the sustainable reuse of material resources.

Household users:

You should contact either the retailer where you buy the product or your local authority for further details of your nearest designated collection point.

Business users:

You should contact your dealer or supplier for further information.

Revision history

Table 27. **Document revision history**

Date	Revision	Changes
13-Dec-2024	1	Initial release.

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