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STM32MP157X-DKX - hardware description

This article provides an overview of STM32MP157x-DKx Discovery kits.

Contents

1 Article purpose

This article briefly describes:

- what are the different components present on the board
- how to connect the board to external material
- how to configure the board for boot
- what are the configurations of the connector pins

This article is valid both for the STM32MP157A-DK1 and STM32MP157C-DK2 Discovery kits: the part numbers are specified in the STM32MP15 microprocessor part numbers article.

This article is only an introduction to the STM32MP157x-DKx Discovery kits. Detailed information can be found in the STM32MP157x-DKx discovery board user manual.

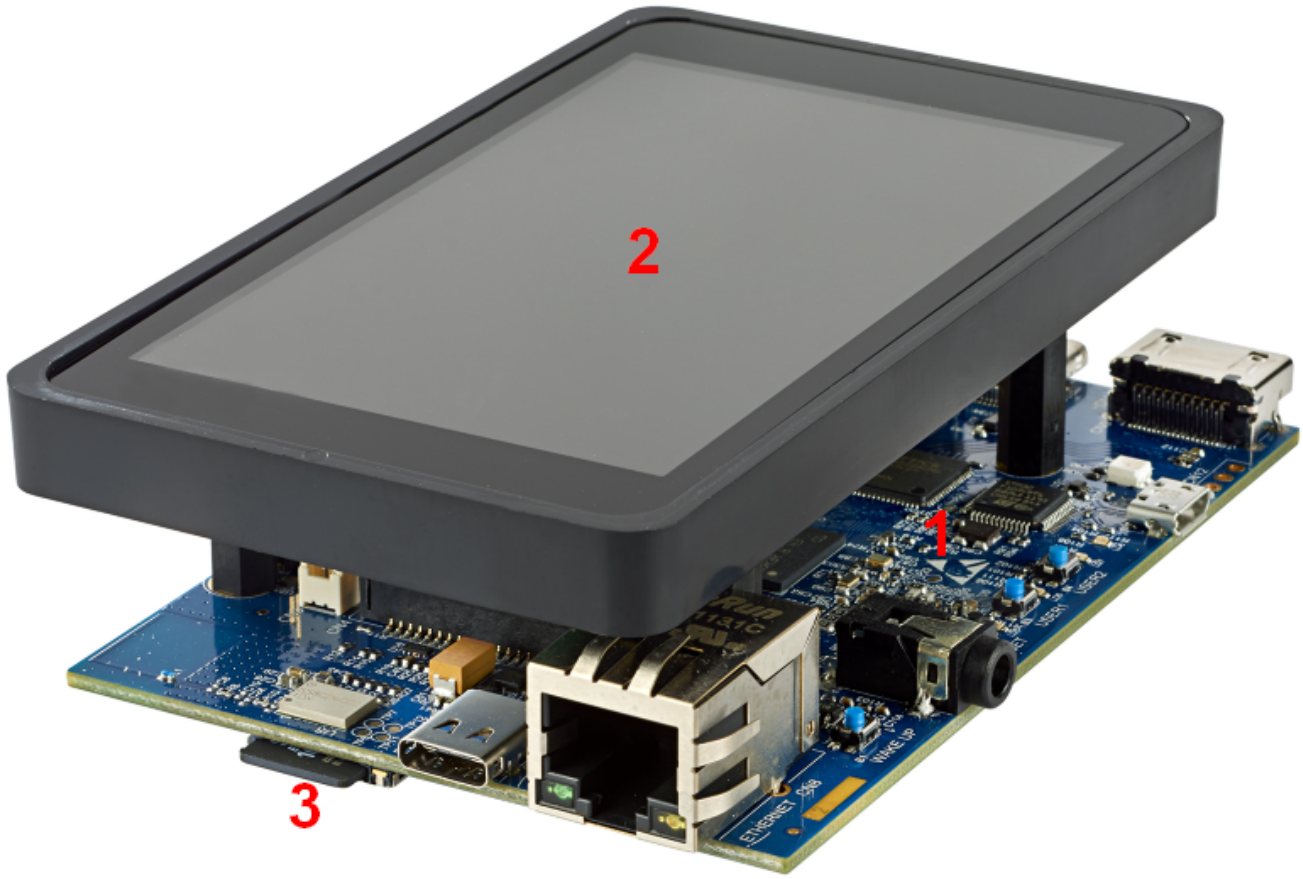
2 Board assembly

The STM32MP157x-DKx Discovery kits packages (STM32MP157A-DK1 and STM32MP157C-DK2) are delivered assembled, and contain the items listed below. A USB Type-C™ cable is also included.

Please note that;

- the **STM32MP157A-DK1** Discovery kit neither includes the "WLAN + Bluetooth" component (muRata LBEE5KL1DX), nor the MB1407 daughterboard DSI display
- the **STM32MP157C-DK2** Discovery kit includes the "WLAN + Bluetooth" component (muRata LBEE5KL1DX), and the MB1407 daughterboard DSI display

Position	Description
1	MB1272 motherboard ("WLAN + Bluetooth" component included only for the **STM32MP157C-DK2** Discovery kit)
2	MB1407 daughterboard DSI display (480x800 pixels): only for the **STM32MP157C-DK2** Discovery kit
3	microSD card

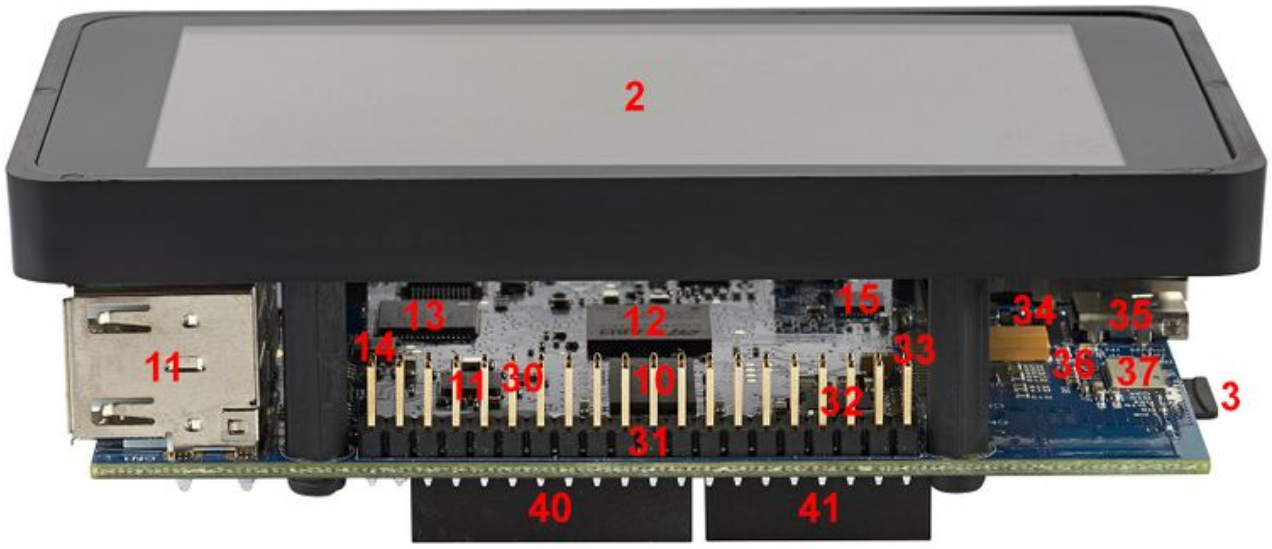


STM32MP157x-DKx Discovery kit assembled
STM32MP157C-DK2 shown here (picture not contractual)
(for the STM32MP157A-DK1, the element 2 is not present)

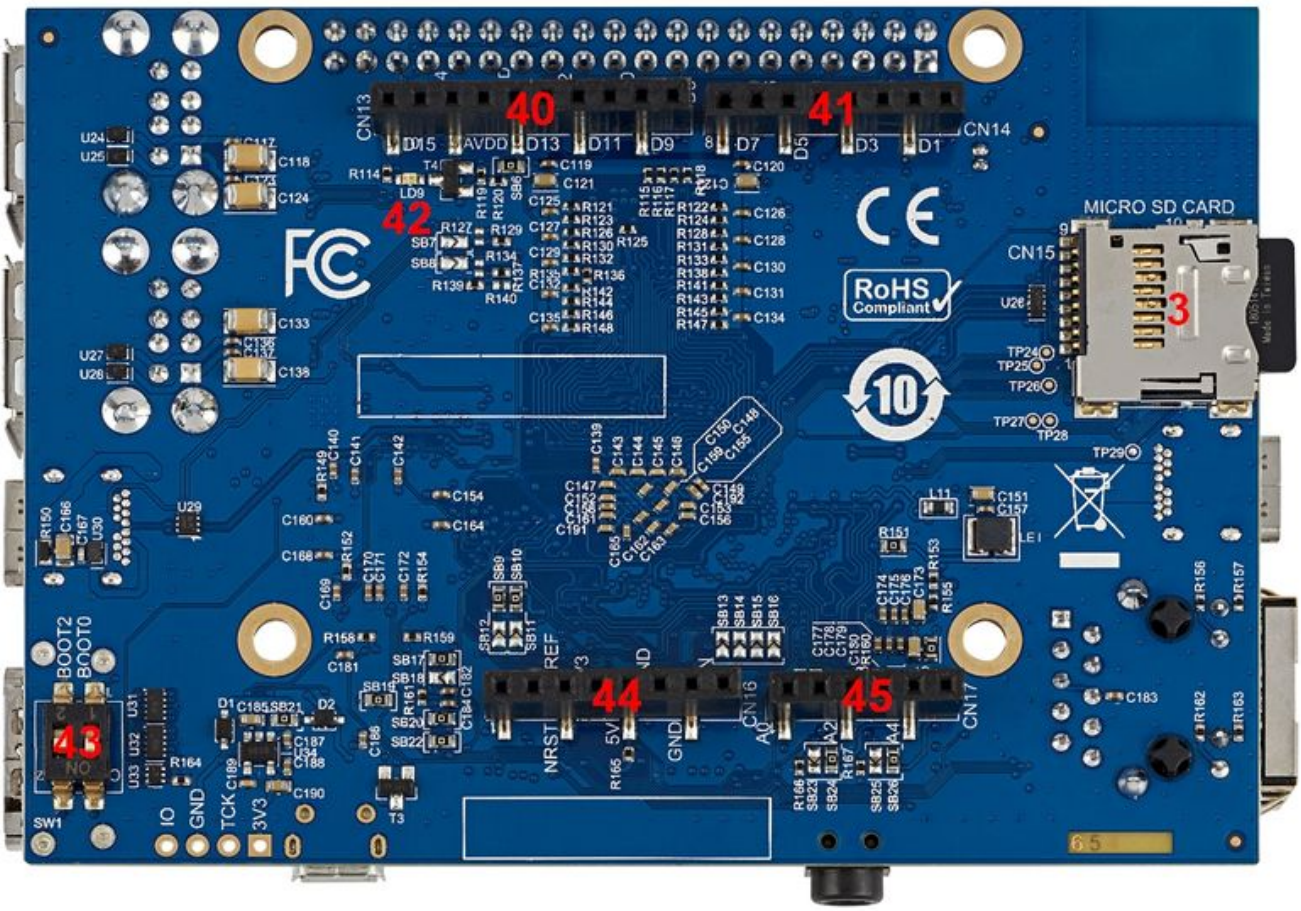
3 Board overview

Position	Description
1	MB1272 motherboard
2	MB1407 daughterboard DSI display (480x800 pixels): only for the STM32MP157C-DK2 Discovery kit
3 (**CN15**)	microSD card

STM32MP157x-DKx Discovery kit front side (first angle)
STM32MP157C-DK2 shown here (picture is not contractual)



STM32MP157x-DKx Discovery kit front side (second angle)
STM32MP157C-DK2 shown here (picture is not contractual)



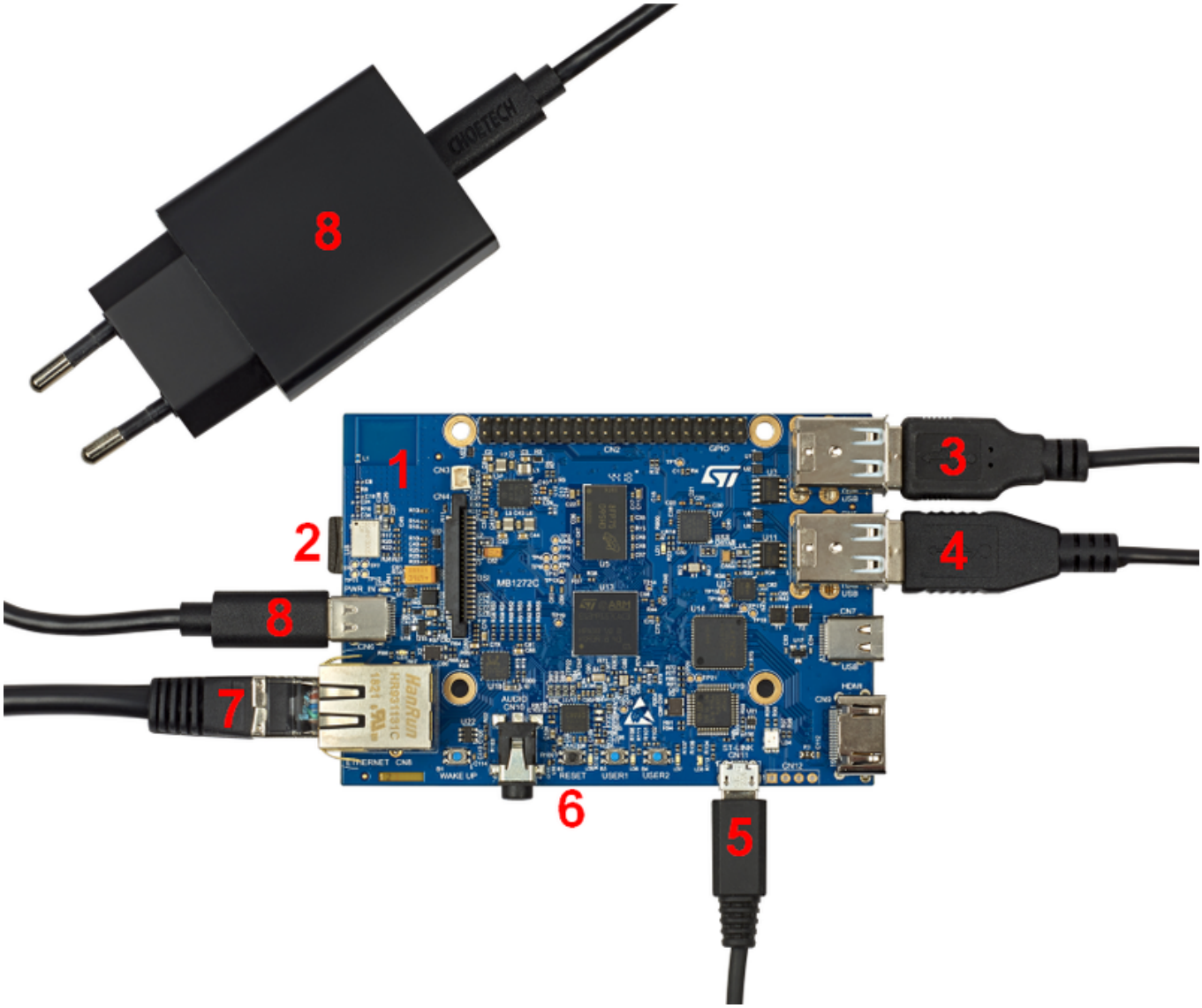
STM32MP157x-DKx Discovery kit back side
STM32MP157C-DK2 shown here (picture is not contractual)

Details about some LEDs:

1. LD5, LD6, LD7, LD8: some user LEDs are used to reflect the system activity, while the others are left free to be used by the application, as explained in LEDs and buttons on STM32 MPU boards article
2. LD4: flashes red if ST-LINK/V2-1 connection not established, else green
3. LD1: turns red if USB Type-A connection established
4. LD3: flashes green when Ethernet connection established
5. LD2: turns green if power connection established

4 Board connection

The connections shown in the picture below are the ones recommended to start with the STM32MP157x_DKx Discovery kits. As shown in the board overview, other connectors are available for these boards (for example HDMI).



1. MB1272 motherboard: STM32MP157x 12x12, PMIC, DDR3
2. MicroSD card slot
3. 2 x USB Type-A (host) → mouse, keyboard or USB driver
4. 2 x USB Type-A (host) → mouse, Keyboard or USB driver
5. USB micro-B (ST-LINK/V2-1) → PC virtual COM port and debug
6. Reset button
7. Ethernet → Network
8. USB Type-C (power 5V-3A)

STM32MP157x-DKx Discovery kit connections

STM32MP157C-DK2 shown here without the MB1407 daughterboard DSI display to avoid hiding the connections (picture is not contractual)

5 Boot related switches

The following table defines the different combination of the boot mode selection switches:

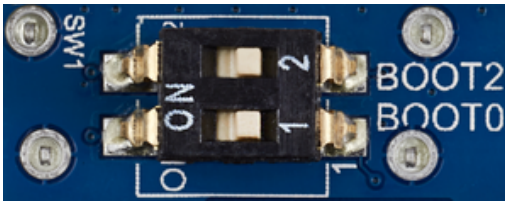
"Boot 1" is grounded (always 0) on the Discovery kits

Boot mode	Boot 0	Boot 1	Boot 2
Forced USB boot for flashing	0	0	0

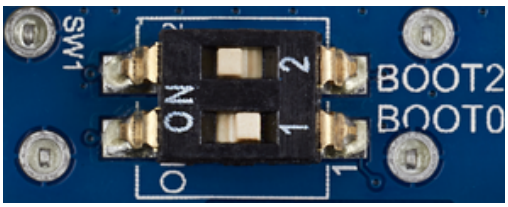
Not supported	1	0	0
Engineering boot	0	0	1
microSD card	1	0	1

Boot modes

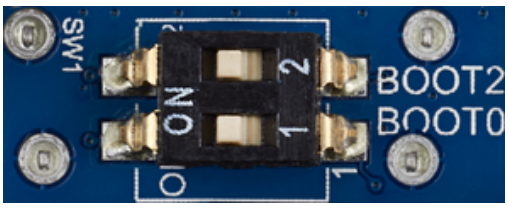
Below the corresponding configurations of the boot related switches (SW1 on the board overview picture):



Forced USB boot for flashing



Engineering boot



Boot from microSD card

6 GPIO mapping

6.1 GPIO expansion connector

The pins of the GPIO expansion connector (CN2 on the board overview picture) are described in the following table:

Function	STM32 pin	Pin	Pin	STM32 pin	Function
3V3	-	1	2	-	5V
GPIO2 / I2C5_SDA	PA12	3	4	-	5V
GPIO3 / I2C5_SCL	PA11	5	6	-	GND
GPIO4 / MCO1	PA8	7	8	PB10	GPIO14 / USART3_TX
GND	-	9	10	PB12	GPIO15 / USART3_RX
GPIO17 / USART3_RTS	PG8	11	12	PI5	GPIO18 / SAI2_SCKA[EX 1]
GPIO27 / SDMMC3_D3	PD7	13	14	-	GND
GPIO22 / SDMMC3_CK	PG15	15	16	PF1	GPIO23 / SDMMC3_CMD
3V3	-	17	18	PF0	GPIO24 / SDMMC3_D0
GPIO10 / SPI5_MOSI	PF9	19	20	-	GND
GPIO9 / SPI5_MISO	PF8	21	22	PF4	GPIO25 / SDMMC3_D1

GPIO11 / SPI5_SCK	PF7	23	24	PF6	GPIO8 / SPI5_NSS
GND	-	25	26	PF3	GPIO7
I2C1_SDA[EX 2]	PF15	27	28	PD12	I2C1_SCL[EX 2]
GPIO5 / MCO2	PG2	29	30	-	GND
GPIO6 / TIM5_CH2	PH11	31	32	PD13	GPIO12 / TIM4_CH2
GPIO13 / TIM3_CH2	PC7	33	34	-	GND
GPIO19 / SAI2_FSA[EX 1]	PI7	35	36	PB13	GPIO16 / USART3_CTS
GPIO26 / SDMMC3_D2	PF5	37	38	PI6	GPIO20 / SAI2_SDA[EX 1]
GND	-	39	40	PF11	GPIO21 / SAI2_SDB[EX 1]

GPIO expansion connector

1. The SAI2 is shared between the audio codec and the GPIO expansion connector. By default, the SAI2 is connected to the audio codec thanks to Solder Bridge SB13, SB14, SB15, and SB16: more details in the STM32MP157x-DKx discovery board user manual.
2. Warning: the I2C1 is used to communicate with several on-board peripherals, but is also available on the GPIO expansion connector. So, it is important to ensure that new components added on the I2C1 connection will not disturb the bus behavior.

6.2 Arduino Uno connector

The pins of the Arduino Uno connector are described in the following table:

Arduino Uno connector

Pin names	Signal name	STM32 pin	Comment
1	ARD_D8	PG3	IO
2	ARD_D9	PH6	TIM12_CH1
3	ARD_D10	PE11	SPI4_NSS and TIM1_CH2
4	ARD_D11	PE14	SPI4_MOSI and TIM1_CH4
5	ARD_D12	PE13	SPI4_MISO
6	ARD_D13	PE12	SPI4_SCK
7	GND	-	GND
8	VREFP	-	VREF+
9	ARD_D14	PA12	I2C5_SDA
10	ARD_D15	PA11	I2C5_SCL

Socket 10x1 (CN13)

Pin names	Signal name	STM32 pin	Comment
1	ARD_D0	PE7	UART7_RX
2	ARD_D1	PE8	UART7_TX
3	ARD_D2	PE1	IO
4	ARD_D3	PD14	TIM4_CH3
5	ARD_D4	PE10	IO
6	ARD_D5	PD15	TIM4_CH4
7	ARD_D6	PE9	TIM1_CH1
8	ARD_D7	PD1	IO

Socket 8x1 (CN14)

Pin names	Signal name	STM32 pin	Comment
1	NC	-	NC (reserved for test)
2	3V3	-	IOREF 3V3
3	NRST	NRST	NRST
4	3V3	-	3V3
5	5V	-	5V
6	GND	-	GND
7	GND	-	GND
8	VIN	-	Not connected

socket 8x1 (CN16)

Pin names	Signal name	STM32 pin	Comment
1	A0	PF14	ADC1_IN0
2	A1	PF13	ADC1_IN1
3	A2	ANA0	ADC1_IN6
4	A3	ANA1	ADC1_IN2
5	A4	PC3 / PA12	ADC1_IN13
6	A5	PF12 / PA11	

Socket 6x1 (CN17)

6.3 User buttons and LEDs

The GPIO assignments for the user buttons and LEDs are described in the following table. Refer to LEDs and buttons on STM32 MPU boards article to get information on the functional mapping for each one.

LED color and label	Button label	GPIO
Green LD5 (*)	USER1 (*)	PA14
Red LD6 (*)	USER2 (*)	PA13
Orange LD7	-	PH7
Blue LD8	-	PD11

GPIO for user buttons and LEDs

(*) Both a LED and a button are connected to the same GPIO, with inverted logic for the LED control (so the LED is switched on when the GPIO output is set to low).