

# MB202 – Carrier board

## Technical Product Specification

Evaluation board for SoM-A73-STMP15

Version 1

## **MB202 – Technical Product Specification**

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### Revision History

Revision	Author	Date	Notes
0	AG	29/08/2023	Document generation
1	AG	19/09/2023	Added pin-out table and minor correction.

# 1 Overview

The aim of this document is the description of the hardware of the evaluation board MB202. With the help of the application schematic some hardware solutions is suggested. Obviously this document cannot embrace the whole hardware solutions and products that may be designed, if in doubt pleas ask the manufacturer.

## Product Highlights

SO-DIMM200 socket	Compatible with SoM-A73-STM32MP15
Ethernet	1x 10/100Base-T, RJ45 connector
Display interface	24 bit LCD interface, FPC/FFC ZIF connector
Touch interface	Capacitive – USB or I2C based Resistive
USB	3x USB2.0 Host Type A 1x USB2.0 OTG, Type Micro B
µSD-Card	Standard slot
Terminal/Debug	Linux console on UART, pin header
RTC	PCF8563 with CR2032 battery holder
UART, SPI, I2C, GPIO	Headers Digilent Pmod™ Compatible
CAN, I2S, GPIO	Headers
Dip-switch, LED, Buttons	Configuration and control
Power Supply	5V dc @0,8A
Dimension	160 x 120 mm

### 1. Industrial standard SO-DIMM interface connector

## 1.1 Technical Support

We are committed to make our products easy to use and will help developers use our CPU modules in their systems.

Technical support is delivered through email for registered customers. Support requests can be sent to [info@hce-engineering.com](mailto:info@hce-engineering.com)

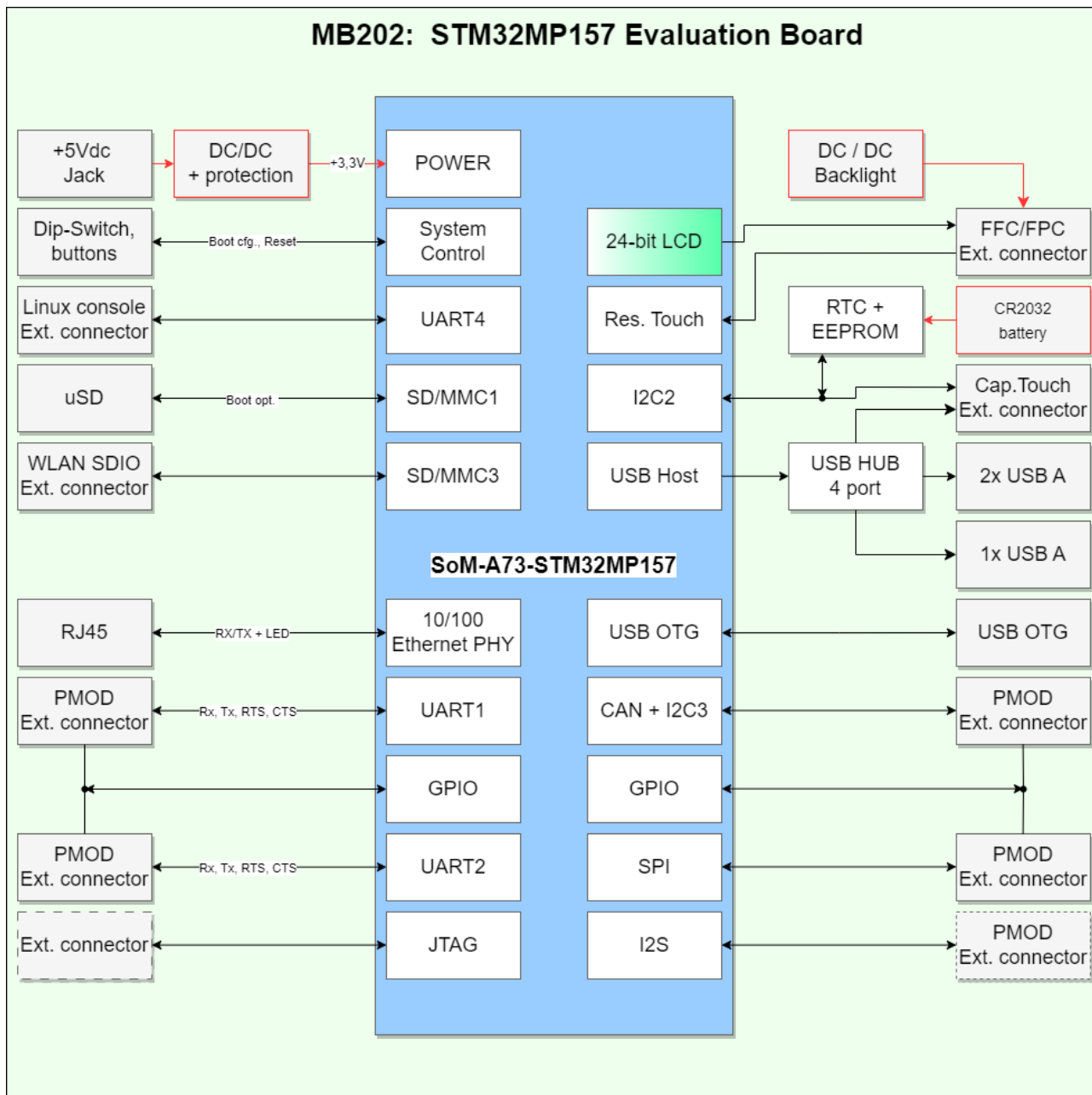
Any account is required to access this area.

Please refer to our Web site at <http://www.hce-engineering.it> for the latest product documents, utilities, drivers, demo projects.

### Reference Documents

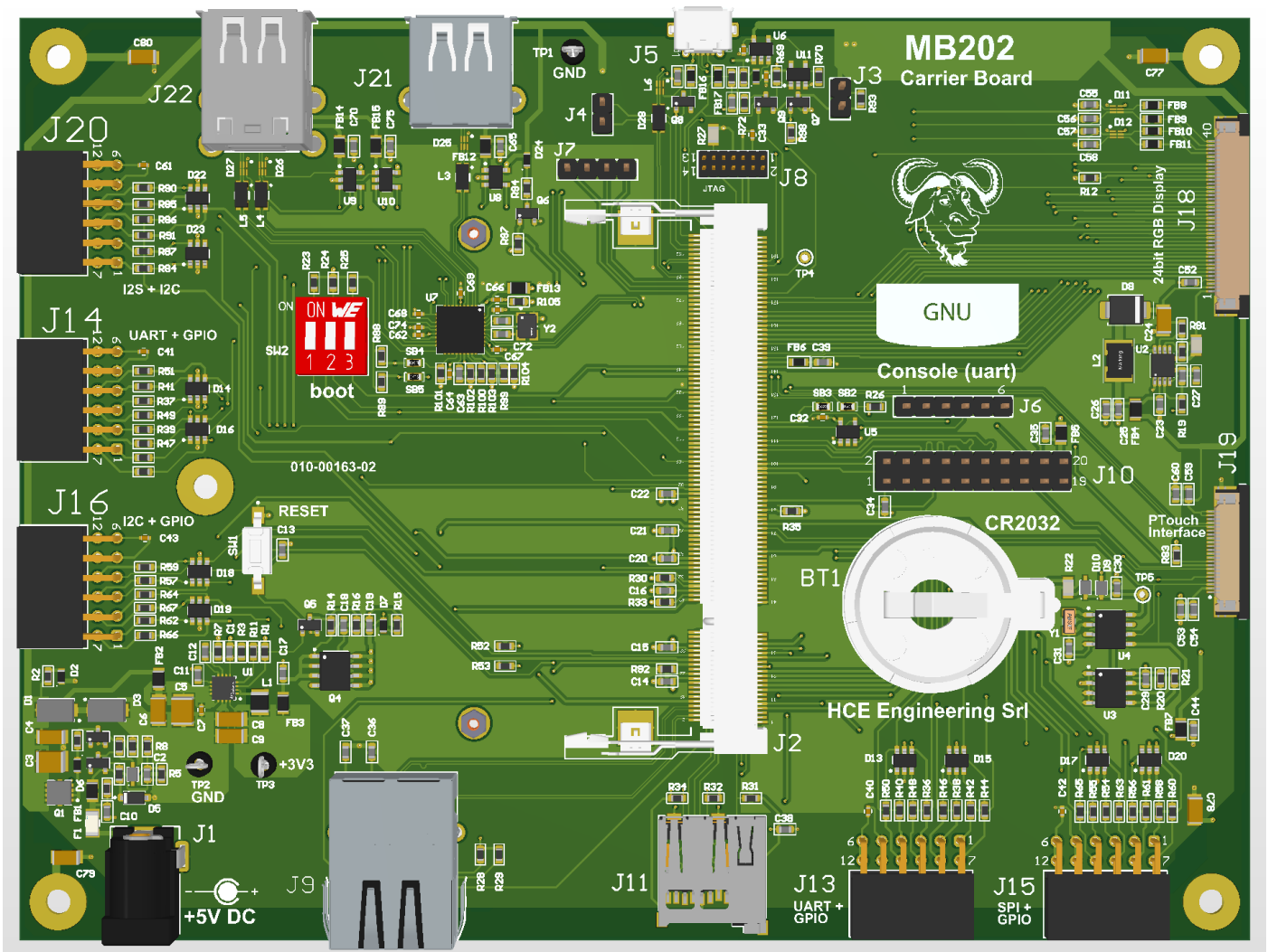
Document	Link
STM32MP157 data-sheets	<a href="https://www.st.com/resource/en/datasheet/stm32mp157a.pdf">https://www.st.com/resource/en/datasheet/stm32mp157a.pdf</a>
Pin Mux table	Ask for the documents
ES-021-00163-02	Schematic print for MB202

## 1.2 Block Diagram



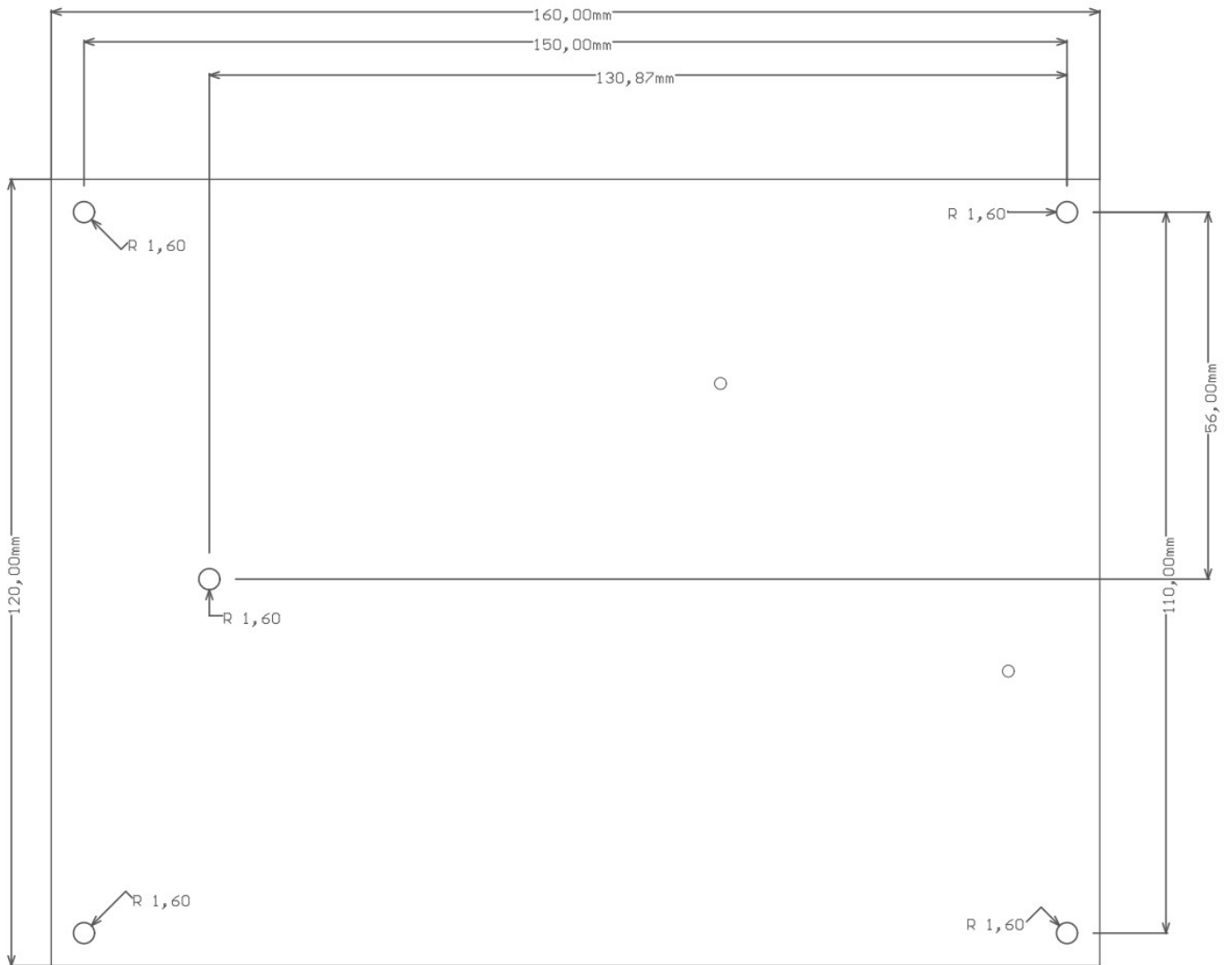
### 1.3 Board layout and dimension

CAD files are available, ask the documents.





Mechanical Drawing  
MB202 Carrier Board 2r1



## 2 MB202 connectors

Listed below are all available connectors on the SoM-A73-STM32MP15 evaluation board. A detailed description and pin-out is given in the following paragraphs.

Reference	Function	Type
J1	Power Input	DC Jack 2,0mm
J2	System-on-Module	SO-DIMM 200-pin 0,6mm
J3	PWM/GPIO	02x1 Pin Header 2,54mm
J4	PWM/GPIO	02x1 Pin Header 2,54mm
J5	USB OTG	Micro-AB
J6	Linux console	06x1 Pin Header 2,54mm
J7	PWM/SPI/GPIO	04x1 Pin Header 2,54mm
J8	Jtag / Linux console	07x2 Pin Header 1,27mm
J9	10/100Mbps Ethernet Port	RJ45 with led
J10	SDIO/USART8	10x2 Pin Header 2,54mm
J11	SD/MMC	Micro-SD connector
J13	UART/GPIO	06x2 Female Header 2,54mm
J14	UART/GPIO	06x2 Female Header 2,54mm
J15	SPI/GPIO	06x2 Female Header 2,54mm
J16	CAN/I2C/GPIO	06x2 Female Header 2,54mm
J18	24bit RGB Display + R-Touch	FFC/FPC 40-pin 0,5mm
J19	Capacitive Touch	FFC/FPC 40-pin 0,5mm
J20	I2S/I2C	06x2 Female Header 2,54mm
J21	USB Host	Type A
J22	2x USB Host	Type A
BT1	RTC	CR2032 Battery Holder

## 2.1 Internal (SoM) Connector

The MB202 evaluation board has a SO-DIMM 200-pin (J2) standard connector for the SOM-A73-STM32MP15 cpu module. Please refer to the SoM datasheet for the pin-out and description.

## 2.2 External Connector

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### J1 Connector: Power Input

DC POWER JACK. Positive plug inner 2.0mm; negative plug outer 5,5mm.

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### J3 Connector: PWM/GPIO

Pin-header, vertical 2 poles, 2,54mm pitch. [Not fitted]

Legend	Type	Pin	Signal / I/O
J3	+5,0V	1	+5,0V power supply
	O.D.	2	Open Drain

---

### J4 Connector: PWM/GPIO

Pin-header, vertical 2 poles, 2,54mm pitch. [Not fitted]

Legend	Type	Pin	Signal / I/O
J4	Differential Signal 2,5V	1	USB Full Speed DP (not active)
		2	USB Full Speed DM (not active)

---

## J5 Connector: USB OTG

USB Micro-AB receptacle

Legend	Type	Pin	Signal / I/O
J5	+5,0V	1	+5,0V power supply input/output
	Different.	2	USB Data Minus
	Different.	3	USB Data Plus
	Input	4	USB OTG Identification signal
	GND	5	Ground

---

## Linux Console

Pin-header, vertical 6 poles, 2,54mm pitch.

Legend	Type	Pin	Signal / I/O
J6	GND	1	Ground
		2, 3, 6	Not connected
	Cmos	4	Uart Rx 3,3V
	Cmos	5	Uart Tx 3,3V

Use USB to UART cable FTDI TTL-232R-3V3 or equivalent

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## J7 Connector: PWM/GPIO

Pin-header, vertical 4 poles, 2,54mm pitch.

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Legend	Type	Pin	Signal / I/O
J7	CMOS	1	PE13 SPI4_MISO
	CMOS	2	PE12 SPI4_CLK
	CMOS	3	PE14 SPI4_MOSI
	CMOS	4	PE11 SPI4_CS

## JTAG

Pin-header, vertical 7+7 poles, 1,27mm pitch. [Not fitted]

Legend	Type	Pin	Signal / I/O
J8		1, 2, 9	Not connected
	+3,3V	3	Voltage output
	Cmos	4	Jtag TMS, 1,8 voltage level
	GND	5, 7	Ground
	Cmos	6	Jtag TCK, 1,8 voltage level
	Cmos	8	Jtag TDO, 1,8 voltage level
	Cmos	10	Jtag TDI, 1,8 voltage level
	Rp-d	11	Ground detect
		12	System
	Cmos	13	Uart Rx linux console, 3,3 voltage level

Legend	Type	Pin	Signal / I/O
	Cmos	14	Uart Tx linux console, 3,3 voltage level

Compatible with STM STDC14 connection.

---

## Ethernet port

J9, standard 10/100Base-T RJ45 connector

LED \STATUS 100M Link 100M Active

Link 10/100 ON ON

ACT ON Blink

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## J10 Connector: SDIO/USART8

Pin-header, vertical 10+10 poles, 2,54mm pitch. [Not fitted]



Legend	Type	Pin	Signal / I/O
J10	+3,3V	1, 20	+3,3V power supply output
	Cmos	2	USART8 CTS, 3,3V
	GND	3, 18	Ground
	Cmos	4	SDIO CMD, 3,3V
	Cmos	5	USART8 Rx, 3,3V
	Cmos	6	SDIO DAT2, 3,3V
	Cmos	7	USART8 RTS, 3,3V
	Cmos	8	SDIO DAT3, 3,3V
	Cmos	9	USART8 Tx, 3,3V
	Cmos	10	SDIO DAT0, 3,3V
	Cmos	11	Wi-Fi GPIO3, 3,3V
	Cmos	12	SDIO CLK, 3,3V
	Cmos	13	Wi-Fi GPIO2, 3,3V
	Cmos	14	SDIO DAT1, 3,3V
	Cmos	15	Wi-Fi GPIO1, 3,3V
	Cmos	16	Wi-Fi CE, 3,3V
	Cmos	17	Wi-Fi IRQN, 3,3V
Cmos	19	Wi-Fi WAKE, 3,3V	

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## SD/MMC port

J11, standard Micro-SD connector

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## J13 Connector: UART1/GPIO

Female-header, horizontal 6+6 poles, 2,54mm pitch. Digilent Pmod™ Compatible.

Legend	Type	Pin	Signal / I/O
J13	Cmos	1	Uart1 CTS, 3,3 voltage level
	Cmos	2	Uart1 TX, 3,3 voltage level
	Cmos	3	Uart1 RX, 3,3 voltage level
	Cmos	4	Uart1 RTS, 3,3 voltage level
	GND	5, 11	Ground
	+3V3	6, 12	Power Supply
	Cmos	7	PH9 GPIO, 3,3 voltage level
	Cmos	8	PH10 GPIO, 3,3 voltage level
	Cmos	9	PH14 GPIO, 3,3 voltage level
	Cmos	10	PH15 GPIO, 3,3 voltage level

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**J14 Connector: UART2/GPIO**

Female-header, horizontal 6+6 poles, 2,54mm pitch. Digilent Pmod™ Compatible.

Legend	Type	Pin	Signal / I/O
J14	Cmos	1	Uart2 CTS, 3,3 voltage level
	Cmos	2	Uart2 TX, 3,3 voltage level
	Cmos	3	Uart2 RX, 3,3 voltage level
	Cmos	4	Uart2 RTS, 3,3 voltage level
	GND	5, 11	Ground
	+3V3	6, 12	Power Supply
	Cmos	7	PD9 GPIO, 3,3 voltage level
	Cmos	8	PD14 GPIO, 3,3 voltage level
	Cmos	9	PZ2 GPIO, 3,3 voltage level
	Cmos	10	PZ6 GPIO, 3,3 voltage level

**J15 Connector: SPI/GPIO**

Female-header, horizontal 6+6 poles, 2,54mm pitch. Digilent Pmod™ Compatible.

Legend	Type	Pin	Signal / I/O
J15	Cmos	1	SPI2 CS, 3,3 voltage level

Legend	Type	Pin	Signal / I/O
	Cmos	2	SPI2 MOSI, 3,3 voltage level
	Cmos	3	SPI2 MISO, 3,3 voltage level
	Cmos	4	SPI2 CLK, 3,3 voltage level
	GND	5, 11	Ground
	+3V3	6, 12	Power Supply
	Cmos	7	PC7 GPIO / USART6 RX, 3,3 voltage level
	Cmos	8	PC6 GPIO / USART6 TX, 3,3 voltage level
	Cmos	9	PG13 GPIO / USART6 CTS, 3,3 voltage level
	Cmos	10	PG8 GPIO / USART6 RTS, 3,3 voltage level

## J16 Connector: CAN/PWM/GPIO

Female-header, horizontal 6+6 poles, 2,54mm pitch. Digilent Pmod™ Compatible.

Legend	Type	Pin	Signal / I/O
J16	Cmos	1	CAN1 TX, 3,3 voltage level
	Cmos	2	CAN1 RX, 3,3 voltage level
	O.D.	3	I2C3 SCL
	O.D.	4	I2C3 CLK

Legend	Type	Pin	Signal / I/O
	GND	5,11	Ground
	+3V3	6,12	Power Supply
	Cmos	7	PG0 GPIO
	Cmos	8	PG1 GPIO
	Cmos	9	PB10 / TIM2_CH3
	Cmos	10	PE9 / TIM1_CH1

### J18 Connector: 24-bit LCD

FFC/FPC 40-pin; 0,5mm, horizontal.

Legend	Type	Pin	Signal / I/O
J18	Analog	1	LCD backlight feedback (200mV)
	Analog	2	LCD backlight power ( about 21V with reference display)
	GND	3,29,36	Ground
	+3,3V	4	Power Supply
	Cmos	5..12	RGB DATA R0 to R7, 3,3 voltage level
	Cmos	13..20	RGB DATA G0 to G7, 3,3 voltage level
	Cmos	21..28	RGB DATA B0 to B7, 3,3 voltage level

Legend	Type	Pin	Signal / I/O
	Cmos	30	RGB DATA CLOCK
	Cmos	31	DISPLAY ON/OFF Signal, 3,3 voltage level
	Cmos	32	RGB DATA Horizontal Sync
	Cmos	33	RGB DATA Vertical Sync
	Cmos	34	RGB DATA Enable
	--	35	Not connected
	Analog	37	Resistive Touch ADC input X Plus
	Analog	38	Resistive Touch ADC input Y Minus
	Analog	39	Resistive Touch ADC input X Minus
	Analog	40	Resistive Touch ADC input Y Plus

## J19 Connector: Capacitive Touch

FFC/FPC 22-pin; 0,5mm, horizontal.

Legend	Type	Pin	Signal / I/O
J19	GND	1,17,20	Ground
	+3,3V	2	Power Supply
	O.D.	3	I2C2 Clock

Legend	Type	Pin	Signal / I/O
		4, 6	Not connected
	O.D.	5	I2C2 Data
	Cmos	7	Touch controller reset
	Cmos	8	Touch controller wake
	Cmos	9	Touch controller Interrupt
		10..16	Not connected
	Different.	18	USB Date Minus
	Different.	19	USB Date Plus
	+5,0V	21, 22	Power Supply 5V

### J20 Connector: I2S/GPIO/ADC

Female-header, horizontal 6+6 poles, 2,54mm pitch. Digilent Pmod™ Compatible.

Legend	Type	Pin	Signal / I/O
J20	Cmos	1	Frame synchronization line for audio, 3,3 voltage level
	Cmos	2	Data line Output, 3,3 voltage level
	Cmos	3	Data line Input, 3,3 voltage level
	Cmos	4	Audio bit clock

Legend	Type	Pin	Signal / I/O
	GND	5, 11	Ground
	+3V3	6, 12	Power Supply
	O.D.	7	I2C4 Clock
	O.D.	8	I2C4 Data
	Cmos	9	Audio master clock
	Analog	10	ADC ANA0 Input

## J21 Connector: USB Host

Type A 2.0 horizontal receptacle

Legend	Type	Pin	Signal / I/O
J21	+5,0V	1	+5,0V power supply input/output
	Different.	2	USB Data Minus
	Different.	3	USB Data Plus
	GND	4	Ground

## J22 Connector: 2x USB Host

Double Type A 2.0 horizontal receptacle



Legend	Type	Pin	Signal / I/O
J22	+5,0V	A1, B1	+5,0V power supply input/output
	Different.	A2, B2	USB Data Minus
	Different.	A3, B3	USB Data Plus
	GND	A4, B4	Ground

---

### BT1 Connector: RTC Battery

The evaluation board is fitted with a CR2032 battery holder to supply the RTC IC PCF8563.

# 3 Configuration and Signalling

## 3.1 SWITCH

Boot Mode Switch	SW2-1	SW2-2	SW2-3
micro-SD	ON	OFF	ON
eMMC	OFF	ON	OFF
Serial	OFF	OFF	OFF

**SW1** - Reset switch

## 3.2 LED

Led D2	5V Power Input, green ON
Led D6	Overvoltage input, red ON
Led D7	+3,3V Power, green ON
Led D24	Linux RUN, green blinking





## 4 Operational characteristics

- Environmental Conditions Limits

Operating temperature	0..70°C	
Storage temperature	-40..85°C	
Relative humidity (non condensing )	10% to 85% (operation)	

- *Input Supply*

External power supply	5,0 Vdc (-2% + 2%)	
Current consumption	450mA to 1100mA	Depending on peripherals configuration and use