# Discovery kits with STM32H745XI and STM32H750XB MCUs

## Introduction

The STM32H745I-DISCO and STM32H750B-DK Discovery kits are complete demonstration and development platforms for STMicroelectronics Arm® Cortex®-M7 and Cortex®-M4 core-based STM32H745XI (STM32H745XIH6 order code), and Cortex®-M7 core-based STM32H750XB (STM32H750XBH6 order code) microcontrollers. Both devices feature four I2Cs, six SPIs with three multiplexed simplex I2Ss, two SD/SDIO/DMMC interfaces, four USARTs, four UARTs, one LPUART, two CAN controllers, three 16-bit ADCs, two 12-bit DACs, four SAIs, 8- to 14-bit digital camera interface, 1 Mbyte (STM32H745XIH6) or 128 Kbytes (STM32H750XBH6) of internal SRAM and 2 Mbytes of flash memory, a USB OTG HS and a USB OTG FS, an Ethernet MAC interface, an FMC interface, a Quad-SPI interface, and SWD debugging support. The STM32H745I-DISCO and STM32H750B-DK Discovery kits enable users to get started quickly and develop applications.

In addition, the STM32H745I-DISCO and STM32H750B-DK, shown in Figure 1 and Figure 2, can be used as a reference design for user application prototyping before porting to the final product.

The full range of hardware features available on the board helps users enhance their application development by an evaluation of almost all peripherals (such as USB OTG FS, Ethernet 10/100Mb/s, eMMC, USART, SAI audio DAC stereo with audio jack input and output, MEMS digital microphone, SDRAM, Quad-SPI flash memory, and RGB interface LCD with capacitive multi-touch panel). ARDUINO® Uno V3 connectors provide easy connection to extension shields or daughterboards for specific applications.
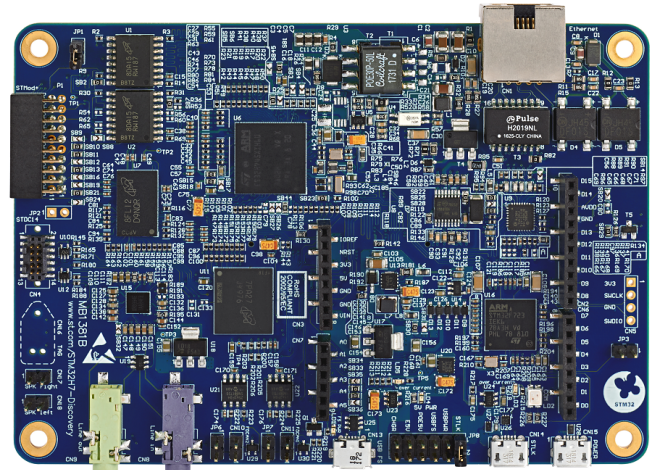
STLINK-V3E is integrated into the board, as an embedded in-circuit debugger and programmer for the STM32 MCU and the USB Virtual COM port bridge.

The STM32H745I-DISCO and STM32H750B-DK boards come with the STM32CubeH7 MCU Package, which provides an STM32 comprehensive software HAL library as well as various software examples.

**Figure 1. STM32H745I-DISCO and STM32H750B-DK boards (top view)**



**Figure 2. STM32H745I-DISCO and STM32H750B-DK boards (bottom view)**



*Pictures are not contractual. PCB colors may differ.*

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For further information contact your local STMicroelectronics sales office.

www.st.com

# 1      Features

- Arm® Cortex® core-based microcontroller with 2 Mbytes (STM32H745XIH6) or 128 Kbytes (STM32H750XBH6) of flash memory and 1 Mbyte of RAM, in a TFBGA240+25 package
- 4.3" RGB interface LCD with touch panel connector
- Ethernet compliant with IEEE-802.3-2002, and PoE
- USB OTG FS
- SAI audio codec
- One ST-MEMS digital microphone
- 2× 512-Mbit Quad-SPI NOR flash memory
- 128-Mbit SDRAM
- 4-Gbyte on-board eMMC
- 1 user and reset push-button
- Fanout daughterboard
- 2× CAN FDs
- Board connectors:
  - USB FS Micro-AB connectors
  - ST-LINK Micro-B USB connector
  - USB power Micro-B connector
  - Ethernet RJ45
  - Stereo headset jack including analog microphone input
  - Audio header for external speakers
  - Tag-Connect™ (TAG) 10-pin footprint
  - Arm® Cortex® 10-pin 1.27 mm pitch debug connector over STDC14 footprint
  - ARDUINO® Uno V3 expansion connectors
  - STMod+
- Flexible power-supply options:
  - STLINK-V3E USB connector, USB FS connector
  - 5 V delivered by RJ45 (Power over Ethernet)
  - 5 V delivered by ARDUINO® or external connector
  - USB charger
  - USB power
- On-board STLINK-V3E debugger/programmer with USB re-enumeration capability: mass storage, Virtual COM port, and debug port
- Support of a wide choice of Integrated Development Environments (IDEs) including IAR Embedded Workbench®, MDK-ARM, and STM32CubeIDE

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

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# 2 Ordering information

To order the STM32H745I-DISCO and STM32H750B-DK Discovery kits, refer to Table 1. Additional information is available from the datasheet and reference manual of the target STM32.

**Table 1. List of available products**

| Order code | Board reference | Target STM32 |
|---|---|---|
| STM32H745I-DISCO | MB1381 | STM32H745XIH6 |
| STM32H750B-DK | | STM32H750XBH6 |

## 2.1 Codification

The meaning of the codification is explained in Table 2.

**Table 2. Codification explanation**

| STM32XXYYZ-DISCO<br>STM32XXYYZ-DK | Description | Example: STM32H745I-DISCO |
|---|---|---|
| STM32XX | MCU series in STM32 32-bit Arm Cortex MCUs | STM32H7 Series |
| YY | MCU product line in the series | STM32H745/755 includes the STM32H745xx MCUs |
| Z | STM32 flash memory size:<br>• B for 128 Kbytes<br>• I for 2 Mbytes | 2 Mbytes |
| DISCO / DK | Toolkit type:<br>• DISCO or DK: 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 Micro-B 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 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*.

# 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 Delivery recommendations

Before the first use, check the board for any damage that may have occurred during shipment, and check that all socketed components are firmly fixed in their sockets and that none is loose in the plastic bag.

# 6 Hardware layout and configuration

The STM32H745I-DISCO and STM32H750B-DK Discovery kits are designed around the STM32H745XIH6 and STM32H750XBH6 microcontrollers, respectively. Both microcontrollers are packaged in TFBGA240+25. The hardware block diagram (see Figure 3) illustrates the connection between the microcontroller and the peripherals (SDRAM, eMMC, Quad-SPI flash memory, CAN FD (FDCAN), LCD RGB connector, USB OTG connectors, UART, Ethernet, audio, TAG connector, STDC connector, ARDUINO® Uno shields, and embedded ST-LINK). Figure 4 and Figure 5 help to locate these features on the STM32H745I-DISCO and STM32H750B-DK boards.

**Figure 3. Hardware block diagram**
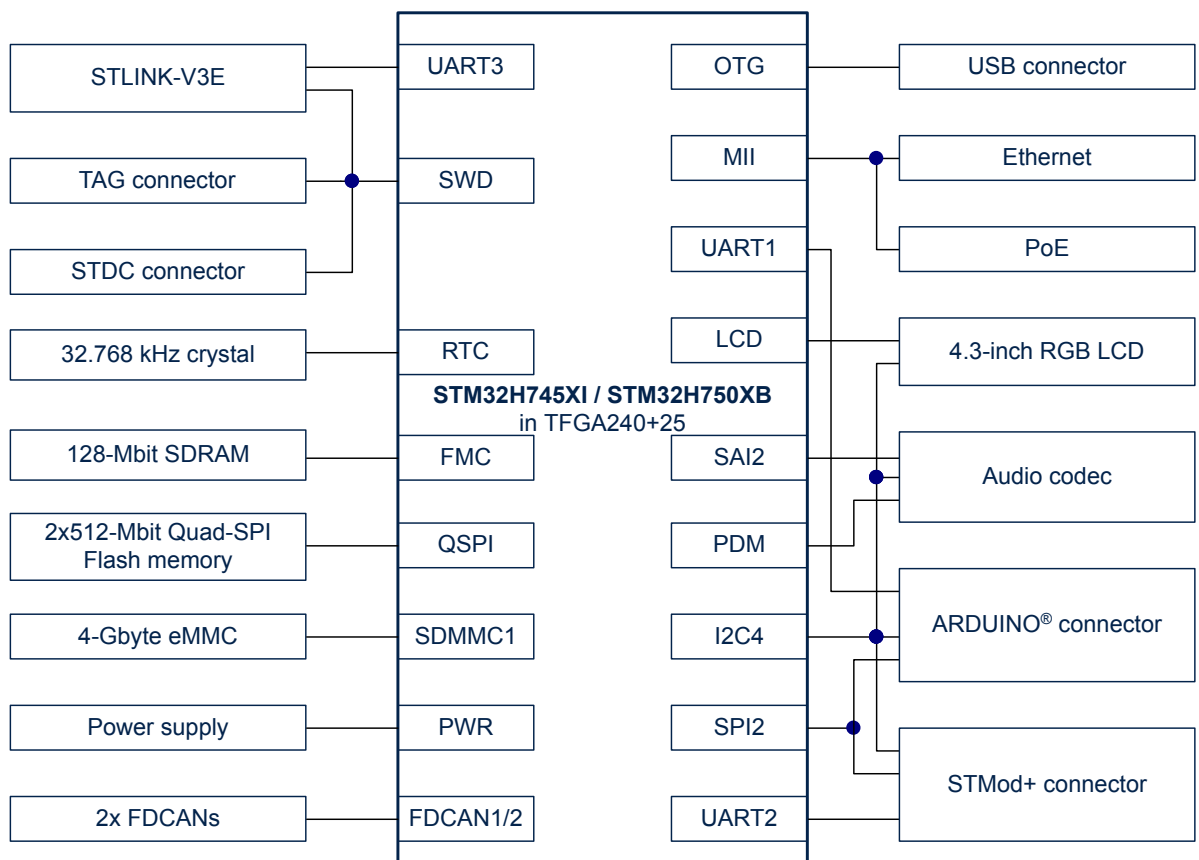
## 6.1 STM32H745I-DISCO and STM32H750B-DK layout

**Figure 4. STM32H745I-DISCO and STM32H750B-DK Discovery board top layout**
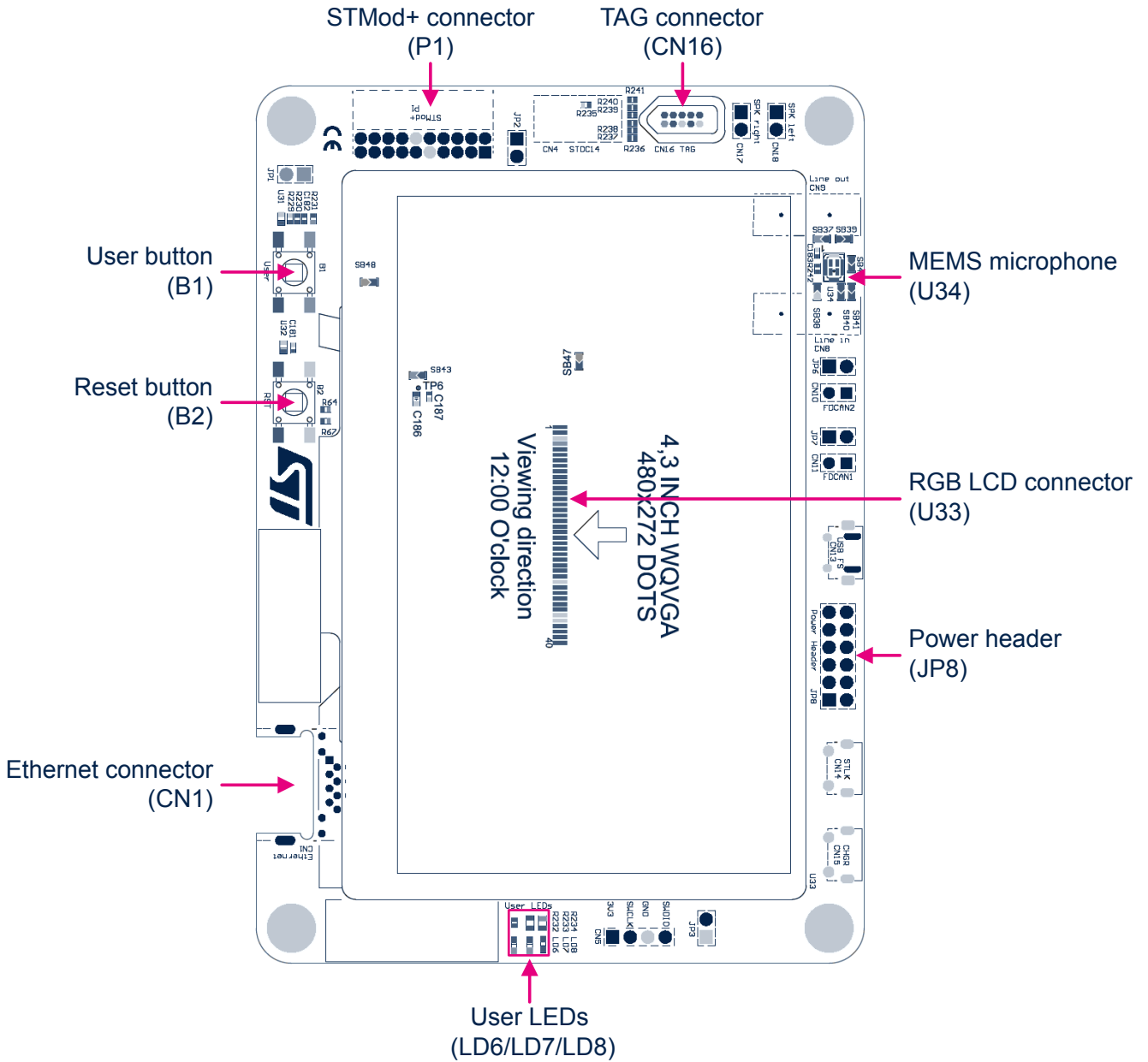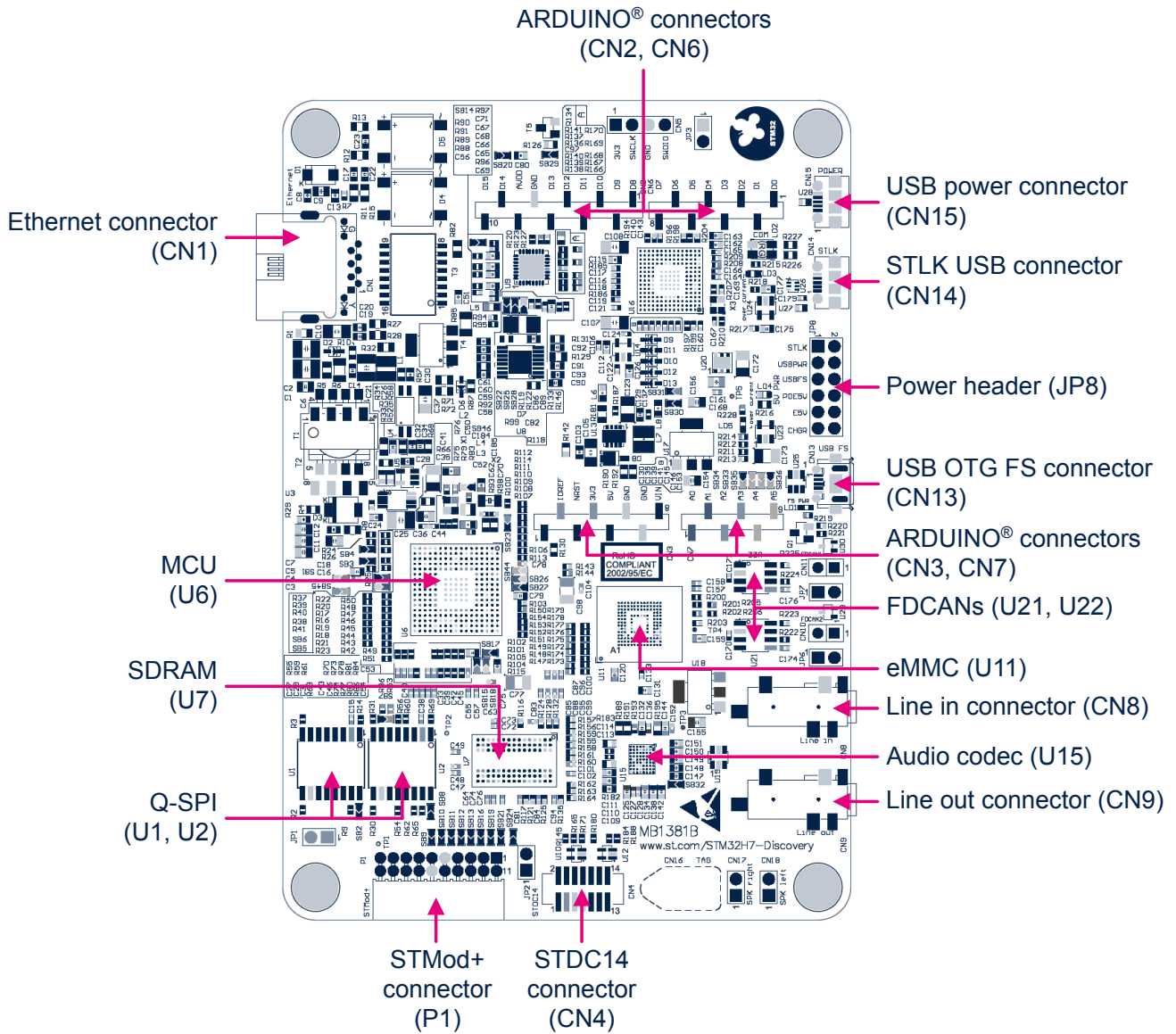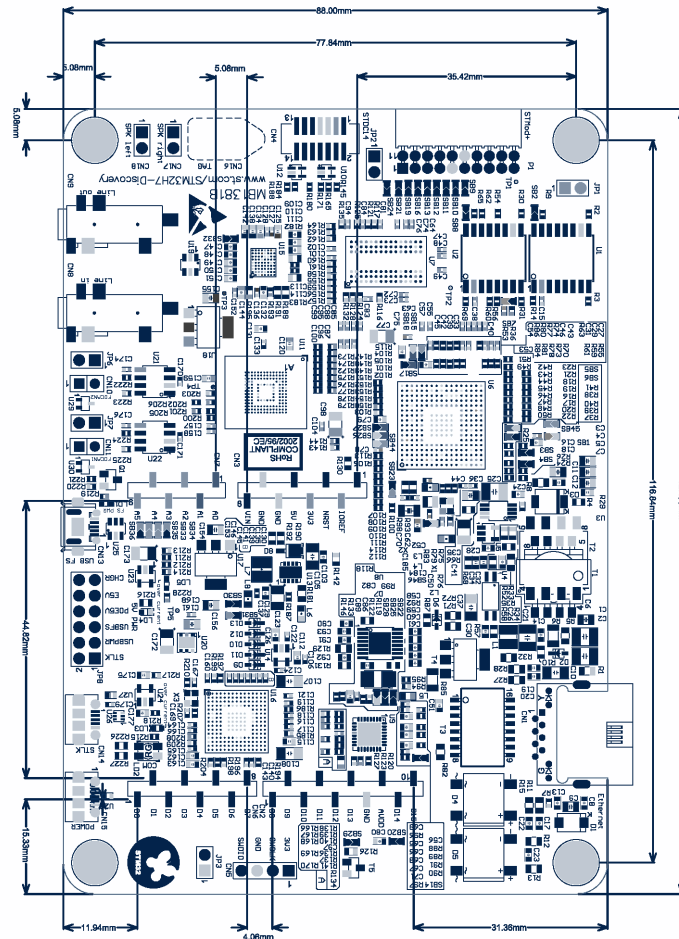
**Figure 5. STM32H745I-DISCO and STM32H750B-DK Discovery board bottom layout**

## 6.2 STM32H745I-DISCO and STM32H750B-DK mechanical drawing

Figure 6 shows the mechanical dimensions of the STM32H745I-DISCO and STM32H750B-DK boards.

**Figure 6. STM32H745I-DISCO and STM32H750B-DK Discovery board mechanical drawing (bottom view)**



## 6.3 Embedded STLINK-V3E

The STLINK-V3E programming and debugging tool is integrated into the STM32H745I-DISCO and STM32H750B-DK Discovery kits. It supports:

- 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

The USB connector (CN14) can be used to power the STM32H745I-DISCO and STM32H750B-DK regardless of the STLINK-V3E facility used for debugging or programming the STM32H745XIH6 and STM32H750XBH6. This holds also when the STLINK-V3E standalone tool is connected to the CN4 or CN16 connector and used for debugging or programming the STM32H745XIH6 and STM32H750XBH6. Section 6.4 Power supply provides more details about STM32H745I-DISCO and STM32H750B-DK powering.

Refer to *www.st.com* for details about STLINK-V3E.

**Drivers and firmware upgrade**

The STLINK-V3E requires drivers to be installed on Windows®. It embeds firmware that needs to be updated from time to time in order to benefit from new functionalities and bug corrections. Refer to technical note *Overview of ST-LINK derivatives* (TN1235) for details.

## 6.4 Power supply

The STM32H745I-DISCO and STM32H750B-DK Discovery kits are designed to be powered from a 5 V DC power source. Either of the following five 5 V DC power inputs can be used, upon appropriate board configuration:

- Micro-B USB receptacle CN14 of STLINK-V3E without enumeration: up to 500 mA can be supplied to the board (JP8 jumper setting on CHGR position on the silkscreen).

- 7 to 12 V DC power from CN3 pin 8: named VIN on the silkscreen, extension connectors for ARDUINO® Uno shields or daughterboard (JP8 jumper setting on E5V on the silkscreen).

- 48 V DC power from RJ45 connector CN1 (Ethernet):
  In this case, the on-board module PoE (Power over Ethernet) generates the 5 V supply voltage with up to 600 mA. This module is a powered device complying with IEEE 802.3af, class 1 / 2 standard. The external power supply must be fully IEEE 802.3af compliant (JP8 jumper setting on POE5V on the silkscreen).

- Micro-AB USB receptacle CN13 of the USB OTG_FS interface: marked USB OTG FS on the board (JP8 jumper setting on USBFS on the silkscreen), and supplying up to 500 mA to the board.

- Micro-B USB receptacle CN15 of the USB power: marked USB PWR on the board (JP8 jumper setting on USBPWR on the silkscreen), and supplying up to 500 mA to the board.

- Micro-B USB receptacle CN14 of STLINK-V3E with enumeration: with enumeration feature (see Supplying the board through the STLINK-V3E USB port), up to 500 mA can be supplied to the board (JP8 jumper setting on STLK on the silkscreen).

The LD4 green LED turns ON when the voltage on the power line marked as +5 V is present. All the supply voltage lines required for the operation of the STM32H745I-DISCO/STM32H750B-DK components are derived from this +5 V line.

**Supplying the board through the STLINK-V3E USB port**

To power the STM32H745I-DISCO and STM32H750B-DK in this way, the USB host (a PC) gets connected to the Micro-B USB receptacle of the board via a USB cable. The connection event starts the USB enumeration procedure. In its initial phase, the host USB port current supply capability is limited to 100 mA. This is sufficient since only the STLINK-V3E part of the STM32H745I-DISCO/STM32H750B-DK draws power at that time: the U24 power switch is set to the OFF position, which isolates the rest of the board from the power source. In the next phase of the enumeration procedure, the host PC informs the STLINK-V3E that it is able to supply current up to 300 mA. If the answer is positive, the STLINK-V3E sets the U24 switch to the ON position to supply power to the rest of the board. Otherwise, CN3 pin 8 (VIN) or CN15 can be used to supply the board instead.

Should a short-circuit occur on the board, the U24 power switch protects the USB port of the host PC against a current demand exceeding 500 mA. In such an event, the LD4 LED lights up.

The STM32H745I-DISCO and STM32H750B-DK boards can also be supplied from a USB power source that does not support enumeration, such as a USB charger. In this particular case, the JP6 jumper must be ON with a jumper hat as shown in Table 4. Power-supply related jumper and solder bridge settings. STLINK-V3E bypasses the U24 switch power regardless of the enumeration procedure result and passes the power unconditionally to the board.

The LD4 green LED turns ON whenever the whole board is powered.

**Using STLINK-V3E along with powering through external power**

It can happen that the board requires a supply current higher than 300 mA. It consequently cannot be supplied from the host PC connected to the STLINK-V3E USB port for debugging or programming the STM32H745XIH6 or STM32H750XBH6 microcontroller. In such a case, the board can be supplied through CN3 pin 8 (marked VIN on the board) or by CN15.

To do this, it is important to power the board before connecting it with the host PC, which requires the following sequence to be respected:

1. Set jumper JP8 in the E5V or CHGR position.
2. Connect the external power source to CN3 pin 8 or CN15.

3. Check that the green LED LD4 is turned ON.

4. Connect the host PC to USB connector CN14.

**Caution:** If the board requests more than 300 mA and the host PC is connected via USB before the board is powered from CN3 pin 8 or CN15, the following events may occur (listed in reverse severity order):

1. The host PC is capable of supplying 300 mA (the enumeration succeeds) but does not feature any over-current protection on its USB port. It is damaged due to over-current.

2. The host PC is capable of supplying 300 mA (the enumeration succeeds) and it has a built-in over-current protection on its USB port, limiting or shutting down the power out of its USB port when the excessive current demand from STM32H745I-DISCO/STM32H750B-DK is detected. This causes an operating failure of the board.

3. The host PC is not capable of supplying 300 mA (the enumeration fails). The STLINK-V3E does not supply the rest of the STM32H745I-DISCO/STM32H750B-DK from its USB port VBUS line.

**SMPS/LDO power supply**

There are three solutions to provide power to the microcontroller $V_{CORE}$ logic supply: SMPS, LDO, and SMPS and LDO. Power consumption in Run mode is significantly improved by generating $V_{CORE}$ from the internal DC/DC converter (SMPS) and the default connection must be set to SMPS. Some modifications are required to supply the microcontroller from the LDO. Below the board configuration for each case:

• LDO mode (default on the STM32H750XB): mount SB6, SB17, and SB45; remove SB5, SB18, SB26, SB27, SB44, SB46, and L4.

• SMPS mode (default on the STM32H745XI): mount SB5, SB18, SB44, SB46, and L4; remove SB6, SB17, SB27, SB26, and SB45.

• SMPS plus LDO mode: mount SB6, SB17, SB44, SB46, and L4; remove SB26, SB5, SB18, SB27, and SB45.

**Caution:** A deadlock occurs if the STM32H745I-DISCO SMPS/LDO firmware PWR configuration does not match the board hardware configuration: after the reset, the ST-LINK cannot connect the target anymore.

The firmware PWR configuration must be set as follows in the function `SystemClock_Config` in the file `main.c`:

• If the hardware configuration is *Direct SMPS* (default configuration):
`HAL_PWREx_ConfigSupply(PWR_DIRECT_SMPS_SUPPLY);`

• If the hardware configuration is *LDO*:
`HAL_PWREx_ConfigSupply(PWR_LDO_SUPPLY);`

If a deadlock occurs because of a mismatch between hardware and firmware PWR settings (SMPS/LDO), the user can recover the STM32H745I-DISCO board by applying the following procedure:

1. Power off the board.

2. Remove the 10 kΩ resistor from R143 and mount it on R144.
This changes the BOOT0 pin to 1 instead of 0, thus changing the device boot address to boot address 1 and making the bootloader start in System memory. This avoids starting firmware in the user flash memory with a wrong SMPS/LDO configuration versus the hardware board configuration.

3. Power on the board and connect using STM32CubeProgrammer (STM32CubeProg).

4. Erase the user flash memory.

5. Power off the board and remove the 10 kΩ resistor from R144 and mount it back on R143.

6. The board is recovered and can be used normally with matching firmware PWR.

Table 4. Power-supply related jumper and solder bridge settings describes the settings of all the jumpers related to the powering of the STM32H745I-DISCO/STM32H750B-DK and the extension board. VDD_MCU corresponds to the STM32H745XIH6/STM32H750XBH6 digital supply voltage line. It can be connected to a fixed 3.3 V supply.

**Table 4. Power-supply related jumper and solder bridge settings**

| Jumper/Solder bridge | Setting | Configuration |
|---|---|---|
| JP8 Power source selector | | The STM32H745I-DISCO/STM32H750B-DK is supplied through the CN14 Micro-B USB receptacle. |
| | | The STM32H745I-DISCO/STM32H750B-DK is supplied through the pin 8 of CN3 (marked VIN). |
| | | The STM32H745I-DISCO/STM32H750B-DK is supplied through the RJ45 connector CN1. |
| | | The STM32H745I-DISCO/STM32H750B-DK is supplied through the CN13 Micro-AB USB receptacle. |
| | | **Default setting** The STM32H745I-DISCO/STM32H750B-DK is supplied through the CN14 Micro-B USB receptacle. It depends on the host PC USB port powering capability declared in the enumeration. |
| SB23 VBAT connection | SB23 ON | **Default setting** VBAT is connected to +3V3. |
| | SB23 OFF | VBAT is not connected to +3V3. |
| SB15 VDD_USB connection | SB15 ON | **Default setting.** VDD_USB (VDDUSB terminal of STM32H745XIH6/STM32H750XBH6) is connected to VDD_MCU. |
| | SB15 OFF | VDD_USB is not connected to VDD_MCU. |
| JP1 VDD_MCU connection | | **Default setting** VDD_MCU (VDD terminals of STM32H745XIH6/STM32H750XBH6) is connected to fixed +3.3 V. |
| | | VDD_MCU (VDD terminals of STM32H745XIH6/STM32H750XBH6) is not connected to fixed +3.3 V |

*Note:*     *STM32H750B-DK only supports the LDO mode.*

## 6.5 Clock sources

Three clock sources are available on the STM32H745I-DISCO and STM32H750B-DK boards:

•     X1: 25 MHz oscillator for STM32H745XIH6/STM32H750XBH6 microcontroller and Ethernet PHY.

•     X2: 32.768 kHz crystal for STM32H745XIH6/STM32H750XBH6 embedded RTC.

•     X3: 25 MHz oscillator for STLK.

## 6.6 Reset sources

The reset signal of the STM32H745I-DISCO and STM32H750B-DK Discovery kits is active low. The reset sources include:

- B2 reset button
- ARDUINO® Uno shield board from CN3
- Embedded STLINK-V3E
- TAG connector
- STDC14 receiver
- eMMC
- Ethernet

## 6.7 Audio

An audio codec with four DACs and two ADCs is connected to the STM32H745XIH6 and STM32H750XBH6 SAI interface. It communicates with the STM32H745XIH6 and STM32H750XBH6 microcontrollers via an I$^2$C bus shared with the touch panel of the RGB LCD, ARDUINO®, and STMod+ connectors.

- The analog input line is connected to the audio codec ADC through the blue audio jack (CN8).
- The analog output line is connected to the audio codec DAC via the green audio jack (CN9).
- Two external speakers can be connected to the audio codec via CN18 for the left speaker and CN17 for the right speaker.
- The STM32H745I-DISCO and STM32H750B-DK feature one digital ST MEMS microphone. It is connected to the digital microphone input of the STM32H745XIH6/STM32H750XBH6 and managed by the PDM functionality.

## 6.8 USB OTG FS

The STM32H745I-DISCO and STM32H750B-DK boards support USB OTG full-speed communications via the CN13 USB Micro-AB connector.

The USB connectors can power the Discovery kit with a 5 V DC supply voltage, at a current up to 500 mA.

A USB power switch is also connected to VBUS and provides power to CN13. The green LED LD1 is lit when either one of the following events occurs:

- The power switch is ON and the STM32H745I-DISCO/STM32H750B-DK operate as a USB Host.
- VBUS is powered by another USB Host when the STM32H745I-DISCO/STM32H750B-DK operate as a USB Device.

The red LED LD5 is lit when an overcurrent occurs.

*Note:* *The STM32H745I-DISCO and STM32H750B-DK boards must be powered by an external power supply when using the OTG function.*

## 6.9 eMMC

The STM32H745I-DISCO and STM32H750B-DK embed a 4-Gbyte eMMC chip. It is connected to the STM32H745XIH6 and STM32H750XBH6 SDMMC1 port.

## 6.10 Ethernet

The STM32H745I-DISCO and STM32H750B-DK boards support 10/100 Mbit/s Ethernet communications by a PHY, which supports IEEE 802.3az Energy Efficient Ethernet (EEE) and integrated RJ45 connector CN1. The Ethernet PHY is connected to the STM32H745XIH6/STM32H750XBH6 microcontroller through an MII interface.

The PHY 25 MHz clock is generated from the X1 oscillator, while the STM32H745XIH6/STM32H750XBH6 50 MHz clock is generated by the PHY MII_REF_CLK.

**Half-duplex operation**

With the default settings, Ethernet half-duplex operation is not working because of a multiplex of I/Os between Ethernet MII_CRS and MII_COL, and Q-SPI flash memory QSPI_BK2_IO0 and QSPI_BK2_IO1. Table 5 shows the possible settings of all solder bridges or resistors associated with Ethernet on the boards.

**Table 5. Ethernet-related solder bridge and resistor settings**

| Solder bridges / Resistors | Setting | Configuration |
|---|---|---|
| SB3, SB4, R38, R40 | SB3 and SB4 OFF<br>R38 and R40 ON | Default setting.<br>PH2 and PH3 are connected to the Q-SPI flash memory. Ethernet half-duplex operation is not supported. |
| | SB3 and SB4 ON<br>R38 and R40 OFF | PH2 and PH3 are connected to the Ethernet PHY. Ethernet half-duplex operation is supported. |

## 6.11 Power over Ethernet

The STM32H745I-DISCO and STM32H750B-DK Discovery boards embed a power module that uses Ethernet. This module is an IEEE802.3af compliant class 1 / 2 PoE converter, based on a simple diode rectified flyback topology built around a PoE-PD interface and PWM controller. This *"powered device"* module accepts a 48 V input voltage and can deliver 5 V with 600 mA.

## 6.12 SDRAM

A 128-Mbit SDRAM is connected to the STM32H745XIH6/STM32H750XBH6 FMC interface.

## 6.13 Quad-SPI NOR flash memory

By default, two 512-Mbit Quad-SPI NOR flash memories are connected to the STM32H745XIH6/STM32H750XBH6 Quad-SPI interface. A single 1-Gbit Quad-SPI NOR flash memory can also be plugged on the board. The settings for each configuration are detailed in Table 6.

**Table 6. Quad-SPI flash memories configurations settings**

| Configurations | Flash memory devices | Solder bridges and resistors |
|---|---|---|
| Two Quad-SPI flash memories | U1: 512-Mbit Quad-SPI NOR flash memory<br>U2: 512-Mbit Quad-SPI NOR flash memory | • R53/R62/R54/R56/R60/SB8/SB48 OFF<br>• R14/R3/R2/R9/SB2/C15 ON |
| One twin Quad-SPI flash memory | U1: 1-Gbit Quad-SPI NOR flash memory<br>U2: - | • R53/R62/R54/R56/R60/SB8/SB48 ON<br>• R14/R3/R2/R9/SB2/C15 OFF |

## 6.14 Virtual COM port

The USART3 serial interface is directly available as a Virtual COM port of the PC, connected to the STLINK-V3E USB connector (CN14). The Virtual COM port settings are the following:

• 115200 bauds
• 8-bit data
• no parity
• 1 stop bit
• no flow control

## 6.15 RGB LCD display

The on-board color display is a 4.3-inch 480×272 TFT LCD with capacitive touch panel. It is connected to the STM32H745XIH6/STM32H750XBH6 LCD interface.

## 6.16 Buttons and LEDs

The black button (B2), located on the board top side, is the reset of the STM32H745XIH6 and STM32H750XBH6 microcontrollers. Refer to Figure 4. STM32H745I-DISCO and STM32H750B-DK Discovery board top layout. The blue button (B1), located on the top side, is available for use as a digital input or as a wakeup alternate function.

Table 7 summarizes the assignment of the control ports to the LED indicators.

**Table 7. Assignment of control ports to LEDs**

| Reference | Color | Name | Comment |
|-----------|-------|------|---------|
| B1 | Blue | USER | Wakeup alternate function |
| B2 | Black | RESET | - |
| LD1 | Green | VBUS USB FS | PA9 |
| LD2 | Green/Red | STLK COM | Green when communication ongoing |
| LD3 | Red | STLK Over Current | - |
| LD4 | Green | PWR | - |
| LD5 | Green | OTG Over Current | PH11 |
| LD6 | Red | USER1 | PI13 |
| LD7 | Green | USER2 | PJ2 |
| LD8 | Green | ARDUINO | PD3 |

# 7 Connectors

## 7.1 ARDUINO® Uno V3 connectors

CN2, CN3, CN6, and CN7 are female connectors compatible with the ARDUINO® standard. Most shields designed for ARDUINO® can fit to the STM32H745I-DISCO and STM32H750B-DK Discovery kits. The STM32H745I-DISCO/STM32H750B-DK ARDUINO® connectors support ARDUINO® Uno V3.

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

**Table 8. ARDUINO® connectors (CN2, CN3, CN6, and CN7)**

| Left connectors | | | | | Right connectors | | | | |
|---|---|---|---|---|---|---|---|---|---|
| CN number | Pin number | Pin name | Microcontroller pin | Function | Function | Microcontroller pin | Pin name | Pin number | CN number |
| - | | | | | I2C1_SCL | PD12 | D15 | 10 | CN2 digital |
| | | | | | I2C1_SDA | PD13 | D14 | 9 | |
| | | | | | AVDD | - | AREF | 8 | |
| | | | | | Ground | - | GND | 7 | |
| CN3 power | 1 | NC | - | - | SPI2_SCK | PD3 | D13 | 6 | |
| | 2 | IOREF | - | 3.3 V Ref | SPI2_MISO | PI2 | D12 | 5 | |
| | 3 | RESET | NRST | RESET | TIM12_CH2, SPI2_MOSI | PB15 | D11 | 4 | |
| | 4 | 3V3 | - | 3.3 V input/output | TIM3_CH1, SPI2_NSS | PB4 | D10 | 3 | |
| | 5 | 5V | - | 5 V output | TIM8_CH3N | PH15 | D9 | 2 | |
| | 6 | GND | - | Ground | - | PE3 | D8 | 1 | |
| | 7 | GND | - | Ground | - | | | | |
| | 8 | VIN | - | Power input | - | PI8 | D7 | 8 | CN6 digital |
| - | | | | | TIM15_CH2 | PE6 | D6 | 7 | |
| CN7 analog | 1 | A0 | PC0 | ADC123_IN10 | TIM1_CH1 | PA8 | D5 | 6 | |
| | 2 | A1 | PF8 | ADC3_IN7 | - | PK1 | D4 | 5 | |
| | 3[1] | A2 | PA0_C | ADC12_IN0 | TIM3_CH1 | PA6 | D3 | 4 | |
| | 4[1] | A3 | PA1_C | ADC12_IN1 | - | PG3 | D2 | 3 | |
| | 5[1] | A4 | PC2_C or PD13 | ADC3_IN0 (PC2) or I2C1_SDA (PD13) | USART1_TX | PB6 | D1 | 2 | |
| | 6[1] | A5 | PC3_C or PD12 | ADC3_IN1 (PC3) or I2C1_SCL (PD12) | USART1_RX | PB7 | D0 | 1 | |

1. Supports analog input only. The current capability is limited to 1 mA when used as digital output or input.

## 7.2 CN13 USB OTG FS Micro-AB connector
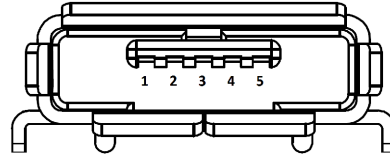
**Figure 7. CN13 USB OTG Micro-AB connector (front view)**



**Table 9. CN13 USB OTG FS Micro-AB connector**

| Pin number | Description | Pin number | Description |
|---|---|---|---|
| 1 | VBUS | 4 | ID |
| 2 | D- | 5 | GND |
| 3 | D+ | - | - |

## 7.3 CN1 Ethernet RJ45 connector

**Figure 8. CN1 Ethernet RJ45 connector (front view)**
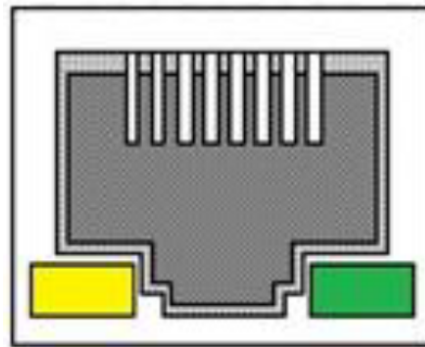


**Table 10. CN1 Ethernet RJ45 connector**

| Pin number | Description | Pin number | Description |
|---|---|---|---|
| 1 | Tx+ | 7 | Nc7 |
| 2 | Tx- | 8 | Nc8 |
| 3 | Rx+ | 9 | K, yellow LED |
| 4 | Nc4 | 10 | A, yellow LED |
| 5 | Nc5 | 11 | K, green LED |
| 6 | Rx- | 12 | A, green LED |

## 7.4 RGB LCD connector

**Figure 9.** RGB LCD connector (footprint)

4,3 INCH WQVGA
480x272 DOTS

Viewing direction
12:00 O'clock
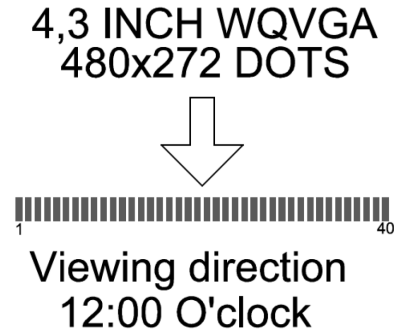
**Table 11.** RGB LCD connector

| Pin number | Description | Pin connection | Pin number | Description | Pin connection |
|---|---|---|---|---|---|
| 1 | LCD_BL_K | - | 2 | LCD_BL_A | - |
| 3 | GND | - | 4 | VDD | - |
| 5 | LCD_R0 | PI15 | 6 | LCD_R1 | PJ0 |
| 7 | LCD_R2 | PJ1 | 8 | LCD_R3 | PH9 |
| 9 | LCD_R4 | PJ3 | 10 | LCD_R5 | PJ4 |
| 11 | LCD_R6 | PJ5 | 12 | LCD_R7 | PJ6 |
| 13 | LCD_G0 | PJ7 | 14 | LCD_G1 | PJ8 |
| 15 | LCD_G2 | PJ9 | 16 | LCD_G3 | PJ10 |
| 17 | LCD_G4 | PJ11 | 18 | LCD_G5 | PI0 |
| 19 | LCD_G6 | PI1 | 20 | LCD_G7 | PK2 |
| 21 | LCD_B0 | PJ12 | 22 | LCD_B1 | PJ13 |
| 23 | LCD_B2 | PJ14 | 24 | LCD_B3 | PJ15 |
| 25 | LCD_B4 | PK3 | 26 | LCD_B5 | PK4 |
| 27 | LCD_B6 | PK5 | 28 | LCD_B7 | PK6 |
| 29 | GND | - | 30 | LCD_CLK | PI14 |
| 31 | LCD_DISP | PD7 | 32 | LCD_HSYNC | PI12 |
| 33 | LCD_VSYNC | PI9 | 34 | LCD_DE | PK7 |
| 35 | GND | - | 36 | GND | - |
| 37 | LCD_RST | - | 38 | LCD_INT | PG2 |
| 39 | LCD_SCL | PD12 | 40 | LCD_SDA | PD13 |

## 7.5 CN2 STMod+ connector

An STMod+ connector is available on the STM32H745I-DISCO and STM32H750B-DK Discovery kits. It provides flexibility in small form factor applications. In addition, the STMod+ connector expands the SPI interface and frees I/Os that can be used by other peripheral expansions.

**Table 12.** **CN2 STMod+ connector**

| Pin number | Description | Pin number | Description |
|---|---|---|---|
| 1 | SS/CTS (PA15/PA0) | 11 | INT (PH12) |
| 2 | MOSI/TXD (PB15/PD5) | 12 | RESET (PH10) |
| 3 | MISO/RXD (PI2/PD6) | 13 | ADC (PA4) |
| 4 | SCK/RTS (PD3/PD4) | 14 | PWM (PA3) |
| 5 | GND | 15 | 5V |
| 6 | 5V | 16 | GND |
| 7 | I2C_SCL (PD12) | 17 | GPIO (PH1) |
| 8 | MOSIs (PI3) | 18 | GPIO (PI11) |
| 9 | MISOs (PB14) | 19 | GPIO(PH4) |
| 10 | I2C_SDA (PD13) | 20 | GPIO(PH8) |

## 7.6 CN14 STLINK-V3E USB Micro-B connector

The CN14 USB connector is used to connect the embedded STLINK-V3E to the host PC in order to program and debug the STM32H745XIH6/STM32H750XBH6 microcontroller.

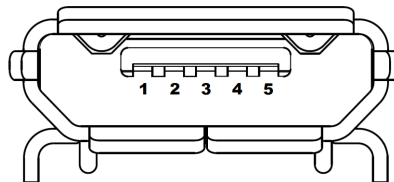**Figure 10.** **CN14 USB Micro-B connector (front view)**



**Table 13.** **CN14 USB Micro-B connector**

| Pin number | Description | Pin number | Description |
|---|---|---|---|
| 1 | VBUS (power) | 4 | GND |
| 2 | DM | 5, 6 | Shield |
| 3 | DP | - | - |

## 7.7 Audio stereo speaker header connectors (CN17 and CN18)

The stereo audio outputs, CN17 and CN18, can support the left and right stereo speakers, respectively.

## 7.8 CN9 audio line output (green jack) connector

A 3.5 mm stereo audio green jack output, CN9, can support the headphone.

## 7.9 CN8 audio line input (blue jack) connector

A 3.5 mm stereo audio green jack input, CN8, can support the audio line input.

## 7.10 CN16 TAG connector

The CN16 TAG connector is used to connect the STM32H745XIH6/STM32H750XBH6 microcontroller for the board programming and debugging.
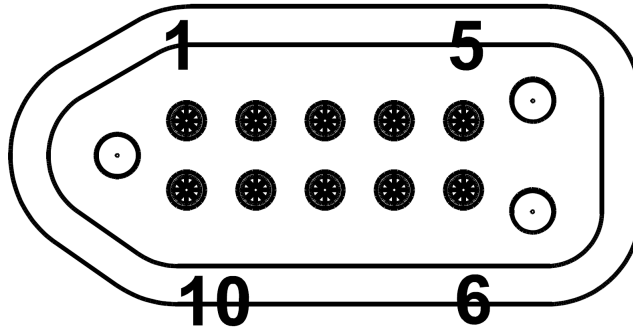
**Figure 11. CN16 TAG debugging connector (top view)**



**Table 14. CN16 TAG connector**

| Pin number | Description | Pin number | Description |
|---|---|---|---|
| 1 | VDD | 10 | RESET# |
| 2 | SWDIO(PA13) | 9 | NA |
| 3 | GND | 8 | TDI(PA15) |
| 4 | SWCLK(PA14) | 7 | NA |
| 5 | GND | 6 | SWO(PB3) |

## 7.11 CN4 STDC14 connector

The STDC14 connector can be used to program/debug the microcontroller in an external application board using a cable connected to the CN4 connector.

**Table 15. CN4 STDC14 connector**

| Pin number | Description | Pin number | Description |
|---|---|---|---|
| 1 | NC | 8 | T_SWO |
| 2 | NC | 9 | NC |
| 3 | 3V3 | 10 | T_JTDI |
| 4 | T_SWDIO | 11 | GNDDETECT |
| 5 | GND | 12 | T_NRST |
| 6 | T_SWCLK | 13 | T_VCP_RX |
| 7 | GND | 14 | T_VCP_TX |

# 7.12 CN15 USB power connector

**Figure 12. CN15 USB Micro-B connector (front view)**
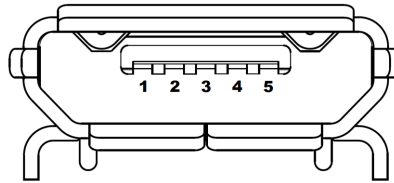


**Table 16. CN15 USB Micro-B connector**

| Pin number | Description | Pin number | Description |
|:---:|:---:|:---:|:---:|
| 1 | VBUS | 4 | NC |
| 2 | NC | 5 | GND |
| 3 | NC | - | - |

# 8 STM32H745I-DISCO and STM32H750B-DK I/O assignment

Table 17. STM32H745I-DISCO and STM32H750B-DK I/O assignment

| Pin name | Pin number | Signal or label | Comment |
|----------|-----------|-----------------|---------|
| PA0 | N5 | STMOD#1-CTS | - |
| PA1 | N4 | MII_RX_CLK | - |
| PA2 | N3 | MII_MDIO | - |
| PA3 | U2 | STMOD#14-PWM | - |
| PA4 | U3 | STMOD#13-ADC | - |
| PA5 | T3 | OTG_FS2_PSO | - |
| PA6 | R3 | ARD_D3 | - |
| PA7 | R5 | MII_RX_DV | - |
| PA8 | E5 | ARD_D5 | - |
| PA9 | D15 | VBUS_FS2 | - |
| PA10 | D14 | USB_OTG_FS2_ID | - |
| PA11 | E17 | USB_OTG_FS2_N | - |
| PA12 | E16 | USB_OTG_FS2_P | - |
| PA13 | C15 | SWDIO | SWDIO |
| PA14 | B14 | SWCLK | SWCLK |
| PA15 | A14 | STMOD#1_SPI_CS\|\|T_JTDI | - |
| PB0 | U5 | MII_RXD2 | - |
| PB1 | T5 | MII_RXD3 | - |
| PB2 | R6 | MII_TX_ER | - |
| PB3 | C6 | SWO | - |
| PB4 | B7 | ARD_D10 | - |
| PB5 | A5 | FDCAN2_RX | - |
| PB6 | B5 | ARD_D1 | - |
| PB7 | C5 | ARD_D0 | - |
| PB8 | D5 | SDIO1_D4 | - |
| PB9 | D4 | SDIO1_D5 | - |
| PB10 | P11 | VCP_TX | - |
| PB11 | P12 | VCP_RX | - |
| PB12 | T14 | LCD_RST | - |
| PB13 | U14 | FDCAN2_TX | - |
| PB14 | U15 | STMOD#9-MISOs | - |
| PB15 | T15 | ARD_D11 | - |
| PC0 | L2 | ARD_A0 | - |
| PC1 | M2 | MII_MDC | - |
| PC2 | M3 | MII_TXD2 | - |
| PC3 | M4 | MII_TX_CLK | - |
| PC4 | T4 | MII_RXD0 | - |
| PC5 | U4 | MII_RXD1 | - |

| Pin name | Pin number | Signal or label | Comment |
|----------|------------|-----------------|---------|
| PC6 | F14 | SDIO1_D6 | - |
| PC7 | F13 | SDIO1_D7 | - |
| PC8 | E13 | SDIO1_D0 | - |
| PC9 | E14 | SDIO1_D1 | - |
| PC10 | A13 | SDIO1_D2 | - |
| PC11 | B13 | SDIO1_D3 | - |
| PC12 | C12 | SDIO1_CK | - |
| PC13 | E3 | WAKEUP | - |
| PC14 | C2 | OSC32_IN | - |
| PC15 | C1 | OSC32_OUT | - |
| PD0 | D13 | SDRAM_D2 | - |
| PD1 | E12 | SDRAM_D3 | - |
| PD2 | D12 | SDIO1_CMD | - |
| PD3 | B12 | ARD_D13 | - |
| PD4 | A12 | STMOD#4-RTS | - |
| PD5 | A11 | STMOD#2-TX | - |
| PD6 | B11 | STMOD#3-RX | - |
| PD7 | C11 | LCD_DISP | - |
| PD8 | U16 | SDRAM_D13 | - |
| PD9 | T17 | SDRAM_D14 | - |
| PD10 | T16 | SDRAM_D15 | - |
| PD11 | R15 | QSPI_BK1_IO0 | - |
| PD12 | R16 | IIC4_SCL | - |
| PD13 | R17 | IIC4_SDA | - |
| PD14 | P16 | SDRAM_D0 | - |
| PD15 | P15 | SDRAM_D1 | - |
| PE0 | C4 | SDRAM_NBL0 | - |
| PE1 | B4 | SDRAM_NBL1 | - |
| PE2 | C3 | MII_TXD3 | - |
| PE3 | D3 | ARD_D8 | - |
| PE4 | D2 | SAI4_D2 | - |
| PE5 | D1 | SAI4_CK2 | - |
| PE6 | E5 | ARD_D6 | - |
| PE7 | U9 | SDRAM_D4 | - |
| PE8 | T9 | SDRAM_D5 | - |
| PE9 | P9 | SDRAM_D6 | - |
| PE10 | N9 | SDRAM_D7 | - |
| PE11 | P10 | SDRAM_D8 | - |
| PE12 | R10 | SDRAM_D9 | - |
| PE13 | T10 | SDRAM_D10 | - |
| PE14 | U10 | SDRAM_D11 | - |

| Pin name | Pin number | Signal or label | Comment |
|----------|-----------|-----------------|---------|
| PE15 | R11 | SDRAM_D12 | - |
| PF0 | G4 | SDRAM_A0 | - |
| PF1 | G3 | SDRAM_A1 | - |
| PF2 | G1 | SDRAM_A2 | - |
| PF3 | H4 | SDRAM_A3 | - |
| PF4 | J5 | SDRAM_A4 | - |
| PF5 | J4 | SDRAM_A5 | - |
| PF6 | K2 | QSPI_BK1_IO3 | - |
| PF7 | K3 | QSPI_BK1_IO2 | - |
| PF8 | K4 | ARD_A1 | - |
| PF9 | L4 | QSPI_BK1_IO1 | - |
| PF10 | L3 | QSPI_CLK | - |
| PF11 | T7 | SDRAM_SDNRAS | - |
| PF12 | R7 | SDRAM_A6 | - |
| PF13 | P7 | SDRAM_A7 | - |
| PF14 | P8 | SDRAM_A8 | - |
| PF15 | R9 | SDRAM_A9 | - |
| PG0 | T8 | SDRAM_A10 | - |
| PG1 | U8 | SDRAM_A11 | - |
| PG2 | H16 | LCD_INT | - |
| PG3 | H15 | ARD_D2 | - |
| PG4 | H14 | SDRAM_BA0 | - |
| PG5 | G14 | SDRAM_BA1 | - |
| PG6 | G15 | RCC_OSC_OUT | - |
| PG7 | F16 | Audio_Int | - |
| PG8 | F15 | SDRAM_SDCLK | - |
| PG9 | A10 | QSPI_BK2_IO2 | - |
| PG10 | A9 | SAI2_SDB | - |
| PG11 | B9 | MII_TX_EN | - |
| PG12 | C9 | MII_TXD1 | - |
| PG13 | D9 | MII_TXD0 | - |
| PG14 | D8 | QSPI_BK2_IO3 | - |
| PG15 | D6 | SDRAM_SDNCAS | - |
| PH0 | J2 | OSC_25M | - |
| PH1 | J1 | STMOD#17 | - |
| PH2 | N2 | QSPI_BK2_IO0\|\|MII_CRS[1] | - |
| PH3 | P2 | QSPI_BK2_IO1\|\|MII_COL[1] | - |
| PH4 | P3 | STMOD#19 | - |
| PH5 | P4 | SDRAM_SDNWE | - |
| PH6 | T11 | SDRAM_SDNE1 | - |
| PH7 | U13 | SDRAM_SDCKE1 | - |

| Pin name | Pin number | Signal or label | Comment |
|----------|-----------|-----------------|---------|
| PH8 | T13 | STMOD#20 | - |
| PH9 | R13 | LCD_R3 | - |
| PH10 | P13 | STMOD#12-RST | - |
| PH11 | P14 | OTG_FS2_Overcurrent | - |
| PH12 | R14 | STMOD#11-INT | - |
| PH13 | D16 | FDCAN1_TX | - |
| PH14 | B17 | FDCAN1_RX | - |
| PH15 | PF6 | ARD_D9 | - |
| PI0 | A16 | LCD_G5 | - |
| PI1 | A15 | LCD_G6 | - |
| PI2 | B15 | ARD_D12 | - |
| PI3 | C14 | STMOD#8-MOSIs | - |
| PI4 | A4 | SAI2_MCLKA | - |
| PI5 | A3 | SAI2_SCKA | - |
| PI6 | A2 | SAI2_SDA | - |
| PI7 | B3 | SAI2_FSA | - |
| PI8 | E4 | ARD_D7 | - |
| PI9 | E2 | LCD_VSYNC | - |
| PI10 | F3 | MII_RX_ER | - |
| PI11 | F4 | STMOD#18 | - |
| PI12 | H1 | LCD_HSYNC | - |
| PI13 | H2 | LED2 | - |
| PI14 | H3 | LCD_CLK | - |
| PI15 | P5 | LCD_R0 | - |
| PJ0 | N6 | LCD_R1 | - |
| PJ1 | P6 | LCD_R2 | - |
| PJ2 | T6 | LED1 | - |
| PJ3 | U6 | LCD_R4 | - |
| PJ4 | U7 | LCD_R5 | - |
| PJ5 | R12 | LCD_R6 | - |
| PJ6 | N15 | LCD_R7 | - |
| PJ7 | N14 | LCD_G0 | - |
| PJ8 | N13 | LCD_G1 | - |
| PJ9 | M14 | LCD_G2 | - |
| PJ10 | L14 | LCD_G3 | - |
| PJ11 | K14 | LCD_G4 | - |
| PJ12 | D11 | LCD_B0 | - |
| PJ13 | E10 | LCD_B1 | - |
| PJ14 | D10 | LCD_B2 | - |
| PJ15 | B10 | LCD_B3 | - |
| PK0 | J14 | LCD_BL | - |

| Pin name | Pin number | Signal or label | Comment |
|----------|------------|-----------------|---------|
| PK1 | J15 | ARD_D4 | - |
| PK2 | H17 | LCD_G7 | - |
| PK3 | C8 | LCD_B4 | - |
| PK4 | B8 | LCD_B5 | - |
| PK5 | A8 | LCD_B6 | - |
| PK6 | C7 | LCD_B7 | - |
| PK7 | D7 | LCD_DE | - |
| - | L16 | DSI_CK_P | NC |
| - | L17 | DSI_CK_N | NC |
| - | M16 | DSI_D0_P | NC |
| - | M17 | DSI_D0_N | NC |
| - | K16 | DSI_D1_P | NC |
| - | K17 | DSI_D1_N | NC |
| - | T1 | ARD_A2 | - |
| - | T2 | ARD_A3 | - |
| - | R1 | ARD_A4 | - |
| - | R2 | ARD_A5 | - |
| - | E9 | VDD | ARD_D7 |
| - | E11 | VDD | - |
| - | F5 | VDD | - |
| - | G5 | VDD | - |
| - | G13 | VDD | - |
| - | H5 | VDD | EXT_RST |
| - | H13 | VDD | - |
| - | J13 | VDD | - |
| - | K13 | VDD | - |
| - | L13 | VDD | - |
| - | M13 | VDD | ARD_A0 |
| - | N12 | VDD | - |
| - | N11 | VDD | - |
| - | N10 | VDD | - |
| - | N7 | VDD | DSIHOST_TE |
| - | L5 | VDD | - |
| - | K5 | VDD | - |
| - | E6 | VDD | - |
| P11 | F1 | VDDIO_SD1 | - |
| P12 | E1 | VLX | - |
| P13 | F2 | VSSIO_SD | - |
| P14 | U11 | VCAP1 | - |
| P15 | D17 | VCAP2 | - |
| R1 | A7 | VCAP3 | - |

| Pin name | Pin number | Signal or label | Comment |
|----------|------------|-----------------|---------|
| R2 | N8 | VDDIO1 | - |
| R3 | M5 | VDDIO2 | - |
| R4 | U12 | VDDIO33_LDO1 | - |
| R5 | C17 | VDDIO33_LDO2 | - |
| R6 | A6 | VDDIO33_LDO3 | - |
| R7 | G17 | VDD50_USB | - |
| R8 | F17 | VDD_USB33 | - |
| - | L1 | VDDA | - |
| - | M1 | VREF+ | - |
| - | B1 | VBAT | - |
| - | A1 | VSS | - |
| - | C10 | VSS | - |
| - | C13 | VSS | - |
| - | C16 | VSS | - |
| - | G16 | VSS | - |
| - | J3 | VSS | - |
| - | N16 | VSS | - |
| - | U17 | VSS | - |
| - | T12 | VSS | - |
| - | R8 | VSS | - |
| - | L9 | VSS | - |
| - | L11 | VSS | - |
| - | K10 | VSS | - |
| - | K11 | VSS | - |
| - | A17 | VSS | - |
| - | L10 | VSS | - |
| - | B6 | VSS | - |
| - | B2 | VSS | - |
| - | R2 | VSS | - |
| - | G7 | VSS | - |
| - | G8 | VSS | - |
| - | G9 | VSS | - |
| - | G10 | VSS | - |
| - | G11 | VSS | - |
| - | H7 | VSS | - |
| - | H8 | VSS | - |
| - | H9 | VSS | - |
| - | H10 | VSS | - |
| - | H11 | VSS | - |
| - | J7 | VSS | - |
| - | J8 | VSS | - |

| Pin name | Pin number | Signal or label | Comment |
|:---:|:---:|:---:|:---:|
| - | J9 | VSS | - |
| - | J10 | VSS | - |
| - | J11 | VSS | - |
| - | K7 | VSS | - |
| - | K8 | VSS | - |
| - | K9 | VSS | - |
| - | L7 | VSS | - |
| - | L8 | VSS | - |
| - | U1 | VSS | - |
| - | P1 | VSSA | - |
| - | N1 | VREF- | - |
| - | P17 | VDD33_DSI | - |
| - | N17 | VDD12_DSI_CAP | - |
| - | J16 | VSSDSI1 | - |
| - | J17 | VSSDSI2 | - |
| - | K15 | VSSDSI3 | - |
| - | L15 | VSSDSI4 | - |
| - | M15 | VSSDSI5 | - |

1. For 10 Mbit/s half-duplex MII communication, SB3 and SB4 must be ON.

# 9 STM32H745I-DISCO and STM32H750B-DK product information

## 9.1 Product marking

The stickers located on the top or bottom side of all PCBs provide product information:

- First sticker: product order code and product identification, generally placed on the main board featuring the target device.
  Example:

  > Product order code
  > Product identification

- Second sticker: board reference with revision and serial number, available on each PCB.
  Example:

  > MBxxxx-Variant-yzz
  > syywwxxxxx

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

On the second sticker, the first line has the following format: *"MBxxxx-Variant-yzz"*, where *"MBxxxx"* is the board reference, *"Variant"* (optional) identifies the mounting variant when several exist, *"y"* is the PCB revision, and *"zz"* is the assembly revision, for example B01. The second line shows the board serial number used for traceability.

Parts marked as *"ES"* or *"E"* are not yet qualified and therefore not approved for use in production. ST is not responsible for any consequences resulting from such use. In no event will ST be liable for the customer using any of these engineering samples in production. ST's Quality department must be contacted prior to any decision to use these engineering samples to run a qualification activity.

*"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 evaluation tool ordering part number 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.

## 9.2 STM32H745I-DISCO and STM32H750B-DK product history

**Table 18. Product history**

| Order code | Product identification | Product details | Product change description | Product limitations |
|---|---|---|---|---|
| STM32H745I-DISCO | DKH745IO$AT1 | MCU:<br>• STM32H745XIH6 silicon revision "V"<br><br>MCU errata sheet:<br>• *STM32H745/747xI/G and STM32H755/757xI device limitations* (ES0445)<br><br>Board:<br>• MB1381-H745XI-B01 (main board) | Initial revision | No limitation |

| Order code | Product identification | Product details | Product change description | Product limitations |
|---|---|---|---|---|
| STM32H745I-DISCO | DKH745IO$AT2 | **MCU:** <br> • STM32H745XIH6 silicon revision "V" <br><br> **MCU errata sheet:** <br> • *STM32H745/747xI/G and STM32H755/757xI device limitations* (ES0445) <br><br> **Board:** <br> • MB1381-H745XI-B02 (main board) | • Packaging: plastic blister replaced by a carton box <br> • Main board revision changed | No limitation |
| STM32H750B-DK | DK32H750B$AT1 | **MCU:** <br> • STM32H750XBH6 silicon revision "V" <br><br> **MCU errata sheet:** <br> • *STM32H750xB and STM32H753xI device limitations* (ES0396) <br><br> **Board:** <br> • MB1381-H750XB-B01 (main board) | Initial revision | No limitation |
| | DK32H750B$AT2 | **MCU:** <br> • STM32H750XBH6 silicon revision "Y" <br><br> **MCU errata sheet:** <br> • *STM32H750xB and STM32H753xI device limitations* (ES0396) <br><br> **Board:** <br> • MB1381-H750XB-B02 (main board) | • Packaging: plastic blister replaced by a carton box <br> • Main board revision changed | No limitation |

## 9.3 Board revision history

**Table 19. Board revision history**

| Board reference | Board variant and revision | Board change description | Board limitations |
|---|---|---|---|
| MB1381 (main board) | H745XI-B01 | Initial revision | No limitation |
| | H745XI-B02 | • Updated LEDs <br> • Refer to the bill of materials for further details | No limitation |
| | H750XB-B01 | Initial revision | No limitation |
| | H750XB-B02 | • Updated MCU revision <br> • Updated LEDs, capacitors, and photo transistor optocoupler <br> • Refer to the bill of materials for further details | No limitation |

# 10 Federal Communications Commission (FCC) and ISED Canada Compliance Statements

## 10.1 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)

Terry Blanchard
Americas Region Legal | Group Vice President and Regional Legal Counsel, The Americas
STMicroelectronics, Inc.
750 Canyon Drive | Suite 300 | Coppell, Texas 75019
USA
Telephone: +1 972-466-7845

## 10.2 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)*.

# 11 CE conformity

## 11.1 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.

# Revision history

**Table 20. Document revision history**

| Date | Revision | Changes |
|---|---|---|
| 8-Jan-2019 | 1 | Initial release. |
| 1-Apr-2019 | 2 | Updated *Figure 1* and *Figure 2* on the cover page and reorganized the beginning of the document:<br>• Updated *Features*<br>• Updated *Ordering information*<br>• Updated *Product marking*<br>• Added *Codification*<br>• Added *Development environment* |
| 6-May-2019 | 3 | Updated the description of the *SMPS/LDO power supply* default modes in *Section 6.4 Power Supply*. |
| 12-Sep-2019 | 4 | Updated the descriptions of pins ARD_D0 and ARD_D1 of ARDUINO® connector CN6 in *Figure 29. ARDUINO® connectors* and correspondingly in *Table 6. ARDUINO® connectors (CN2, CN3, CN6, and CN7)*.<br>Updated all schematics related to STM32H745I-DISCO in *Section 9 Electrical schematics*. |
| 31-Jan-2020 | 5 | Updated *SMPS/LDO power supply* in *Section 6.4 Power supply* for hardware/firmware mismatch deadlock recovery. |
| 21-Apr-2020 | 6 | Updated for Ethernet half-duplex support:<br>• Updated *Section 6.10 Ethernet*<br>• Updated PH2 and PH3 in *Table 16. STM32H745I-DISCO and STM32H750B-DK I/O assignment*<br>Updated the document structure:<br>• Updated *Federal Communications Commission (FCC) and Industry Canada (IC) Compliance Statements*<br>• Added *CE conformity*<br>• Removed *Electrical schematics* |
| 27-Apr-2021 | 7 | Updated LEDs LD6 and LD7 in *Table 6. Assignment of control ports to LED*.<br>Added *Section 9 STM32H745I-DISCO and STM32H750B-DK product information* and included *Product marking* within. |
| 9-Sep-2021 | 8 | Updated *Figure 4* and *Figure 5*.<br>Added limitation to pins A[2...5] of ARDUINO® connector CN7 in *Table 7. ARDUINO® connectors (CN2, CN3, CN6, and CN7)*. |
| 16-Dec-2022 | 9 | Updated Product marking, STM32H745I-DISCO and STM32H750B-DK product history, and Board revision history.<br>Updated Federal Communications Commission (FCC) and ISED Canada Compliance Statements.<br>Updated the section titles of STM32H745I-DISCO and STM32H750B-DK layout and STM32H745I-DISCO and STM32H750B-DK mechanical drawing. Updated Figure 4 and Figure 5.<br>Updated Power supply, Audio, USB OTG FS, Ethernet, SDRAM, and Quad-SPI NOR flash memory.<br>Updated USB Type-B to Micro-B in CN14 STLINK-V3E USB Micro-B connector.<br>Updated Features, Ordering information, and Development environment. |

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