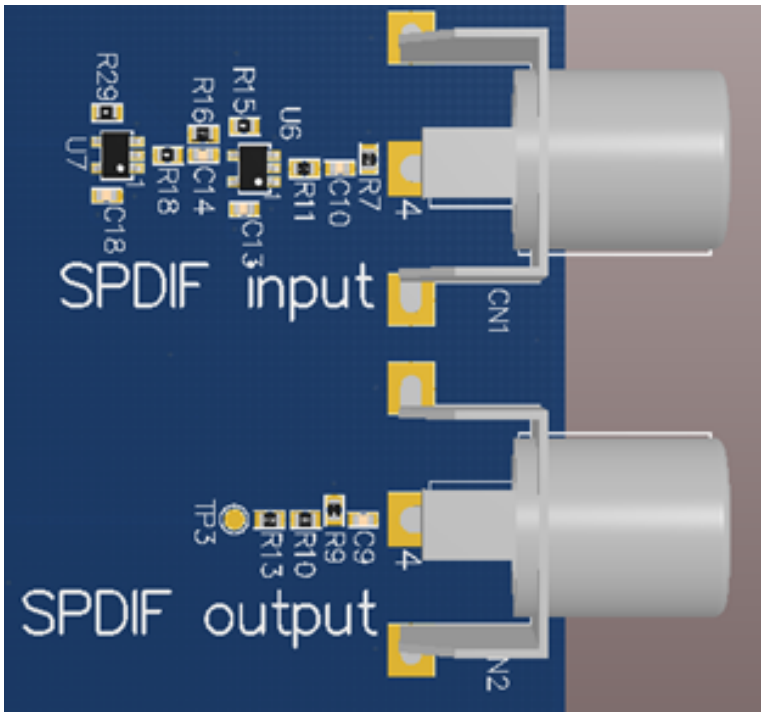
Figure 14. **SPDIF input MB1262/CN1 and output MB1262/CN2 connectors**




### 6.15.6 IO restriction to other features

Due to the share of some IO of STM32MP157xAA3 by multiple peripherals, the following limitations apply in using the audio features:

**The SAI AUDIO CODEC must not be operated simultaneously with expansion connector MB1262/CN21.**
**The MEMS DFSDM must not be operated simultaneously with DFSDM of EXT MEMS module MB1262/CN8.**

## 6.16 DSI LCD

Through the MB1262/CN19 connector, a DSI LCD mounted on a daughterboard MB1230 is provided. MB1230 is a 5.5" TFT 720*1280 pixels with LED backlight, MIPI® DSI interface and capacitive touch panel based on RK055AHD042-CT module embedding the LCD driver IC RM68200 and a touch screen controller GT9147.

3V3 and VIN supply MB1230:

- 3V3: for the LCD module (VDD_LCD and VIO_LCD) and Touch screen
- VIN: for the LED backlight of the LCD

### 6.16.1 DSI LCD interface

MB1230 is connected to the STM32MP157xAA3 through the DSI interface, I2C to control the GT9147, and LCD_BL_CTRL. LCD_INT signal is connected to MFX.

The I2C is I2C2 that is shared with all the peripherals: audio codec, MFX, RGB LTDC, camera, and USB hub. The GT9147 $I^2C$ address is 0xBB.

Table 23 describes the IO configuration for the LCD interface.

Table 23. **IO configuration for the LCD interface**

| IO | Configuration |
|---|---|
| PH4 | I2C2_SCL |
| PH5 | I2C2_SDA |
| DSI_D0P | DSI_D0_P is used as MIPI-DSI data Lane 0 positive |
| DSI_D0N | DSI_D0_N is used as MIPI-DSI data Lane 0 negative |

| IO | Configuration |
|---|---|
| DSI_D1P | DSI_D1_P is used as MIPI-DSI data Lane 1 positive |
| DSI_D1N | DSI_D1_N is used as MIPI-DSI data Lane 0 negative |
| DSI_CKP | DSI_CKP is used as clock Lane positive |
| DSI_DKN | DSI_DKN is used as clock Lane negative |
| PD13 | LCD_BL_CTRL – Backlight Control |
| PF15 | DSI_RESET |
| PC6 | DSI_TE – Tearing Effect |
| MFX_IO14 | LCD_INT - interruption |

## 6.17 Camera

Through the MB1262/CN7 connector, a camera module mounted on a daughterboard MB1379 is provided. MB1379 is a 5 Mpixels, 8-bit color camera module based on OV5640 image sensor, clocked from a 24 MHz crystal (MB1379/X1). It is supplied by 2V8.

### 6.17.1 Camera interface

MB1379 is connected to the STM32MP157xAA3 through DCMI and $I^2C$ interfaces. RSTI, XSDN, PLUG signals are connected to MFX.

The I2C is I2C2 that is shared with all the peripherals: audio codec, MFX, RGB LTDC, DSI LCD, and USB hub. The camera I²C address is 0x3C.

Table 24 describes the IO configuration for the camera interface.

**Table 24. IO configuration for the camera interface**

| IO | Configuration |
|---|---|
| PH4 | I2C2_SCL |
| PH5 | I2C2_SDA |
| PH9 | DCMI_D0 |
| PH10 | DCMI_D1 |
| PH11 | DCMI_D2 |
| PH12 | DCMI_D3 |
| PH14 | DCMI_D4 |
| PI4 | DCMI_D5 |
| PB8 | DCMI_D6 |
| PE6 | DCMI_D7 |
| PI1 | DCMI_D8(1) |
| PH7 | DCMI_D9(1) |
| PI3 | DCMI_D10(1) |
| PH15 | DCMI_D11(1) |
| PB7 | DCMI_VSYNC |
| PH8 | DCMI_HSYNC |
| PA6 | DCMI_PIXCLK |
| MFX_IO12 | Camera PLUG detection |
| MFX_O3 | RSTI - Camera RESETB, active low |

| IO | Configuration |
|---|---|
| MFX_O2 | XSDN – Camera PWDN, active high |

1. *Available on the MB1262/CN7 connector, but not used in the MB1379 module*

## 6.18 1 Gbps Ethernet

The STM32MP157x-EV1 board provides a 1 Gbps Ethernet feature thanks to an external physical interface device (PHY), RTL8211EG-VB-CG. This PHY is connected to the STM32MP157xAA3 Gigabit reduced medium-independent interface (RGMII), and is clocked from a 25 MHz Crystal (X1).

The Ethernet PHY is supplied by 3V3. It generates its own supply 1V05 and Digital/Analog 3V3.

LD1 LED is blinking to indicate the data transmission.

The Ethernet module connector MB1262/CN6 is for STMicroelectronics internal use only.

### 6.18.1 RGMII interface

Table 25 describes the IO configuration for the Ethernet interface.

**Table 25. IO configuration for the Ethernet interface**

| IO | Configuration |
|---|---|
| PD10 | PD10 (SUB_NRST) is used as PHY_NRST active Low |
| PA2 | PA2 is used as ETH_MDIO |
| PG0 | PG0 is used as ETH_MDINT |
| PC1 | PB11 is used as ETH_MDC |
| PA7 | PA7 is used as ETH_RX_DV(PHY_AD2) |
| PC4 | PC4 is used as ETH_RXD0 |
| PC5 | PC5 is used as ETH_RXD1 |
| PB0 | PB0 is used as ETH_RXD2 |
| PB1 | PB1 is used as ETH_RXD3 |
| PB11 | PB11 is used as ETH_TX_EN |
| PG13 | PG13 is used as ETH_TXD0 |
| PG14 | PG14 is used as ETH_TXD1 |
| PC2 | PB11 is used as ETH_TXD2 |
| PE2 | PE2 is used as ETH_TXD3 |
| PA1 | PA1 is used as ETH_RX_CLK |
| PG4 | PG4 is used as ETH_GTX_CLK |
| PG5 | PG5 is used as ETH_CLK125 |

Figure 15. **Ethernet connector MB1262/CN3**

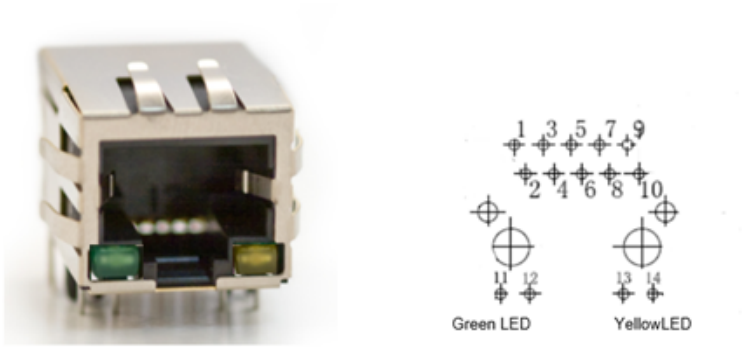



Table 26. **Ethernet connector pinout MB1262/CN3**

| Pin number | Pin name | Function |
|---|---|---|
| **1** | TX1+ | First Bidirectional pair to transmit and receive data |
| **2** | TX1- | |
| **3** | TX2+ | Second Bidirectional pair to transmit and receive data |
| **4** | TX2- | |
| **5** | CT1 | Common connected to GND |
| **6** | CT2 | Common connected to GND |
| **7** | TX3+ | Third Bidirectional pair to transmit and receive data |
| **8** | TX3- | |
| **9** | TX4+ | Fourth Bidirectional pair to transmit and receive data |
| **10** | TX4- | |
| **11** | GA | Green Led anode |
| **12** | GC | Green Led cathode |
| **13** | YA | Yellow Led anode |
| **14** | YC | Yellow Led cathode |
| **15** | GND | GND |
| **16** | GND | GND |

## 6.19 USB OTG HS

The STM32MP157x-EV1 board supports USB OTG high speed communication via a USB Micro-AB connector MB1262/CN16. OTG VBUS supply is managed by the STPMIC1. MB1262/LD2 turns green when USB OTG connection is established.

### 6.19.1 USB OTG interface

Table 27 describes the IO configuration for the USB OTG interface.

Table 27. **IO configuration for the USB OTG interface**

| IO | Configuration |
|---|---|
| PA10 | **OTG_ID line detection** |
| OTG_VBUS | **OTG_VBUS sensing** |

| IO | Configuration |
|---|---|
| USB_DP2 | USB_DP2 |
| USB_DM2 | USB_DM2 |

**Figure 16. USB OTG Type Micro-AB connector MB1262/CN16**

**Table 28. USB OTG Type Micro-AB connector pinout MB1262/CN16**

| Pin CN16 | Pin name | Signal name | Function |
|---|---|---|---|
| **1** | **VBUS** | OTG VBUS | VBUS supply and sensing |
| **2** | **D-** | DM | USB_DM2 |
| **3** | **D+** | DP | USB_DP2 |
| **4** | **ID** | ID | ID |
| **5** | **GND** | VBUS | GND |

## 6.20 USB host

The STM32MP157x-EV1 board provides 4 USB host port (2 dual USB Type A connectors MB1262/CN18 and CN20) thanks to a USB hub USB2514B-AEZC. The USB2514B have a full power management for each USB host port. The default configuration of USB2514B is done in HW, thus I2C is not needed by default. However, if required for a specification application, I2C may be accessed through MB1262/SB71 and SB68 to I2C2 as described in Table 29.

### 6.20.1 USB host interface

Table 29 describes the IO configuration for the USB host interface.

**Table 29. IO configuration for the USB Host interface**

| IO | SB | Setting | Configuration(1) |
|---|---|---|---|
| PH5 | MB1262/SB71 | **OFF** | **PH5 is not used as I2C2_SDA** |
| PH4 | MB1262/SB68 | **OFF** | **PH4 is not used as I2C2_SCL** |
| PD10 | - | - | SUB_NRST |
| USB_DP1 | - | - | USB1_P |
| USB_DM1 | - | - | USB1_N |

1. *Default configuration in **bold***

Figure 17. **Dual USB TYPE A connector MB1262/CN18 and CN20**

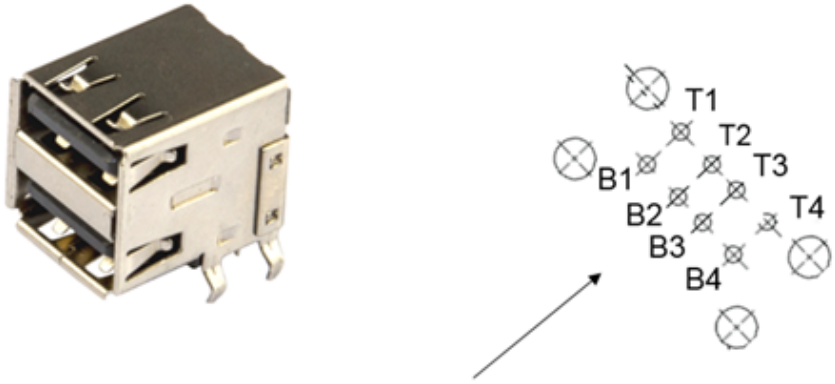



Table 30. **USB Host connector pinout MB1262/CN18**

| Pin CN18 | Pin name | Function |
|---|---|---|
| **T1** | **T1** | VBUS |
| **T2** | **T2** | DM |
| **T3** | **T3** | DP |
| **T4** | **T4** | GND |
| **B1** | **B1** | VBUS |
| **B2** | **B2** | DM |
| **B3** | **B3** | DP |
| **B4** | **B4** | GND |

Table 31. **USB Host connector pinout MB1262/CN20**

| Pin CN20 | Pin name | Function |
|---|---|---|
| **T1** | **T1** | VBUS |
| **T2** | **T2** | DM |
| **T3** | **T3** | DP |
| **T4** | **T4** | GND |
| **B1** | **B1** | VBUS |
| **B2** | **B2** | DM |
| **B3** | **B3** | DP |
| **B4** | **B4** | GND |

## 6.21 RS-232 port

The STM32MP157x-EV1 board offers one RS-232 communication port. The RS-232 communication port uses the DB9 male connector MB1262/CN12.

### 6.21.1 RS-232 interface

The RS-232 transceiver MB1262/U12 supply is 3V3. The RS-232 interface is connected to the STM32MP157xAA3 UART4 that is shared exclusively with the USB micro-B/ST-LINK v2-1 VCP as described in Table 32.

**Table 32. HW configuration for the RS-232 interface**

| Jumpers | IO | Setting | Configuration(1) |
|---|---|---|---|
| MB1263/JP4 | UART4_TX | **JP4[1-2]** | **connected to RS232 CN12** |
| | | JP4[2-3] | Connected to ST-Link V2-1 VCP RX |
| MB1263/JP5 | UART4_RX | **JP5[1-2]** | **connected to RS232 CN12** |
| | | JP5[2-3] | Connected to ST-Link V2-1 VCP TX |

1. *Default configuration in **bold***

**Figure 18. HW configuration for the RS-232 interface**


**Figure 19. RS-232 connector pinout MB1262/CN12**

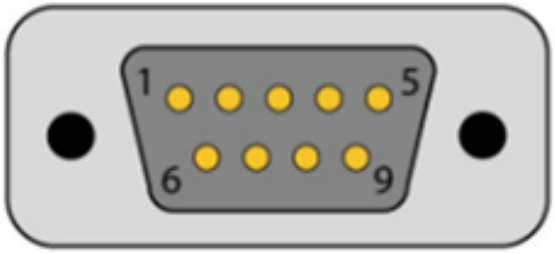



Table 33 RS-232 connector pinout MB1262/CN12

**Table 33. RS-232 connector pinout MB1262/CN12**

| Board function | Pin | Pin | Board function |
|---|---|---|---|
| NC | **1** | **6** | DSR |
| RXD | **2** | **7** | NC |
| TXD | **3** | **8** | CTS |

| Board function | Pin | Pin | Board function |
|---|---|---|---|
| NC | **4** | **9** | NC |
| GND | **5** | - | |

### 6.21.2 IO restriction to other features

The RS-232 must not be operated simultaneously with the STLINK-VCP.

## 6.22 FDCAN

The STM32MP157x-EV1 board supports one FDCAN compliant with ISO-11898-1 version 2.0 part A, B. The MB1262/CN15 DB9 male connector is available as FDCAN interface.

### 6.22.1 Operating voltage

A 5V/3v3 IO compliant high speed FDCAN transceiver is fitted between the MB1262/CN15 connector and the CAN controller port of STM32MP157xAA3.

### 6.22.2 FDCAN interface

Table 34 describes the IO for the CAN interface.

**Table 34. IO configuration for the SDIO interface**

| IO | Signal |
|---|---|
| PG3 | CAN_STBY |
| PH13 | CAN_TX |
| PI9 | CAN_RX |

Figure 20 shows the FDCAN connector pinout MB1262/CN15.

**Figure 20. FDCAN connector pinout CN15**

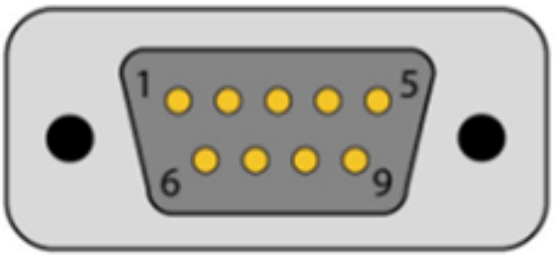



Table 35 describes the FDCAN interface and connector pinout CN17.

**Table 35. FDCAN interface and connector pinout CN17**

| CAN transceiver | Board function | Pin | Pin | Board function | CAN transceiver |
|---|---|---|---|---|---|
| - | NC | **1** | **6** | GND | - |
| CANL | CANL | **2** | **7** | CANH | CANH |
| GND | GND | **3** | **8** | NC | - |
| - | NC | **4** | **9** | NC | - |
| - | GND | **5** | - | | |

## 6.23 Smartcard

The STM32MP157x-EV1 board supports one Smartcard interface. The MB1262/CN23 Smartcard connector is used as card reader.

### 6.23.1 Smartcard interface

A 3V3 Smartcard interface MB1262/U5 is used between the card reader connector MB1262/CN23 and the Smartcard controller port of STM32MP157xAA3.

The Smartcard interface is connected for some IO to the STM32MP157xAA3 and for other IO to the MFX IO expander.

**Table 36. HW configuration for the Smartcard interface**

| IO | Configuration |
|---|---|
| PZ7 | PZ7 is connected to Smartcard interface as SMARTCARD_IO |
| PZ6 | PZ6 is connected to Smartcard interface as SMARTCARD_CLK |
| MFX_IO6 | MFX_IO6 used as SMARTCARD_3/5V |
| MFX_IO7 | MFX_IO7 used as SMARTCARD_OFF |
| MFX_IO8 | MFX_IO8 used as SMARTCARD_RST |
| MFX_IO9 | MFX_IO9 used as SMARTCARD_CMDVCC |

**Figure 21. Smartcard connector pinout MB1262/CN23**

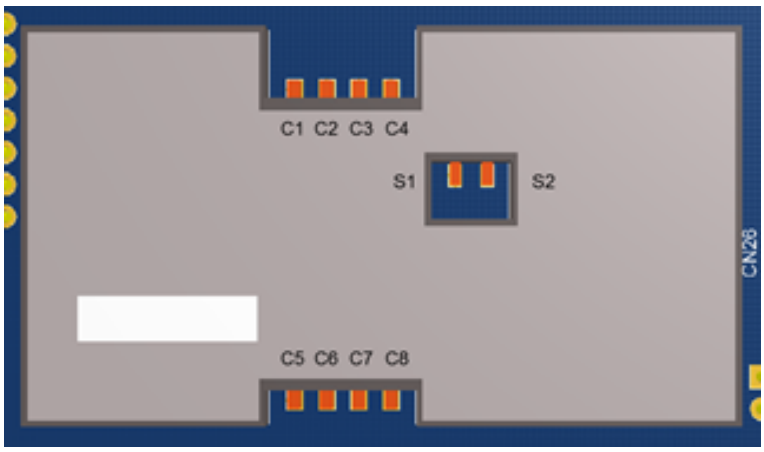



Table 37 describes the Smartcard interface MB1262/U5 and connector pinout MB1262/CN23.

**Table 37. Smartcard interface MB1262/U5 and connector pinout MB1262/CN23**

| Pin | Board function | U5 Smartcard interface pin |
|---|---|---|
| C1 | VCC: Card supply | U5-17 |
| C2 | RST: Card Reset | U5-16 |
| C3 | CLK: Card CLK | U5-15 |
| C4 | NC | U5-13 |
| C5 | GND: CARD GND | U5-14 |
| C6 | SWIO | - |

| Pin | Board function | U5 Smartcard interface pin |
|---|---|---|
| C7 | I/O CARD DATA | U5-11 |
| C8 | NC | U5-12 |
| S1 | GND: CAR GND | GND |
| S2 | DETECT: CARD-Detect (LOW) | U5-9 |

## 6.24 ADC/DAC

The STM32MP157x-EV1 provides some on-board analog-to-digital converters ADC and digital-to-analog converters DAC:

- 2x ADC/DAC
- 2x Fast ADC
- 1x Slow ADC

### 6.24.1 ADC/DAC IO interface

The STM32MP157xAA3 port PA4 may be configured to operate either as ADC input or as DAC output. PA4 is routed to two-way headers MB1263/JP11, to fetch signals to or from MB1263/JP11, or grounded it by fitting a jumper into MB1263/JP11. Same situation for PA5 and its related MB1263/JP10 header.

Parameters of the ADC/DAC low-pass filters formed with MB1263/R24, C31, R19 for PA4 and MB1263/R25, C32, R20 for PA5 may be modified by replacing these components according to application requirements (Default configuration is: R24/R19/R25/R20=0 Ohm, C31/C32 not fitted).

### 6.24.2 Fast ADC

ANA0 may be configured as a fast ADC channel routed to MB1263/JP8. MB1263/SB6, closed by default, should be opened.

ANA1 may be configured as a fast ADC channel routed to MB1263/JP9. MB1263/SB7, closed by default, must be opened.

Parameters of the low-pass filters formed with MB1263/R22, C29, and R17 for ANA0 and MB1263/R23, C30 and R18 for ANA1 may be modified by replacing these components according to application requirements (Default configuration is: R22/R17/R23/R18=0 Ohm, C29/C30 not fitted).

### 6.24.3 Slow ADC

The port PF12 may be configured as slow ADC channel, routed to MB1263/JP7. MB1263/SB5, closed by default, must be opened.

Parameters of the low-pass filters formed with MB1263/R21, C28, and R16 may be modified to application requirements (Default configuration is R21/R16=0 Ohm, C28 not fitted).

The VREF+ terminal of STM32MP157xAA3 is used as reference voltage for both ADC and DAC. By default, it is connected on board to VDDA through MB1263/R96, which may be removed to apply directly an external voltage to VREF+ for specific purposes.

Figure 22 ADC/DAC connectors MB1263/JP7, JP8, JP9, JP10, and JP11

**Figure 22. ADC/DAC connectors MB1263/JP7, JP8, JP9, JP10, and JP11**

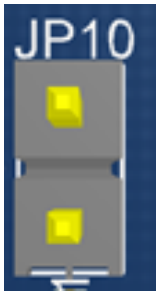


Table 38. **ADC/DAC connectors JP7/JP8/JP9/JP10/JP11 pinout**

| Signal name | Pin | Pin | Signal name |
|---|---|---|---|
| ADC/DAC | **1** | **2** | GND |

### 6.24.4 Limitations

Due to the share of some IO of STM32MP157xAA3 by multiple peripherals, the following limitations apply in using the PMOD Button features:

**The fast ADC ANA0/ANA1 and slow ADC PF12 may not be operated simultaneously with motor control function.**

## 6.25 I2C_EXT connector

I2C_EXT connector MB1262/CN13 may be connected to I²C bus daughterboard. CN13 connector pin 5 is connected to 3V3, so external module must be compliant with 3V3.

MFX_GPIO0 of MFX MCU provides EXT_RESET.

### 6.25.1 I2C_EXT IO interface

Table 39. **HW configuration for the I2C_EXT interface**

| IO | Bridge | Setting[1] | Comment |
|---|---|---|---|
| PA11 | MB1262/ SB51 | **ON** | **PA11 ,used as I2C5_SCL, is connected to EXT_SCL** |
| | | OFF | PA11 is not connected to EXT_SCL<br>PA11 may be connected to the GPIO expansion connector through MB1262/ SB52 |
| PA12 | MB1262/ SB54 | **ON** | **PA12 ,used as I2C5_SDA, is connected to EXT_SDA** |
| | | OFF | PA12 is not connected to EXT_SDA<br>PA12 may be connected to the GPIO expansion connector through MB1262/ SB55 |
| MFX_GPIO0 | - | - | **Connected to EXT_RESET** |

1. *Default configuration is shown in **bold***

Figure 23 shows the I2C_EXT connector pinout MB1262/CN13.

Figure 23. **I2C_EXT connector pinout MB1262/CN13**

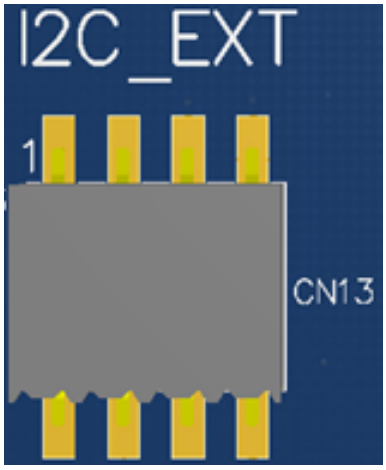



Table 40 describes the I2C_EXT connector pinout MB1262/CN13.

Table 40. **I2C_EXT connector pinout MB1262/CN13**

| Signal name | Pin | Pin | Signal name |
|---|---|---|---|
| EXT_SDA | **1** | **2** | NC |
| EXT_SCL | **3** | **4** | EXT_RST |
| 3V3 | **5** | **6** | NC |
| GND | **7** | **8** | NC |

## 6.26 MFX MCU

The MFX: Multi-Function eXpander MCU is used as a GPIO expander, in position MB1262/U20.

### 6.26.1 MFX IO expander

Supplied by 3V3.

The communication interface between MFX and STM32MP157xAA3 is I2C bus, and an IRQOUT pin.

The I2C is I2C2 that is shared with all the peripherals: Audio codec, DSI LCD, RGB LTDC, Camera, and USB Hub.

The MFX I²C address is 0x42h.

Table 41. **HW configuration for the MFX interface**

| IO | SB | Setting | Configuration(1) |
|---|---|---|---|
| PI8 | R127 | **ON** | **MFX_IRQ_OUT is connected to PI8** |
| PH5 | R124 | **ON** | **PH5 is used as I2C2_SDA** |
| PH4 | R125 | **ON** | **PH4 is used as I2C2_SCL** |
| PD10 | - | - | SUB_NRST |

1. *Default configuration in **bold***

Table 42. **IO signals driven by the MFX**

| Pin number | Pin name | Signal name | Function |
|---|---|---|---|
| 18 | GPIO0 | JOY_CENTER | MB1262/B1 Joystick selection |
| 19 | GPIO1 | JOY_DOWN | MB1262/B1 Joystick down direction |
| 20 | GPIO2 | JOY_LEFT | MB1262/B1 Joystick left direction |
| 39 | GPIO3 | JOY_RIGHT | MB1262/B1 Joystick right direction |
| 40 | GPIO4 | JOY_UP | MB1262/B1 Joystick up direction |
| 15 | GPIO5 | Audio_INT | MB1262/U8 audio codec interrupt |
| 16 | GPIO6 | SMARTCARD_3V/5V | MB1262/U5 Smart card 3 V 5 V selection |
| 17 | GPIO7 | SMARTCARD_OFF | MB1262/U5 Smart Card OFF |
| 29 | GPIO8 | SMARTCARD_RST | MB1262/U5 Smart Card RESET |
| 30 | GPIO9 | SMARTCARD_CMDVCC | MB1262/U5 smartcard VCC command |
| 31 | GPIO10 | MIC_MEMS_LED | MB1262/CN8 pin12 |
| 32 | GPIO11 | - | - |
| 33 | GPIO12 | CAMERA_PLUG | Camera plug detection |
| 26 | GPIO13 | - | - |
| 27 | GPIO14 | LCD_INT | DSI or LTDC interrupt |

| Pin number | Pin name | Signal name | Function |
|---|---|---|---|
| 28 | GPIO15 | - | - |

## 6.27 Motor control

The STM32MP157x-EV1 board supports both asynchronous and synchronous 3-phase brushless motor control via a 34-pin connector MB1262/CN22, which provides all required control and feedback signals, to and from motor power-driving board.

Available signals on this connector includes emergency stop, motor speed, 3-phase motor current, bus voltage, heatsink temperature coming from the motor driving board and 6 channels of PWM control signal (MC-xH/L) going to the motor driving circuit.

### 6.27.1 Motor control IO interface

Because of IO consuming limitation, the motor control IO interface is not enabled by default. As described below, some board modifications are needed to connect the motor control interface.

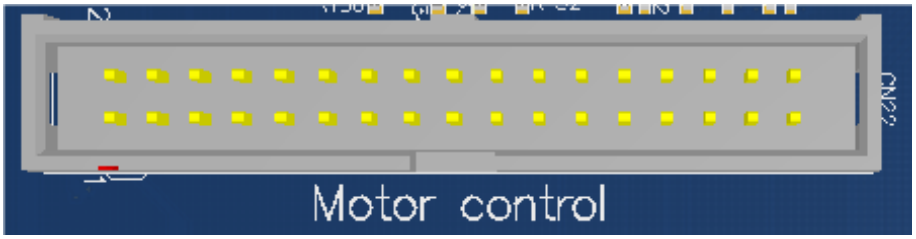
Table 43 describes the assignment of the MB1262/CN22 motor control interface and the IO function associated from the STM32MP157xAA3.

**Table 43. Motor control terminal and IO function assignment**

| Motor Control connector CN22 | | STM32MP157xAA3 microcontroller | | | |
|---|---|---|---|---|---|
| Terminal | Terminal name | Port name | Function | Alternate function | Board configurations to enable Motor Control |
| 1 | Emergency Stop | PA6 | TIM8_BKIN | DCMI_PIXCLK | Close MB1262/SB22 |
| 2 | GND | - | - | - | - |
| 3 | MC_UH | PI5 | TIM8_CH1 | SAI_2_SCK_A | Close MB1262/SB67<br>Open MB1262/SB9 and SB66 |
| 4 | GND | - | - | - | - |
| 5 | MC_UL | PH13 | TIM8_CH1N | CAN_1_TX | Close MB1262/SB76 |
| 6 | GND | - | - | - | - |
| 7 | MC_VH | PI6 | TIM8_CH2 | SAI_2_SD_A | Close MB1262/SB75<br>Open MB1262/SB10 and SB73 |
| 8 | GND | - | - | - | - |
| 9 | MC_VL | PH14 | TIM8_CH2N | DCMI_D4 | Close MB1262/SB21 |
| 10 | GND | - | - | - | - |
| 11 | MC_WH | PI7 | TIM8_CH3 | SAI_2_FS_A | Close MB1262/SB65<br>Open MB1262/SB11 and SB63 |
| 12 | GND | - | - | - | - |
| 13 | MC_WL | PH15 | TIM8_CH3N | DCMI_D11 | Close MB1262/SB33 |
| 14 | Bus Voltage | PA3 | ADC_1_IN15 | GPIO6_TIM2_CH4 | Close MB1262/SB14 |
| 15 | PhaseA current | PF12 | ADC_1_IN6 | - | Close MB1262/SB20 |
| 16 | GND | - | - | - | - |
| 17 | PhaseB current | ANA0 | ADC_1_IN0 | ADC_2_IN0 | Close MB1262/SB12 |
| 18 | GND | - | - | - | - |
| 19 | PhaseC current | ANA1 | ADC_2_IN1 | - | Close MB1262/SB13 |
| 20 | GND | - | - | - | - |
| 21 | NTC Bypass | PF3 | GPIO | GPIO7 | Close MB1262/SB19 |

| Motor Control connector CN22 | | STM32MP157xAA3 microcontroller | | | |
|---|---|---|---|---|---|
| Terminal | Terminal name | Port name | Function | Alternate function | Board configurations to enable Motor Control |
| 22 | GND | - | - | - | - |
| 23 | Dissipative Brake | PH6 | TIM12_CH1 | GPIO12_TIM12_CH1 | Close MB1262/SB29 |
| 24 | GND | - | - | - | - |
| 25 | 5V | - | - | - | - |
| 26 | Heatsink Temp. | PF11 | ADC_1_IN2 | SAI_2_SD_B | Close MB1262/SB70<br>Open MB1262/SB8 and SB69 |
| 27 | PFC Sync | PE0 | TIM4_ETR | SAI_2_MCLK_A | Close MB1262/SB53<br>Open MB1262/SB7 |
| 28 | 3V3 | - | - | - | - |
| 29 | PFC PWM | PB8 | TIM4_CH3 | DCMI_D6 | Close MB1262/SB24 |
| 30 | GND | - | - | - | - |
| 31 | Encoder A | PH10 | TIM5_CH1 | DCMI_D1 | Close MB1262/SB28 |
| 32 | GND | - | - | - | - |
| 33 | Encoder B | PH11 | TIM5_CH2 | DCMI_D2 | Close MB1262/SB30 |
| 34 | Encoder Index | PH12 | TIM5_CH3 | DCMI_D3 | Close MB1262/SB26 |

**Figure 24. Motor control connector MB1262/CN22**




### 6.27.2 Limitations

Due to the share of some IO of STM32MP157xAA3 by multiple peripherals, the following limitations apply in using the Motor control features:

**The Motor control may not be operated simultaneously with the camera, audio Codec, CAN and GPIO expansion (GPIO6, 7 and 12).**

## 6.28 GPIO 40-pin expansion connector

A 2x20-pin, 2.54 mm, GPIO connector is implemented on MB1262/CN21.

28 pins are GPIO, 8 are GND, 2x 5V DC and 2x 3V3 DC are provided on this connector.

This GPIO 40-pin expansion connector has a Raspberry Pi shields support capability.

**Figure 25. MB1262/CN21 connector**


Please note the pin1 position that is on the bottom right on MB1262/CN21.

Table 44 describes the MB1262/CN21 connector pinout.

**Table 44. MB1262/CN21 connector pinout**

| STM32 pin | Board function | Pin | Pin | Board function | STM32 pin |
|---|---|---|---|---|---|
| - | 3V3 | **1** | **2** | 5V | - |
| PA12 | I2C5_SDA | **3** | **4** | 5V | - |
| PA11 | I2C5_SCL | **5** | **6** | GND | - |
| PI11 | MCO1 | **7** | **8** | USART3_TX | PB10 |
| - | GND | **9** | **10** | USART3_RX | PB12 |
| PG8 | USART3_RTS | **11** | **12** | SAI2_SCKA | PI5 |
| PD7 | SDMMC3_D3 | **13** | **14** | GND | GND |
| PG15 | SDMMC3_CK | **15** | **16** | SDMMC3_CMD | PF1 |
| - | 3V3 | **17** | **18** | SDMMC3_D0 | PF0 |
| PZ2 | SPI1_MOSI | **19** | **20** | GND | GND |
| PZ1 | SPI1_MISO | **21** | **22** | SDMMC3_D1 | PF4 |
| PZ0 | SPI1_SCK | **23** | **24** | SPI1_NSS | PZ3 |
| - | GND | **25** | **26** | GPIO | - |
| PH5 | I2C2_SDA | **27** | **28** | I2C2_SCL | PH4 |
| PG2 | MCO2 | **29** | **30** | GND | - |
| PA3 | TIM2_CH4 | **31** | **32** | TIM12_CH1 | PH6 |
| PI2 | TIM8_CH4 | **33** | **34** | GND | - |
| PI7 | SAI2_FSA | **35** | **36** | USART3_CTS | PI10 |
| PF5 | SDMMC3_D2 | **37** | **38** | SAI2_SDA | PI6 |
| - | GND | **39** | **40** | SAI2_SDB | PF11 |

SAI2 on the GPIO connector supports PCM signals. SAI2 is shared between the audio codec and this GPIO expansion connector. By default, SAI2 is connected to the audio codec. I2C5 is connected by default to the I2C_EXT connector.

The following HW board modifications are needed to enable SAI2 and I2C5 on the GPIO expansion connector, as described in Table 45.

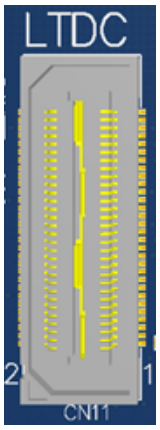
**Table 45. HW configurations to enable SAI2 on the GPIO connector**

| STM32 pin | Board function | Board modifications to enable SAI2 on the GPIO connector |
|---|---|---|
| PI5 | SAI2_SCKA | Open MB1262/SB9 and SB67. Close MB1262/SB66 |
| PI7 | SAI2_FSA | Open MB1262/SB11 and SB65. Close MB1262/SB63 |
| PI6 | SAI2_SDA | Open MB1262/SB10 and SB75. Close MB1262/SB73 |
| PF11 | SAI2_SDB | Open MB1262/SB8 and SB70. Close MB1262/SB69 |
| PA12 | I2C5_SDA | Open MB1262/SB54. Close MB1262/SB55 |
| PA11 | I2C5_SCL | Open MB1262/SB51. Close MB1262/SB52 |

## 6.29 RGB LTDC connector

A 2x30-pin RGB LTDC connector is implemented on MB1262/CN11.

**Figure 26. MB1262/CN11 connector**




A 24-bit RGB interface, LCD control signals (INT, Backlight BL_CTRL, LCD_RESET, I2C), HDMI_CEC and SPDIF_TX are available as described in the connector pinout Section 6.29 .

**Table 46. MB1262/CN21 connector pinout**

| IO | Board function | Pin | Pin | Board function | IO |
|---|---|---|---|---|---|
| PK7 | LTDC_DE | **1** | **2** | LTDC_R7 | PJ6 |
| - | - | **3** | **4** | LCD_INT | MFX_IO14 |
| - | - | **5** | **6** | LTDC_B7 | PK6 |
| PJ4 | LTDC_R5 | **7** | **8** | - | - |
| PI12 | LTDC_HSYNC | **9** | **10** | LTDC_VSYNC | PI13 |
| - | - | **11** | **12** | - | - |
| MFX_O1 | HDMI_PD | **13** | **14** | LTDC_R0 | PI15 |
| - | - | **15** | **16** | - | - |
| PJ0 | LTDC_R1 | **17** | **18** | LTDC_R2 | PJ1 |
| - | - | **19** | **20** | - | - |
| PJ2 | LTDC_R3 | **21** | **22** | LTDC_R4 | PJ3 |
| PK0 | LTDC_G5 | **23** | **24** | LTDC_G6 | PK1 |
| PJ4 | LTDC_R5 | **25** | **26** | LTDC_R6 | PJ5 |
| PK3 | LTDC_B4 | **27** | **28** | LTDC_B5 | PK4 |
| PJ6 | LTDC_R7 | **29** | **30** | LTDC_G0 | PJ7 |
| PK5 | LTDC_B6 | **31** | **32** | - | - |
| PJ8 | LTDC_G1 | **33** | **34** | LTDC_G2 | PJ9 |
| - | - | **35** | **36** | - | - |
| PJ10 | LTDC_G3 | **37** | **38** | LTDC_G4 | PJ11 |
| PJ12 | LTDC_B0 | **39** | **40** | LTDC_B1 | PJ13 |
| PJ14 | LTDC_B2 | **41** | **42** | LTDC_B3 | PJ15 |
| - | - | **43** | **44** | - | - |

| IO | Board function | Pin | Pin | Board function | IO |
|---|---|---|---|---|---|
| - | - | **45** | **46** | LCD_RESET (SUB_NRST) | PD10 |
| - | 3V3 | **47** | **48** | 5V | - |
| PK2 | LTDC_G7 | **49** | **50** | GND | - |
| PA15 | HDMI_CEC | **51** | **52** | - | - |
| PH4 | I2C2_SCL | **53** | **54** | SPDIF_TX | PB5 |
| PH5 | I2C2_SDA | **55** | **56** | GND | - |
| - | LCD_BL_CTRL | **57** | **58** | LTDC_CLK | PI14 |
| - | - | **59** | **60** | GND | - |

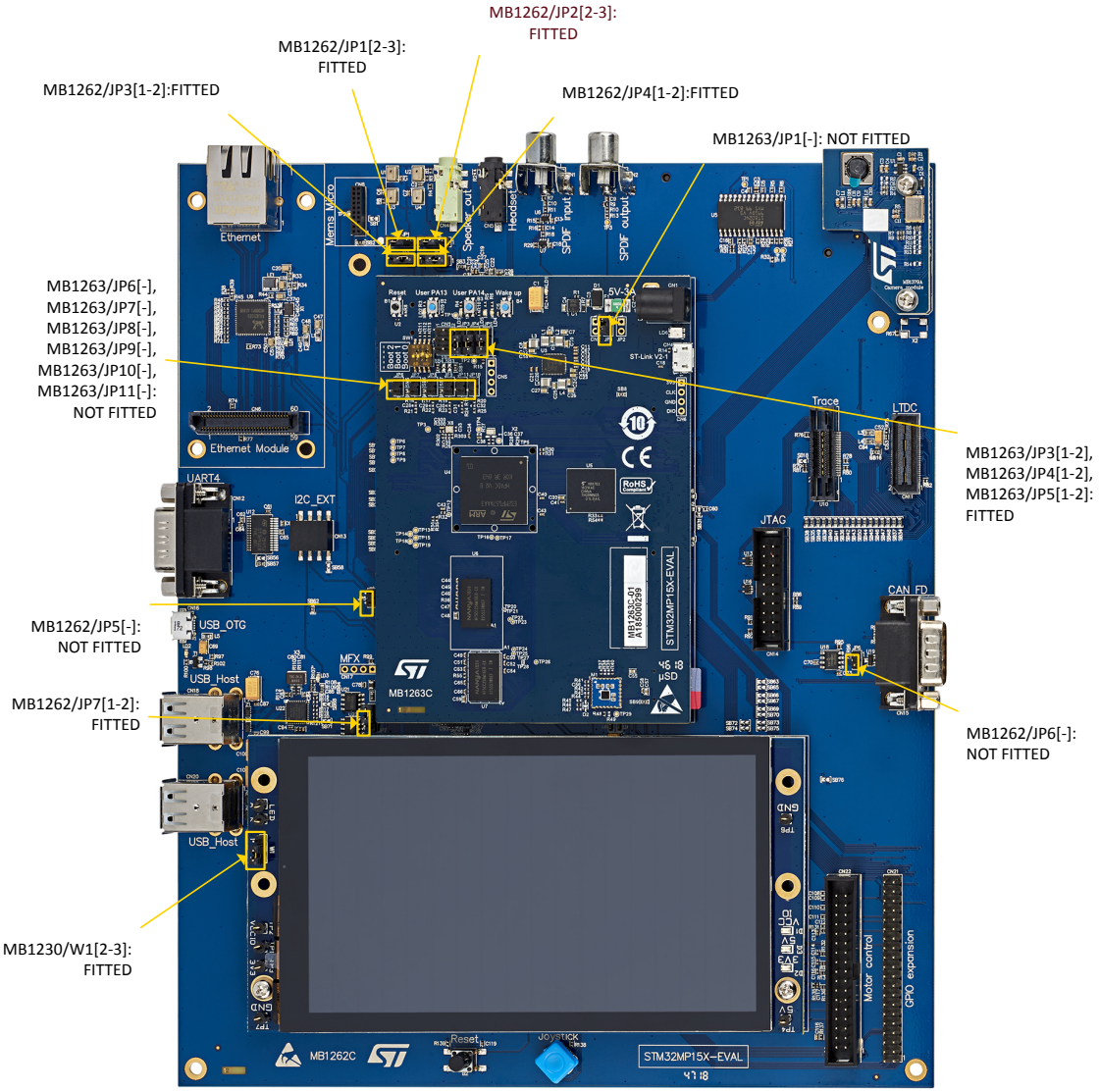
### 6.29.1 Limitations

LCD_INT, LCD_BL_CTRL are shared exclusively with the DSI.

# Appendix A STM32MP157x-EV1 jumper summary

Figure 27 summarizes the jumper default setting of the STM32MP157x-EV1.

**Figure 27. Jumper default setting of the STM32MP157x-EV1**



# Appendix B STM32MP157x-EV1 I/O Assignment

Table 47. **STM32MP157x-EV1 I/O Assignment**

| LFBGA448 ball | IO Port | Main function | Motor Control connector |
|---|---|---|---|
| AA3 | PA0 | WAKE_UP | - |
| V4 | PA1 | ETH_RX_CLK | - |
| AB2 | PA2 | ETH_MDIO | - |
| T4 | PA3 | TIM2_CH4 | Bus Voltage |
| V6 | PA4 | ADC1_IN18_DACOUT1 | - |
| U5 | PA5 | ADC1_IN19_DACOUT2 | - |
| W9 | PA6 | DCMI_PIXCLK | Emergency Stop |
| Y9 | PA7 | ETH_RX_DV | - |
| B13 | PA8 | SDMMC2_D4 | - |
| A11 | PA9 | SDMMC2_D5 | - |
| Y17 | PA10 | OTG_ID | - |
| Y16 | PA11 | I2C5_SCL | - |
| W16 | PA12 | I2C5_SDA | - |
| W3 | PA13 | PA13 GPIO | - |
| R3 | PA14 | PA14 GPIO | - |
| E11 | PA15 | HDMI_CEC | - |
| AB5 | PB0 | ETH_RXD2 | - |
| AA5 | PB1 | ETH_RXD3 | - |
| V13 | PB2 | UART4_RX | - |
| A12 | PB3 | SDMMC2_D2 | - |
| C13 | PB4 | SDMMC2_D3 | - |
| AA8 | PB5 | SPDIF_TX | - |
| W13 | PB6 | QSPI_BK1_NCS | - |
| F11 | PB7 | DCMI_VSYNC | - |
| AB8 | PB8 | DCMI_D6 | PFC PWM |
| F12 | PB9 | SDMMC1_CDIR | - |
| V9 | PB10 | USART3_TX | - |
| Y5 | PB11 | ETH_TX_EN | - |
| AA7 | PB12 | USART3_RX | - |
| V10 | PB13 | DFSDM_CKOUT | - |
| A13 | PB14 | SDMMC2_D0 | - |
| B12 | PB15 | SDMMC2_D1 | - |
| U10 | PC0 | QSPI_BK2_NCS | - |
| AB3 | PC1 | ETH_MDC | - |
| Y1 | PC2 | ETH_TXD2 | - |
| U3 | PC3 | DFSDM_DATA1 | - |
| AB6 | PC4 | ETH_RXD0 | - |

| LFBGA448 ball | IO Port | Main function | Motor Control connector |
|---|---|---|---|
| AA6 | PC5 | ETH_RXD1 | - |
| E13 | PC6 | DSI_TE | - |
| D13 | PC7 | SDMMC1_D123DIR | - |
| E14 | PC8 | SDMMC1_D0 | - |
| D14 | PC9 | SDMMC1_D1 | - |
| F14 | PC10 | SDMMC1_D2 | - |
| D15 | PC11 | SDMMC1_D3 | - |
| E12 | PC12 | SDMMC1_CK | - |
| N2 | PC13 | PMIC_WAKEUP | - |
| P1 | PC14 | LSE_IN | - |
| P2 | PC15 | LSE_OUT | - |
| C10 | PD0 | NAND_D2 | - |
| B10 | PD1 | NAND_D3 | - |
| D12 | PD2 | SDMMC1_CMD | - |
| B11 | PD3 | SDMMC2_D123DIR | - |
| C9 | PD4 | NAND_NOE | - |
| A9 | PD5 | NAND_NWE | - |
| L3 | PD6 | NAND_NWAIT | - |
| F10 | PD7 | SDMMC3_D3 | - |
| M1 | PD8 | NAND_D13 | - |
| M2 | PD9 | NAND_D14 | - |
| A8 | PD10 | NAND_D15 | - |
| AB9 | PD11 | NAND_CLE | - |
| W12 | PD12 | NAND_ALE | - |
| V14 | PD13 | LCD_BL_CTRL | - |
| M3 | PD14 | NAND_D0 | - |
| L1 | PD15 | NAND_D1 | - |
| C5 | PE0 | SAI2_MCLKA | PFC Sync |
| D7 | PE1 | - | - |
| Y2 | PE2 | ETH_TXD3 | - |
| A10 | PE3 | SDMMC2_CK | - |
| F15 | PE4 | SDMMC1_CKIN | - |
| C12 | PE5 | SDMMC2_D6 | - |
| E9 | PE6 | DCMI_D7 | - |
| W10 | PE7 | NAND_D4 | - |
| Y12 | PE8 | NAND_D5 | - |
| W11 | PE9 | NAND_D6 | - |
| W14 | PE10 | NAND_D7 | - |
| D5 | PE11 | uSD_LS_EN | - |
| E4 | PE12 | SAI2_SCKB | - |

| LFBGA448 ball | IO Port | Main function | Motor Control connector |
|---|---|---|---|
| A4 | PE13 | SAI2_FSB | - |
| B4 | PE14 | SAI2_MCLKB | - |
| C4 | PE15 | - | - |
| E10 | PF0 | SDMMC3_D0 | - |
| B9 | PF1 | SDMMC3_CMD | - |
| F13 | PF2 | SDMMC1_D0DIR | - |
| V3 | PF3 | GPIO | NTC Bypass |
| F9 | PF4 | SDMMC3_D1 | - |
| D9 | PF5 | SDMMC3_D2 | - |
| AA11 | PF6 | QSPI_BK1_IO3 | - |
| AA10 | PF7 | QSPI_BK1_IO2 | - |
| AB10 | PF8 | QSPI_BK1_IO0 | - |
| AB11 | PF9 | QSPI_BK1_IO1 | - |
| V12 | PF10 | QSPI_CLK | - |
| W8 | PF11 | SAI_2_SDB | Heatsink Temp. |
| V8 | PF12 | SLOW ADC | PhaseA current |
| W7 | PF13 | DFSDM_DATA3 | - |
| V7 | PF14 | uSD_LDO_SEL | - |
| W6 | PF15 | DSI_RESET | - |
| W5 | PG0 | ETH_MDINT | - |
| Y4 | PG1 | uSD_DETECT | - |
| W4 | PG2 | MCO2 | - |
| U4 | PG3 | CAN_STBY | - |
| AB4 | PG4 | ETH_GTX_CLK | - |
| U8 | PG5 | ETH_CLK125 | - |
| D11 | PG6 | SDMMC2_CMD | - |
| Y11 | PG7 | QSPI_BK2_IO3 | - |
| Y8 | PG8 | USART3_RTS | - |
| W15 | PG9 | NAND_NCE | - |
| AA9 | PG10 | QSPI_BK2_IO2 | - |
| U11 | PG11 | UART4_TX | - |
| J4 | PG12 | SPDIF_RX | - |
| AA1 | PG13 | ETH_TXD0 | - |
| AA2 | PG14 | ETH_TXD1 | - |
| D10 | PG15 | SDMMC3_CK | - |
| T1 | PH0 | HSE_IN | - |
| T2 | PH1 | HSE_OUT | - |
| AB7 | PH2 | QSPI_BK2_IO0 | - |
| Y6 | PH3 | QSPI_BK2_IO1 | - |
| A3 | PH4 | I2C2_SCL | - |

| LFBGA448 ball | IO Port | Main function | Motor Control connector |
|---|---|---|---|
| A2 | PH5 | I2C2_SDA | - |
| V11 | PH6 | TIM12_CH1 | Dissipative Brake |
| W2 | PH7 | DCMI_D9 | - |
| D6 | PH8 | DCMI_HSYNC | - |
| E6 | PH9 | DCMI_D0 | - |
| B1 | PH10 | DCMI_D1 | Encoder A |
| B3 | PH11 | DCMI_D2 | Encoder B |
| F5 | PH12 | DCMI_D3 | Encoder Index |
| D3 | PH13 | CAN_TX | MC_UL |
| C2 | PH14 | DCMI_D4 | MC_VL |
| C1 | PH15 | DCMI_D11 | MC_WL |
| D1 | PI0 | - | - |
| E2 | PI1 | DCMI_D8 | - |
| E1 | PI2 | TIM8_CH4 | - |
| E3 | PI3 | DCMI_D10 | - |
| J6 | PI4 | DCMI_D5 | - |
| F2 | PI5 | SAI2_SCKA | MC_UH |
| G5 | PI6 | SAI2_SDA | MC_VH |
| F1 | PI7 | SAI2_FSA | MC_WH |
| N1 | PI8 | MFX_IRQ_OUT | - |
| J5 | PI9 | CAN_RX | - |
| W1 | PI10 | USART3_CTS | - |
| T3 | PI11 | MCO1 | - |
| H2 | PI12 | LTDC_HSYNC | TRACE_D0 |
| H1 | PI13 | LTDC_VSYNC | TRACE_D1 |
| D2 | PI14 | LTDC_CLK | TRACE_CLK |
| F3 | PI15 | LTDC_R0 | - |
| J2 | PJ0 | LTDC_R1 | TRACE_D8 |
| L6 | PJ1 | LTDC_R2 | TRACE_D9 |
| K4 | PJ2 | LTDC_R3 | TRACE_D10 |
| J1 | PJ3 | LTDC_R4 | TRACE_D11 |
| K2 | PJ4 | LTDC_R5 | TRACE_D12 |
| K1 | PJ5 | LTDC_R6 | TRACE_D2 |
| L5 | PJ6 | LTDC_R7 | TRACE_D3 |
| L4 | PJ7 | LTDC_G0 | TRACE_D13 |
| H6 | PJ8 | LTDC_G1 | TRACE_D14 |
| L2 | PJ9 | LTDC_G2 | TRACE_D15 |
| J3 | PJ10 | LTDC_G3 | - |
| K6 | PJ11 | LTDC_G4 | - |
| B8 | PJ12 | LTDC_B0 | - |

| LFBGA448 ball | IO Port | Main function | Motor Control connector |
|---|---|---|---|
| A7 | PJ13 | LTDC_B1 | - |
| B7 | PJ14 | LTDC_B2 | - |
| C7 | PJ15 | LTDC_B3 | - |
| D8 | PK0 | LTDC_G5 | - |
| E7 | PK1 | LTDC_G6 | TRACE_D4 |
| E8 | PK2 | LTDC_G7 | TRACE_D5 |
| B6 | PK3 | LTDC_B4 | - |
| A6 | PK4 | LTDC_B5 | - |
| C6 | PK5 | LTDC_B6 | TRACE_D6 |
| A5 | PK6 | LTDC_B7 | TRACE_D7 |
| B5 | PK7 | LTDC_DE | - |
| G2 | PZ0 | SPI1_SCK | - |
| H5 | PZ1 | SPI1_MISO | - |
| K5 | PZ2 | SPI1_MOSI | - |
| F4 | PZ3 | SPI1_NSS | - |
| G1 | PZ4 | I2C4_SCL | - |
| H4 | PZ5 | I2C4_SDA | - |
| G3 | PZ6 | SMARTCARD_CLK | - |
| H3 | PZ7 | SMARTCARD_IO | - |

# Appendix C Federal Communications Commission (FCC) and Industry Canada (IC) Compliance Statements

## C.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.

### FCC ID

FCC ID: YCP-MB1263-000.

## C.2 IC Compliance Statement

This device complies with FCC and Industry Canada RF radiation exposure limits set forth for general population for mobile application (uncontrolled exposure). This device must not be collocated or operating in conjunction with any other antenna or transmitter.

### Compliance Statement

Notice: This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

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

### Déclaration de conformité

Avis: Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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

# Appendix D CE conformity

## D.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.

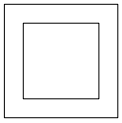
## D.2 Simplified declaration of conformity

Hereby, STMicroelectronics declares that the radio equipment types STM32MP157A-EV1 and STM32MP157C-EV1 are in compliance with Directive 2014/53/EU.

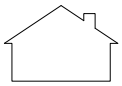
# Appendix E Safety instructions

## E.1 Safety instructions

- The STM32MP157x-EV1 Evaluation board is designed to be powered from the 5 V DC power supply unit provided in the package. The power supply acting as a disconnection device must remain easily accessible in case of issue.
- Marking observed on the power supply unit:

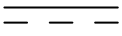


Marking for Class II product. Such product does not require a safety connection to electrical earth.



For indoor use only.

This marking indicates that the product operates with an alternating current (AC) source (mains). It is completed by afferent values (voltage, frequency and max current).



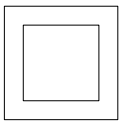
This marking indicates that the terminal is suitable for direct current (DC) only. It is completed by afferent values (voltage and max current).

The associated symbol means that WEEE and waste batteries must not be thrown away but collected separately and recycled.

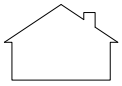
- Do not expose it to heat from any source.
- Do not expose it to water, moisture or place on a conductive surface while in operation.

## E.2 Sicherheitshinweise

- Das Evaluierungsboard STM32MP157x-EV1 ist ausgelegt für den Betrieb mit dem im Lieferumfang enthaltenen 5V DC Netzteil. Das Netzteil muss frei zugänglich sein damit es jederzeit im Fall einer Gefahr oder einer Störung vom Netz getrennt werden kann.
- Kennzeichnung am Netzteil beachtet:

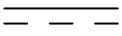


Kennzeichnung für Produkte der Klasse II. Für ein solches Produkt ist keine Erdung erforderlich.



Nur für den Innengebrauch.

Diese Markierung zeigt an, dass das Produkt nur mit einer Wechselspannung (Netz) betrieben werden darf.



Diese Markierung zeigt an, dass das Terminal nur für Gleichstrom (DC) geeignet ist. Das Netzteil versorgt das Terminal mit der angepassten Spannung.

Das zugehörige Symbol bedeutet, dass Elektro- und Elektronik-Altgeräte nicht weggeworfen, sondern getrennt gesammelt und recycelt werden müssen.

- Setzen Sie es keiner Wärmequelle aus.
- Setzen Sie es während des Betriebs weder Wasser noch Feuchtigkeit aus und legen Sie es nicht auf eine leitfähige Oberfläche.

# Revision history

Table 48. **Document revision history**

| Date | Version | Changes |
|---|---|---|
| 20-Feb-2019 | 1 | Initial release. |
| 22-Aug-2019 | 2 | Added certification appendices Federal Communications Commission (FCC) and Industry Canada (IC) Compliance Statements, CE conformity, and Safety instructions. |

# Contents

# List of tables

# List of figures