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# VisionCB-RT-STD v.1.0 Datasheet and Pinout

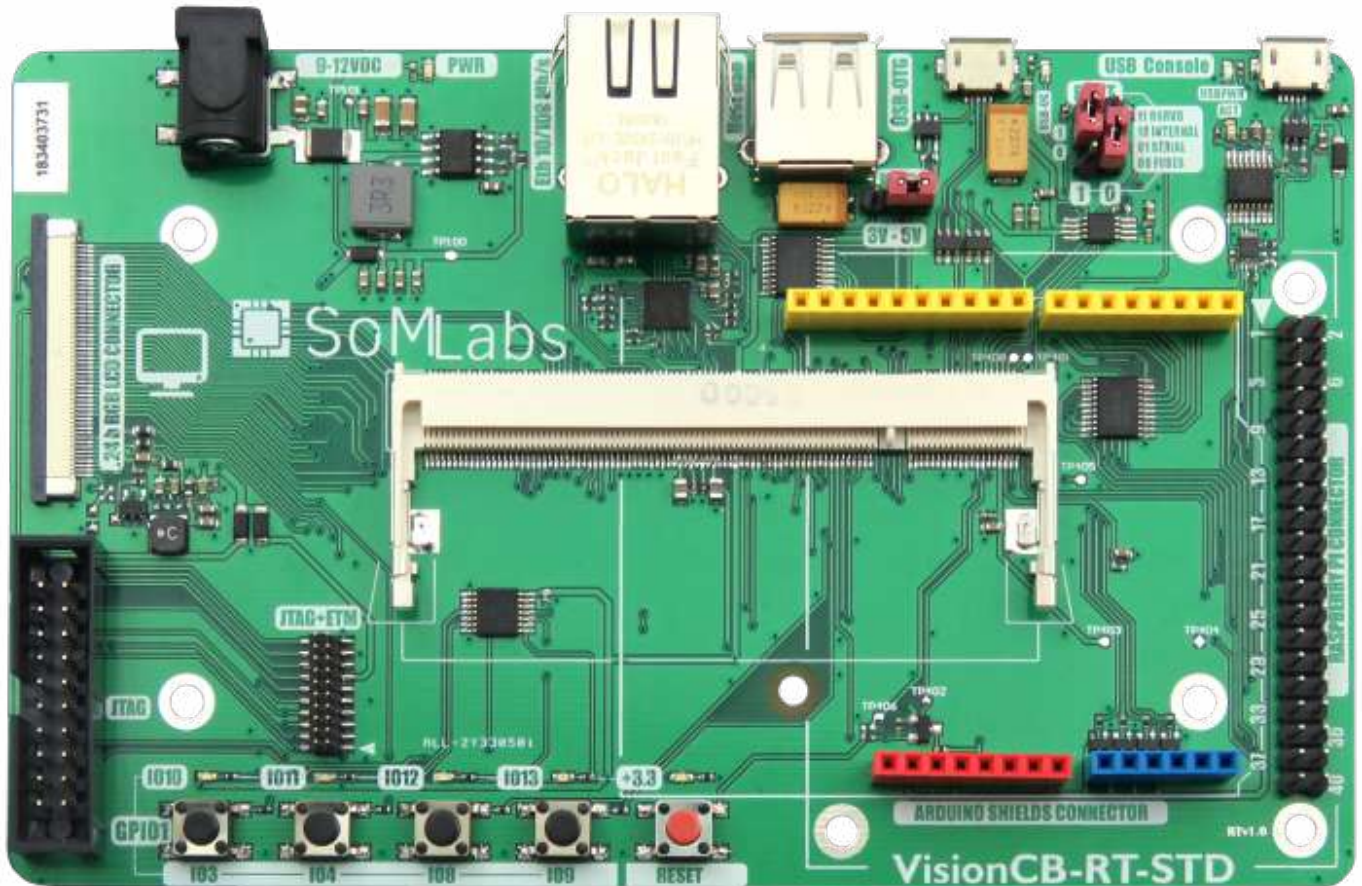
Rev. 20190913080256

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## Table of Contents

<b>General description</b> .....	1
Applications .....	1
<b>Features</b> .....	3
<b>Pictures of VisionCB-RT-STD v1.0 board</b> .....	4
<b>Ordering info</b> .....	5
<b>Block Diagram</b> .....	6
<b>Electrical parameters</b> .....	7
<b>Boot Selector</b> .....	8
<b>JTAG &amp; JTAG+ETM Connectors</b> .....	9
<b>Raspberry Pi compatible I/O header (J504)</b> .....	11
<b>Arduino compatible I/O headers (J500-J503)</b> .....	13
<b>User LEDs connections</b> .....	15
<b>User switches connections</b> .....	16
<b>TFT LCD connector (RGB 24b, J405)</b> .....	17
<b>Dimensions</b> .....	19

## General description



VisionCB-RT-STD is a carrier board for the VisionSOM family of computer-on-modules which are powered by NXP i.MX RT application processors (ARM Cortex-M7). A carrier board, together with a System on Module (SoM), makes a complete development platform similar to SBC. The carrier board houses the most common interfaces such as USB, Ethernet, UART, etc. A large variety of interfaces allows to use it as both a complete development platform or as a stand-alone end-product.

The carrier board connects with the SoM via a standard SODIMM connector.

## Applications



- Industrial embedded Linux computer
- Home Appliances
- Home Automation - Smart Home
- Human-machine Interfaces (HMI)
- Point-of-sales (POS) terminals
- Cash Register
- 2D barcode scanners and printers
- Smart grid Infrastructure
- IoT gateways
- Residential getaways
- Machine vision equipment

- Robotics
- Fitness/outdoor equipment

## Features

- Carrier Board (Base Board) compatible with the VisionSOM family of modules based on NXP i.MX RT application processors
- SoM connector: SODIMM200
- Expansion Connectors:
  - Arduino Uno Rev. 3 1x8, 1x6, 1x8, 1x10 Pin Headers (Female)
  - Raspberry Pi compatible connectors 2x20 Pin Header (Male)
- Communication Connectors:
  - 1x JTAG connector
  - 1x J-Trace connector
  - 1x Ethernet 10/100Mbit/s, RJ45
  - 1x USB Host Type A connectors
  - 1x USB Micro AB connector
  - 1x Console MicroUSB B connector (via FTDI FT230 UART to USB converter)
- Display Interface: 50-pin FFC/FPC Parallel RGB - 24-bit, (1366 x 768 Max. Resolution)
- User Interface:
  - 5 Pushbuttons
  - 5 LEDs
- Boot selector
- Power Supply
  - DC connector: Input Voltage 9-12V DC (5.5x2.1 connector)
  - MicroUSB connector: Input Voltage 5V DC
- Temperature Range: 0 to +70°C
- Board Size: 145mm x 90mm x 17mm

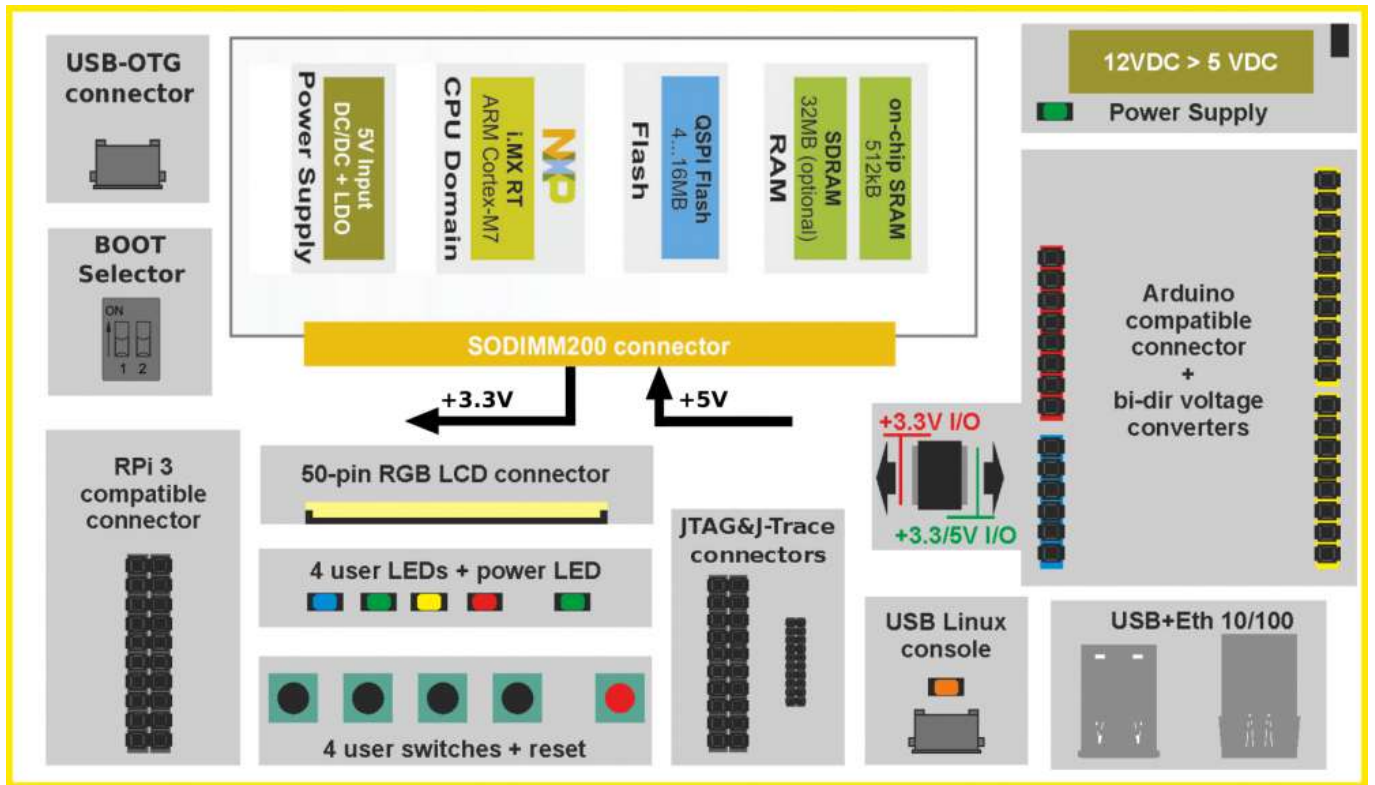
## Pictures of VisionCB-RT-STD v1.0 board

Version	Photo
VisionCB-RT-STD v1.0 board only	
VisionCB-RT-STD v1.0 board with VisionSOM-RT	

## Ordering info

VisionCB-RT-STD v1.0

# Block Diagram





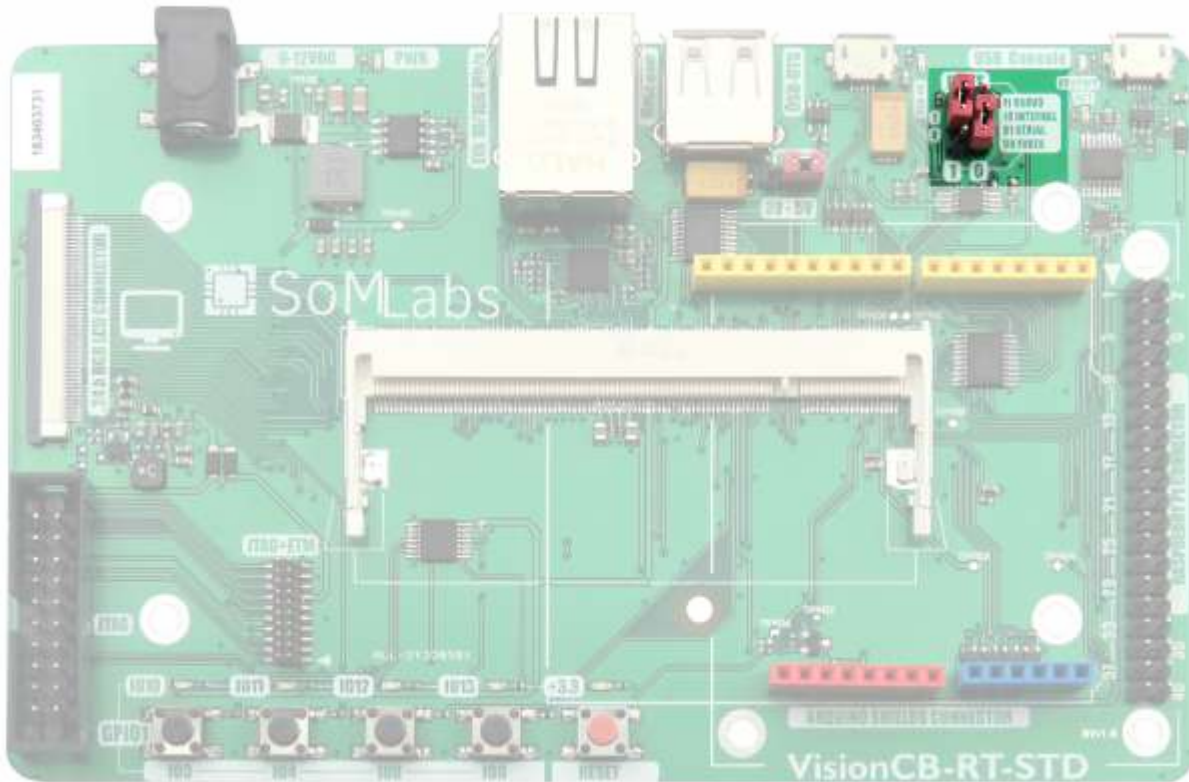
## Electrical parameters

Parameter	Value			Units	Comment
	Min.	Typ.	Max.		
Power Supply (J100 input)	9.0	11.0	12.0	V	Positive pole on central connector of J100
Supply current	-	-	0.15	A	Excluding LCD, USB and antoher external loads
Output voltage (VCC-3V3)	-	3.3	-	V	Generated by internal LDO
Output VCC-3V3 current	-	-	500	mA	Generated by internal LDO
USB power supply	4.75	4.9	5.5	V	On J201 (Linux USB console connector)
Input GPIO voltage (J405)	0	-	3.3	V	LCD-RGB connector
Input GPIO voltage (J504)	0	-	3.3	V	Raspberry Pi compatible
Input GPIO voltage (J502, J503)	0	-	3.3/5 (1)	V	Arduino compatible connector (digital I/O)
Input GPIO voltage (J501)	0	-	3.3	V	Arduino compatible connector (analog inputs)

Note:

1. Depends on JP3 selector.

## Boot Selector

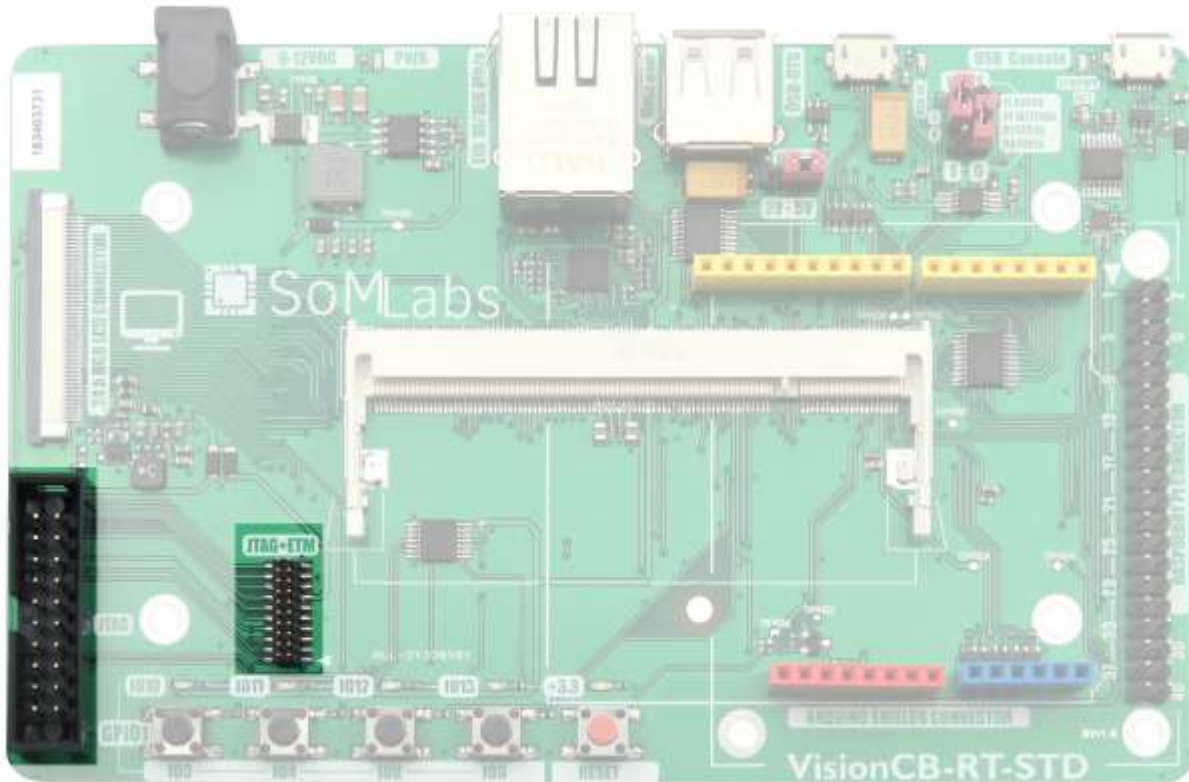


BOOTx		Boot Mode
BOOT1 GPIO_AD_B0_05	BOOT0 GPIO_AD_B0_04	
1	1	Reserved
1	0	Internal
0	1	Serial
0	0	Fuses

Note:

1. BOOT0 line is also referred as GPIO-4.
2. By default BOOT0 is pulled down with 10k resistor.
2. By default BOOT1 is pulled up with 1k resistor.

## JTAG & JTAG+ETM Connectors



JTAG Connector	Default function name	MCU pin name
1	VCC-3V3	NA
2	-	NA
3	-	NA
4	GND	NA
5	JTAG-TDI	GPIO_AD_B0_09
6	GND	NA
7	JTAG-TMS	GPIO_AD_B0_06
8	GND	NA
9	JTAG-TCK	GPIO_AD_B0_07
10	GND	NA
11	-	NA
12	GND	NA
13	JTAG-TDO	GPIO_AD_B0_10
14	-	NA
15	POR-B	POR-B
16	-	NA
17	-	NA
18	-	NA
19	5V-Supply (IN)	NA
20	-	NA

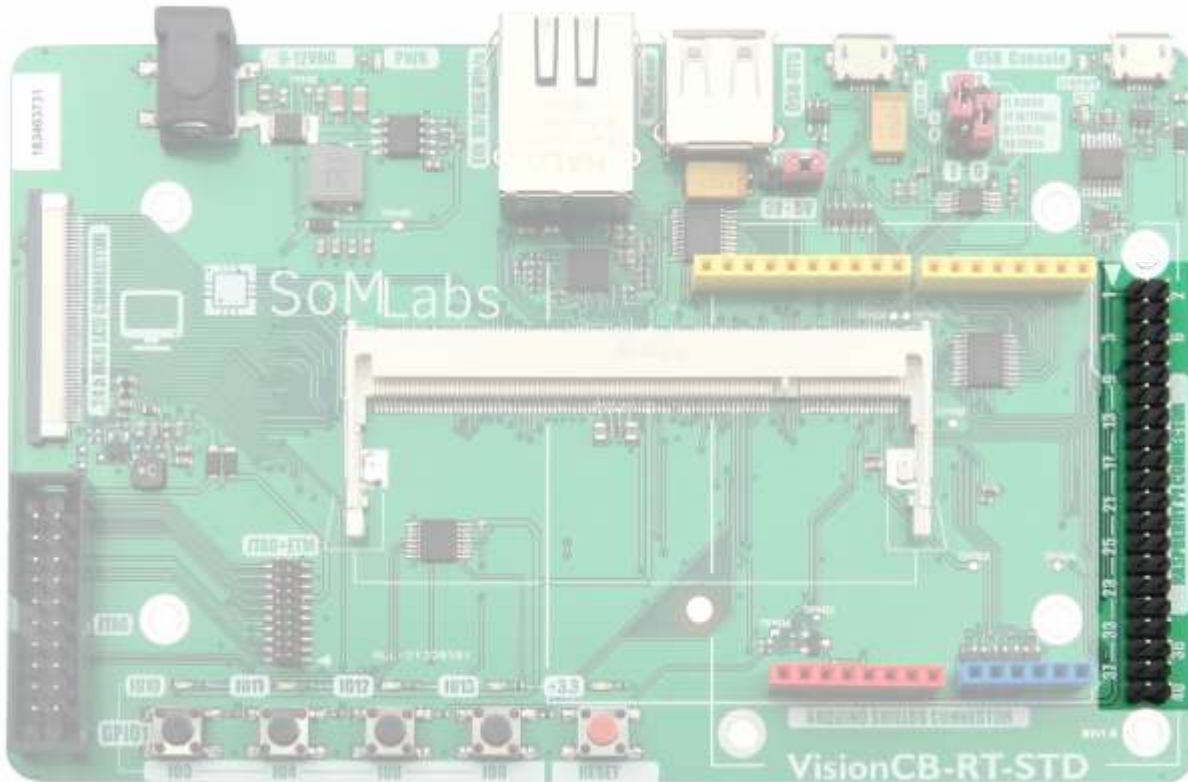
JTAG+ETM Connector	Default function name	MCU pin name
1	VCC-3V3	NA

2	JTAG-TMS	GPIO_AD_B0_06
3	GND	NA
4	JTAG-TCK	GPIO_AD_B0_07
5	GND	NA
6	JTAG-TDO	GPIO_AD_B0_10
7	-	NA
8	JTAG-TDI	GPIO_AD_B0_09
9	-	NA
10	POR-B	POR-B
11	5V-Supply (IN)	NA
12	LCD-DATA13	GPIO_B0_12
13	5V-Supply (IN)	NA
14	LCD-DATA3	GPIO_B0_04
15	GND	NA
16	LCD-DATA4	GPIO_B0_05
17	GND	NA
18	LCD-DATA5	GPIO_B0_06
19	GND	NA
20	LCD-DATA6	GPIO_B0_07

Note:

1. NA - not available.

## Raspberry Pi compatible I/O header (J504)



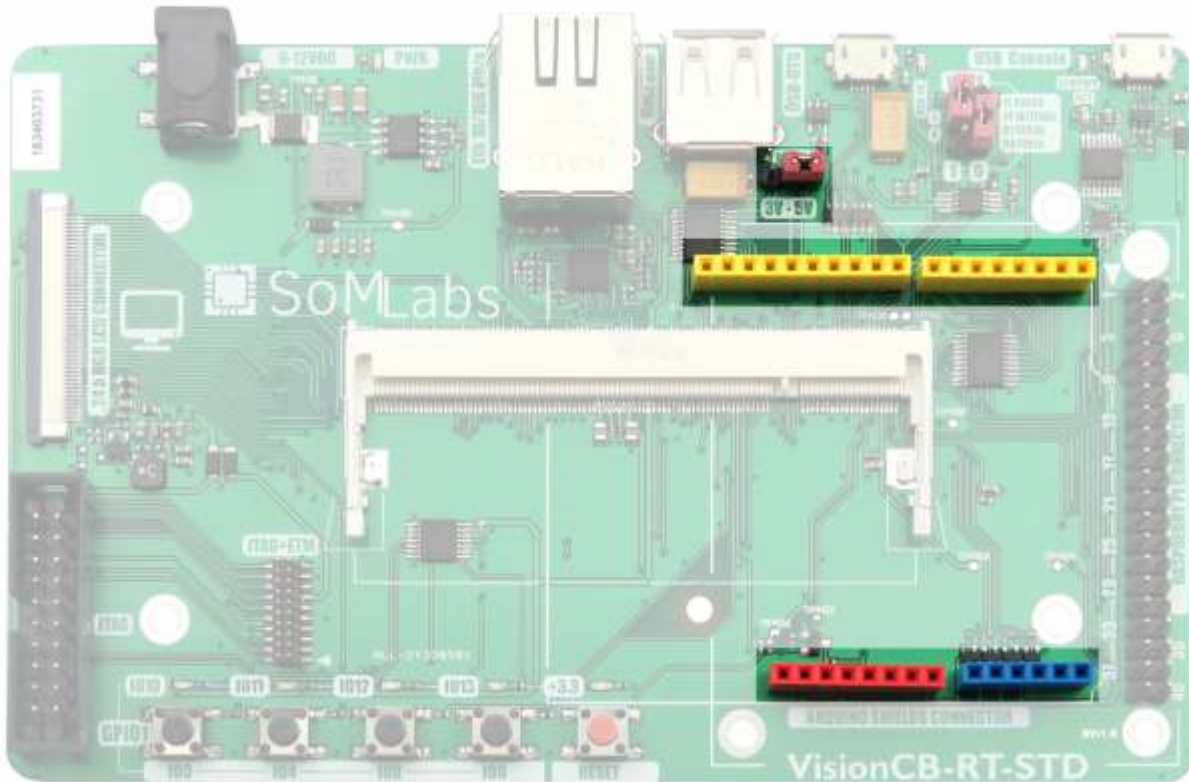
J504 Pin	Default function name	MCU pin name	Description
1	VCC-3V3	NA	+3.3V generated by internal SOM LDO converter (limited load current).
2	VCC-5V0	NA	+5V generated by carrier board built-in DC/DC converter.
3	UART5-RXD	GPIO_B1_13	Default: UART5 RxD input or universal GPIO with 3.3V logic levels.
4	VCC-5V0	NA	+5V generated by carrier board built-in DC/DC converter.
5	UART5-TXD	GPIO_B1_12	Default: UART5 TxD output or universal GPIO with 3.3V logic levels.
6	GND	NA	-
7	ENET2-TXD0	GPIO_B1_15	Default: ENET2 TXD0 line or universal GPIO with 3.3V logic levels.
8	UART4-TXD	NC	-
9	GND	NA	-
10	UART4-RXD	NC	-
11	ENET2_CRS_DV	GPIO_AD_B1_15	Default: ENET2 CRS_DV line or universal GPIO with 3.3V logic levels.
12	GPIO5	GPIO_AD_B1_11	Universal GPIO with 3.3V logic levels.
13	UART1-CTS	GPIO_AD_B0_14	Default: UART1 CTS line or universal GPIO with 3.3V logic levels.
14	GND	NA	-
15	UART1-RTS	GPIO_AD_B0_15	Default: UART1 RTS line or universal GPIO with 3.3V logic levels.
16	GPIO8	GPIO_AD_B1_09	Universal GPIO with 3.3V logic levels.
17	VCC-3V3	NA	+3.3V generated by internal SOM LDO converter (limited load current)
18	GPIO9	GPIO_B1_14	Universal GPIO with 3.3V logic levels.
19	UART2-CTS	GPIO_AD_B1_00	Default: UART2 CTS line or universal GPIO with 3.3V logic levels.
20	GND	NA	-

21	UART2-RTS	GPIO_AD_B1_01	Default: UART2 RTS line or universal GPIO with 3.3V logic levels.
22	GPIO0	GPIO_AD_B0_00	Universal GPIO with 3.3V logic levels.
23	UART2-RXD	GPIO_AD_B1_03	Default: UART2 RXD input or universal GPIO with 3.3V logic levels.
24	UART2-TXD	GPIO_AD_B1_02	Default: UART2 TXD input or universal GPIO with 3.3V logic levels.
25	GND	NA	-
26	ENET2_TXEN	GPIO_AD_B1_12	Default: ENET2 TXEN line or universal GPIO with 3.3V logic levels.
27	-	NA	-
28	-	NA	-
29	ENET2_TX_CLK	NC	-
30	GND	NA	-
31	ENET2_RXER	NC	-
32	JTAG-MOD	GPIO_AD_B0_08	Default: JTAG MOD input or universal GPIO with 3.3V logic levels. Pulled down with 4k7 resistor.
33	UART3-CTS	GPIO_AD_B1_04	Default: UART3 CTS line or universal GPIO with 3.3V logic levels.
34	GND	NA	-
35	UART3-RTS	GPIO_AD_B1_05	Default: UART3 RTS line or universal GPIO with 3.3V logic levels.
36	JTAG-TDO	GPIO_AD_B0_10	Default: JTAG TDO output or universal GPIO with 3.3V logic levels.
37	ENET2-RXD1	NC	-
38	JTAG-TDI	GPIO_AD_B0_09	Default: JTAG TDI input or universal GPIO with 3.3V logic levels.
39	GND	NA	-
40	JTAG-TMS	GPIO_AD_B0_06	Default: JTAG TMS output or universal GPIO with 3.3V logic levels.

Notes:

1. NC - not internally connected.
1. NA - not available.

## Arduino compatible I/O headers (J500-J503)



Pin	Arduino name	Default function name	MCU pin name	Description
Power connector J500, red connector				
1	-	-	-	-
2	IOREF	VCC-3V3	-	+3.3V generated by internal SOM LDO converter (load current limited to 500 mA).
3	RESET	POR-B	POR-B	External reset input, active L.
4	3.3V	VCC-3V3	-	Reference voltage +3.3V generated by internal SOM LDO converter (load current limited to 500 mA).
5	5V	VCC-5V0	-	Reference voltage +5V generated by carrier board built-in DC/DC converter.
6	GND	GND	-	-
7	GND	GND	-	-
8	VIN	VCC-3V3	-	+3.3V generated by internal SOM LDO converter (load current limited to 500 mA).
Analog inputs connector J501, blue connector				
1	AIN0	GPIO-0	GPIO_AD_B0_00	Analog input or universal GPIO with 3.3V logic levels (added 1k resistor in series and 3.3V voltage limiter).
2	AIN1	GPIO-5	GPIO_AD_B1_11	Analog input or universal GPIO with 3.3V logic levels (added 1k resistor in series and 3.3V voltage limiter).

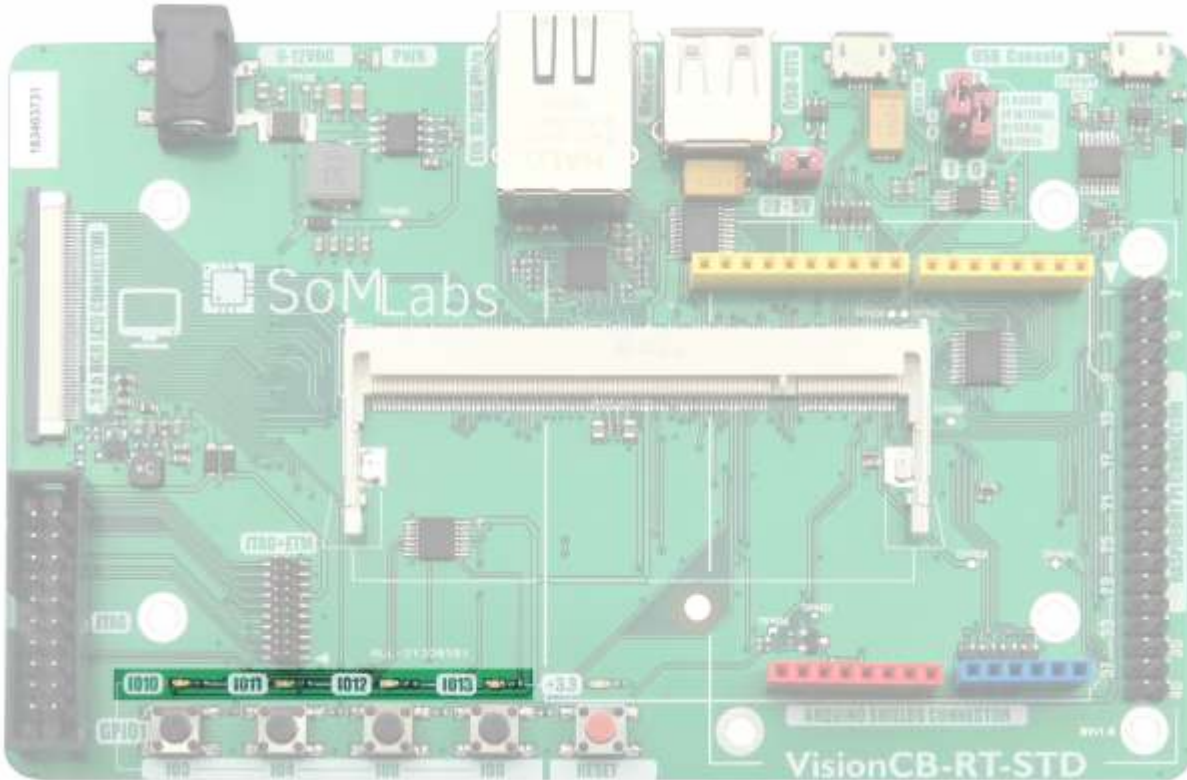
3	AIN2	GPIO8	GPIO_AD_B1_09	Analog input or universal GPIO with 3.3V logic levels (added 1k resistor in series and 3.3V voltage limiter).
4	AIN3	GPIO9	GPIO_B1_14	Analog input or universal GPIO with 3.3V logic levels (added 1k resistor in series and 3.3V voltage limiter).
5	-	-	-	-
6	-	-	-	-
Digital I/Os connector J503, yellow connector				
1	DIO0	UART4-RXD	NC(1)	-
2	DIO1	UART4-TXD	NC(1)	-
3	DIO2	UART3-RTS	GPIO_AD_B1_05	Default: UART3 RTS line or universal GPIO with 5V logic levels.
4	DIO3	UART3-CTS	GPIO_AD_B1_04	Default: UART3 CTS line or universal GPIO with 5V logic levels.
5	DIO4	ENET2_RXER	NC(1)	-
6	DIO5	ENET2_TX_CLK	NC(1)	-
7	DIO6	UART1-RTS	GPIO_AD_B0_15	Default: UART1 RTS line or universal GPIO with 5V logic levels.
8	DIO7	UART1-CTS	GPIO_AD_B0_14	Default: UART1 CTS line or universal GPIO with 5V logic levels.
Digital I/Os connector J502, yellow connector				
1	DIO8	ENET2_TXD0	GPIO_B1_15	Default: ENET2 TXD0 line or universal GPIO with 5V logic levels.
2	DIO9	ENET2_CRS_DV	GPIO_AD_B1_15	Default: ENET2 CRS DV line or universal GPIO with 5V logic levels.
3	DIO10	UART2-TXD	GPIO_AD_B1_02	Default: UART2 TXD line or universal GPIO with 5V logic levels.
4	DIO11	UART2-CTS	GPIO_AD_B1_00	Default: UART2 CTS line or universal GPIO with 5V logic levels.
5	DIO12	UART2-RTS	GPIO_AD_B1_01	Default: UART2 RTS line or universal GPIO with 5V logic levels.
6	DIO13	UART2-RXD	GPIO_AD_B1_03	Default: UART2 RXD line or universal GPIO with 5V logic levels.
7	GND	GND	-	
8	AREF	VCC-3V3	+3.3V generated by internal SOM LDO converter (load current limited to 500 mA).	
9	DIO14-SCL	UART5-RXD	GPIO_B1_13	Default: UART5 RXD line or universal GPIO with 5V logic levels.
10	DIO15-SDA	UART5-TXD	GPIO_B1_12	Default: UART5 TXD line or universal GPIO with 5V logic levels.

Notes:

1. Depends on MCU type. 2. All digital I/O lines are 5V compatible.
3. RESET line is 5V compatible.
4. Preferred voltage range on AIN0...AIN3 lines is 0...+3.3V.
5. Voltage level compatibility can be changed to +3.3V by JP3 selector, but voltage range on AIN0...AIN3 lines must be 0...+3.3V.



## User LEDs connections

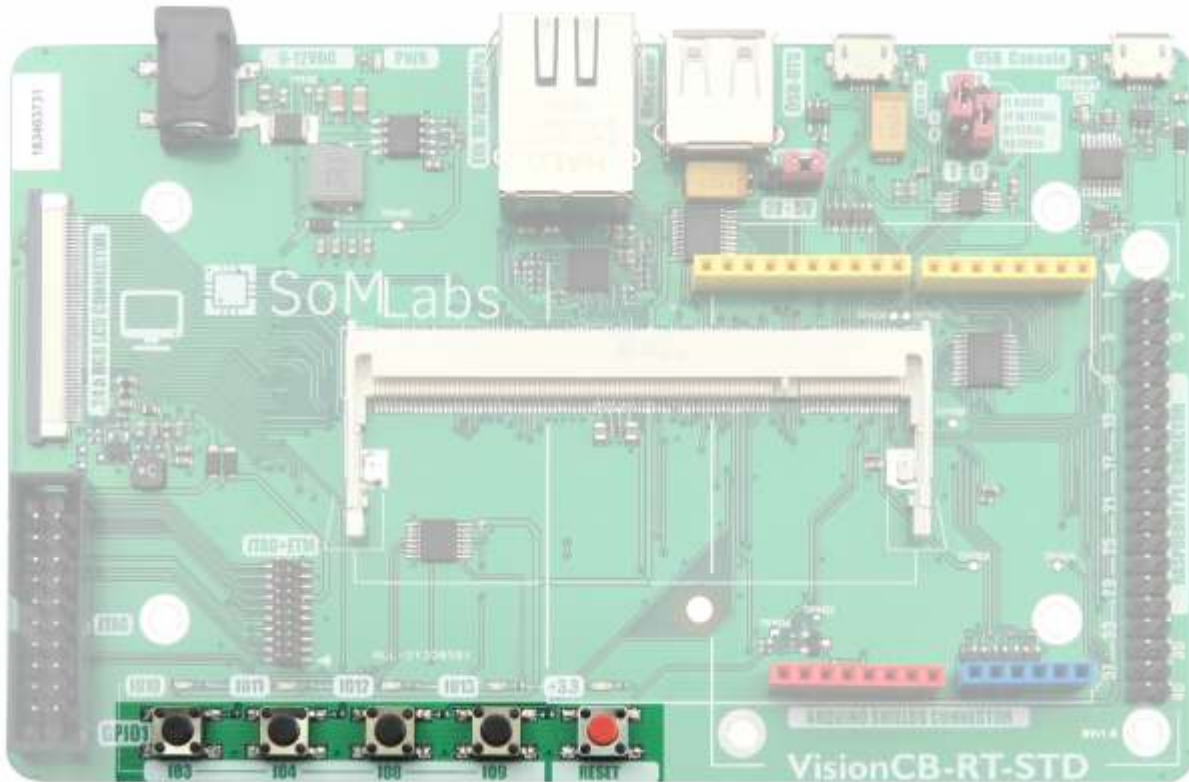


LED	PCB designation	MCU pin name	Description
D400/blue	GPIO10	GPIO_AD_B0_08	Default: JTAG MOD input or universal GPIO with 3.3V logic levels.
D401/green	GPIO11	GPIO_AD_B0_06	Default: JTAG TMS input or universal GPIO with 3.3V logic levels.
D403/yellow	GPIO12	GPIO_AD_B0_10	Default: JTAG TDO input or universal GPIO with 3.3V logic levels.
D402/red	GPIO13	GPIO_AD_B0_09	Default: JTAG TDI input or universal GPIO with 3.3V logic levels.

### Notes:

1. LEDs are switched on by logic „1“ set at the GPIO outputs.
2. LEDs are controlled by current drivers and do not load the GPIOs.

## User switches connections

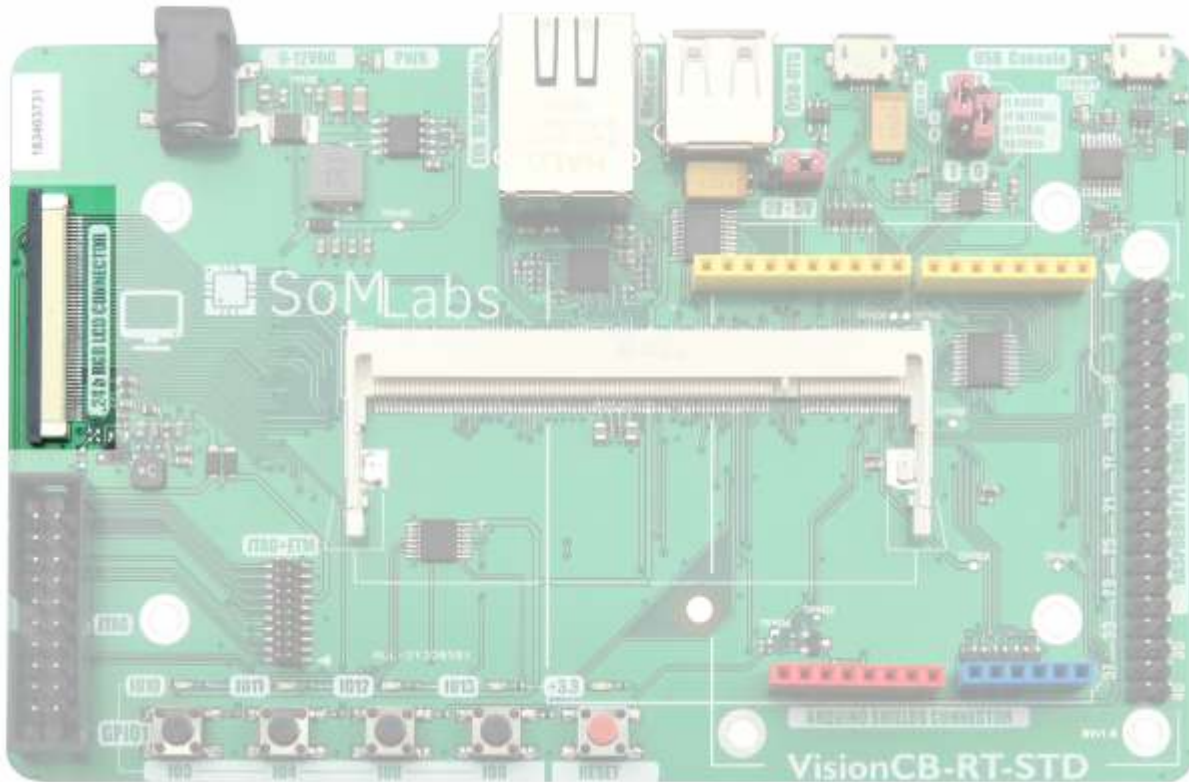


Switch	PCB designation	MCU pin name	Description
S402	GPIO3	GPIO_AD_B0_03	Universal GPIO with 3.3V logic levels.
S403	GPIO4	GPIO_AD_B0_04/BOOT0	Universal GPIO with 3.3V logic levels.
S404	GPIO8	GPIO_AD_B1_09	Universal GPIO with 3.3V logic levels.
S405	GPIO9	GPIO_B1_14	Universal GPIO with 3.3V logic levels.

### Notes:

1. After button pressing on GPIO lines are set to „0”.
2. GPIO lines connected to switches are separated from board’s environment by 1k resistors.

## TFT LCD connector (RGB 24b, J405)



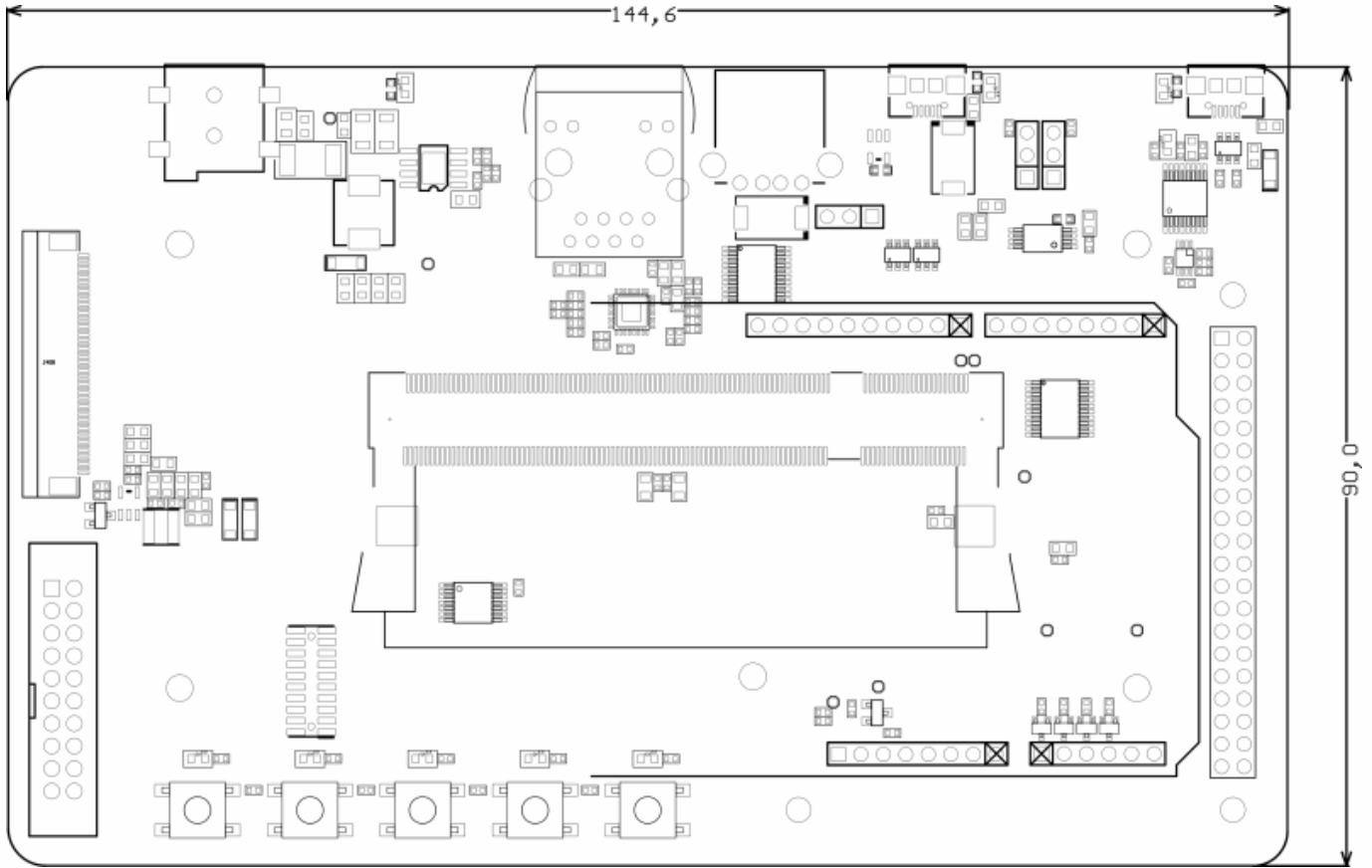
J405 pin	Default function name	MCU pin name	LCD interface name
1	LCD-DATA0	Internally connected to GND	LCD-B0
2	LCD-DATA1	Internally connected to GND	LCD-B1
3	LCD-DATA2	Internally connected to GND	LCD-B2
4	LCD-DATA3	GPIO_B0_04	LCD-B3
5	LCD-DATA4	GPIO_B0_05	LCD-B4
6	LCD-DATA5	GPIO_B0_06	LCD-B5
7	LCD-DATA6	GPIO_B0_07	LCD-B6
8	LCD-DATA7	GPIO_B0_08	LCD-B7
9	GND	-	GND
10	LCD-DATA8	Internally connected to GND	LCD-G0
11	LCD-DATA9	Internally connected to GND	LCD-G1
12	LCD-DATA10	GPIO_B0_09	LCD-G2
13	LCD-DATA11	GPIO_B0_10	LCD-G3
14	LCD-DATA12	GPIO_B0_11	LCD-G4
15	LCD-DATA13	GPIO_B0_12	LCD-G5
16	LCD-DATA14	GPIO_B0_13	LCD-G6
17	LCD-DATA15	GPIO_B0_14	LCD-G7
18	GND	-	GND
19	LCD-DATA16	Internally connected to GND	LCD-R0
20	LCD-DATA17	Internally connected to GND	LCD-R1
21	LCD-DATA18	Internally connected to GND	LCD-R2

22	LCD-DATA19	GPIO_B0_15	LCD-R3
23	LCD-DATA20	GPIO_B1_00	LCD-R4
24	LCD-DATA21	GPIO_B1_01	LCD-R5
25	LCD-DATA22	GPIO_B1_02	LCD-R6
26	LCD-DATA23	GPIO_B1_03	LCD-R7
27	GND	-	GND
28	LCD-DE	GPIO_B0_01	DE
29	LCD-HSYNC	GPIO_B0_02	HSYNC
30	LCD-VSYNC	GPIO_B0_03	VSYNC
31	GND	-	GND
32	LCD-PCLK	GPIO_B0_00	DCLK
33	GND	-	GND
34	GPIO4	GPIO_AD_B0_04	TS-YPUL
35	GPIO3	GPIO_AD_B0_03	TS-YNUR
36	GPIO2	GPIO_AD_B0_02	TS-YPLL
37	GPIO1	GPIO_AD_B0_00	TS-YNLR
38	-	-	-
39	-	-	-
40	-	-	-
41	-	-	-
42	UART5-TXD	GPIO_B1_12	I2C-SCL
43	UART5-RXD	GPIO_B1_13	I2C-SDA
44	GND	-	GND
45	VCC-LCD	-	+3.3V (controlled by GPIO_AD_B0_11/JTAG-TRSTB)
46	VCC-LCD	-	+3.3V (controlled by GPIO_AD_B0_11/JTAG-TRSTB)
47	VCC-5V0	-	+5.0V
48	VCC-5V0	-	+5.0V
49	LCD-RESET	GPIO_AD_B1_08	RESET
50	JTAG-nTRST	GPIO_AD_B0_11	PWREN

Note:

- When GPIO\_AD\_B0\_11/JTAG-TRSTB:  
 = '1' LCD module power supply is OFF.  
 = '0' LCD module power supply is ON.

# Dimensions





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