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VisionCB-RT-STD v.1.0 Datasheet and Pinout

Rev. 20200709131152

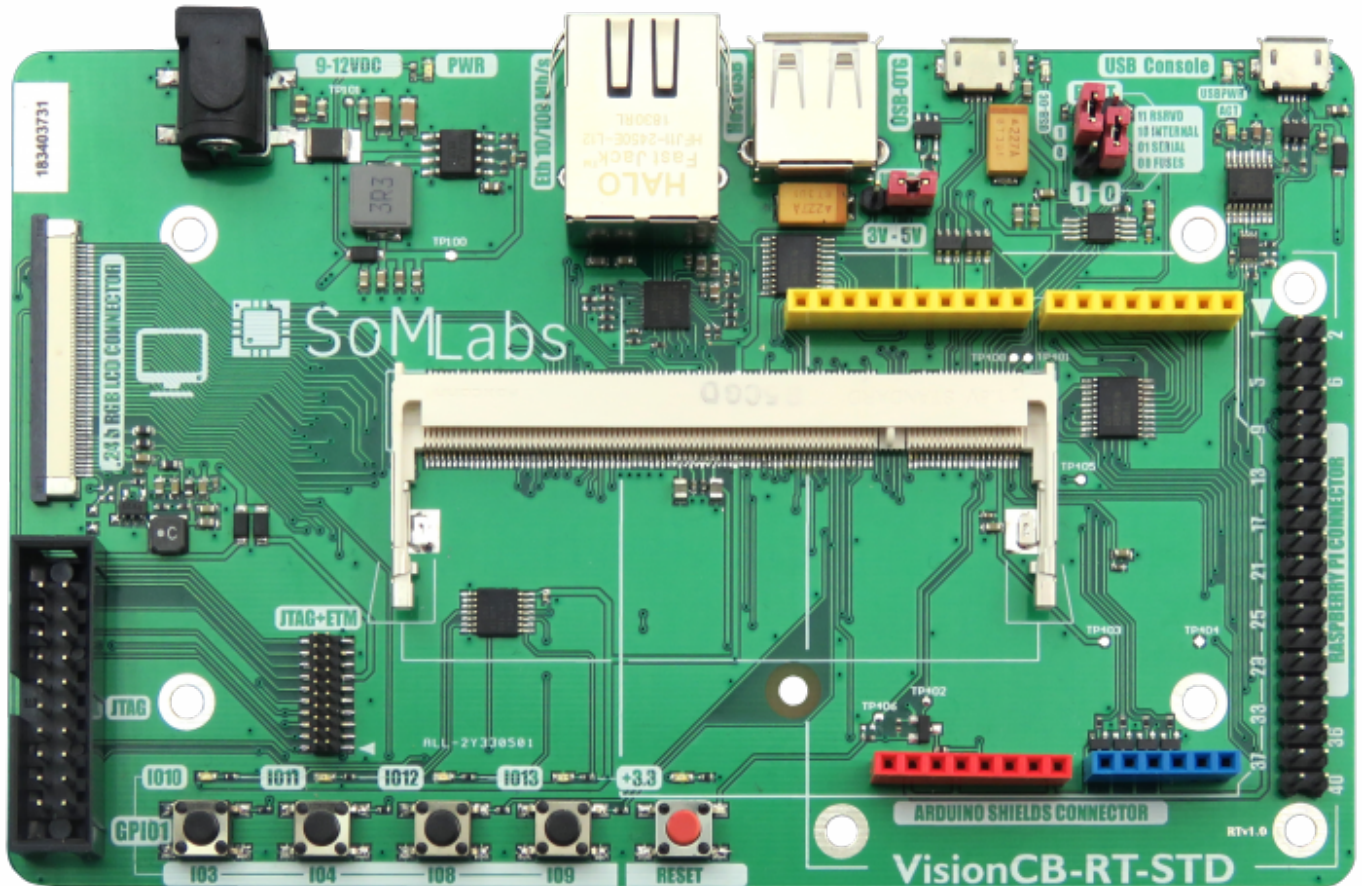
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VisionCB-RT-STD v.1.0 Datasheet and Pinout

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

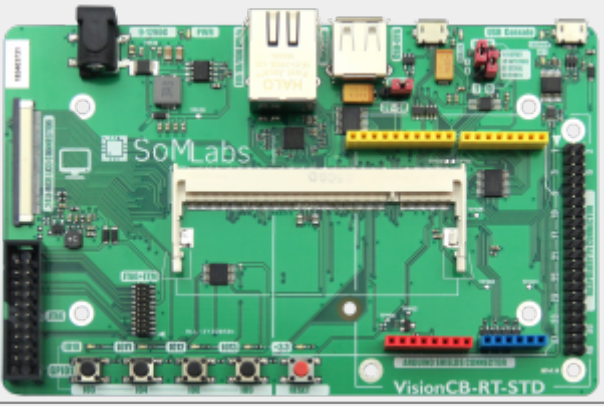
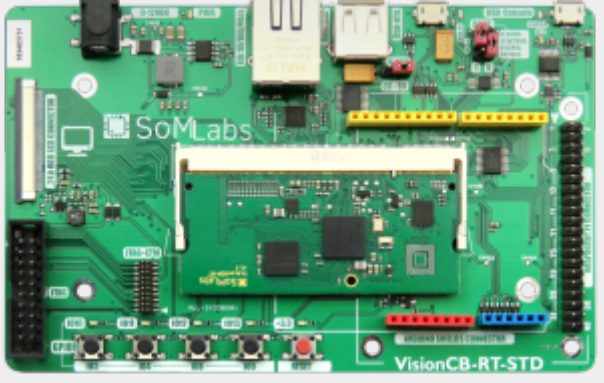
- Industrial embedded Linux computer
- Home Appliances
- Home Automation – Smart Home
- Human-machine Interfaces (HMI)
- Point-of-sales (POS) terminals
- Cash Register
- 2D barcode scanners and printers
- Smart grid Infrastructure
- IoT gateways
- Residential gateways
- Machine vision equipment

- 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

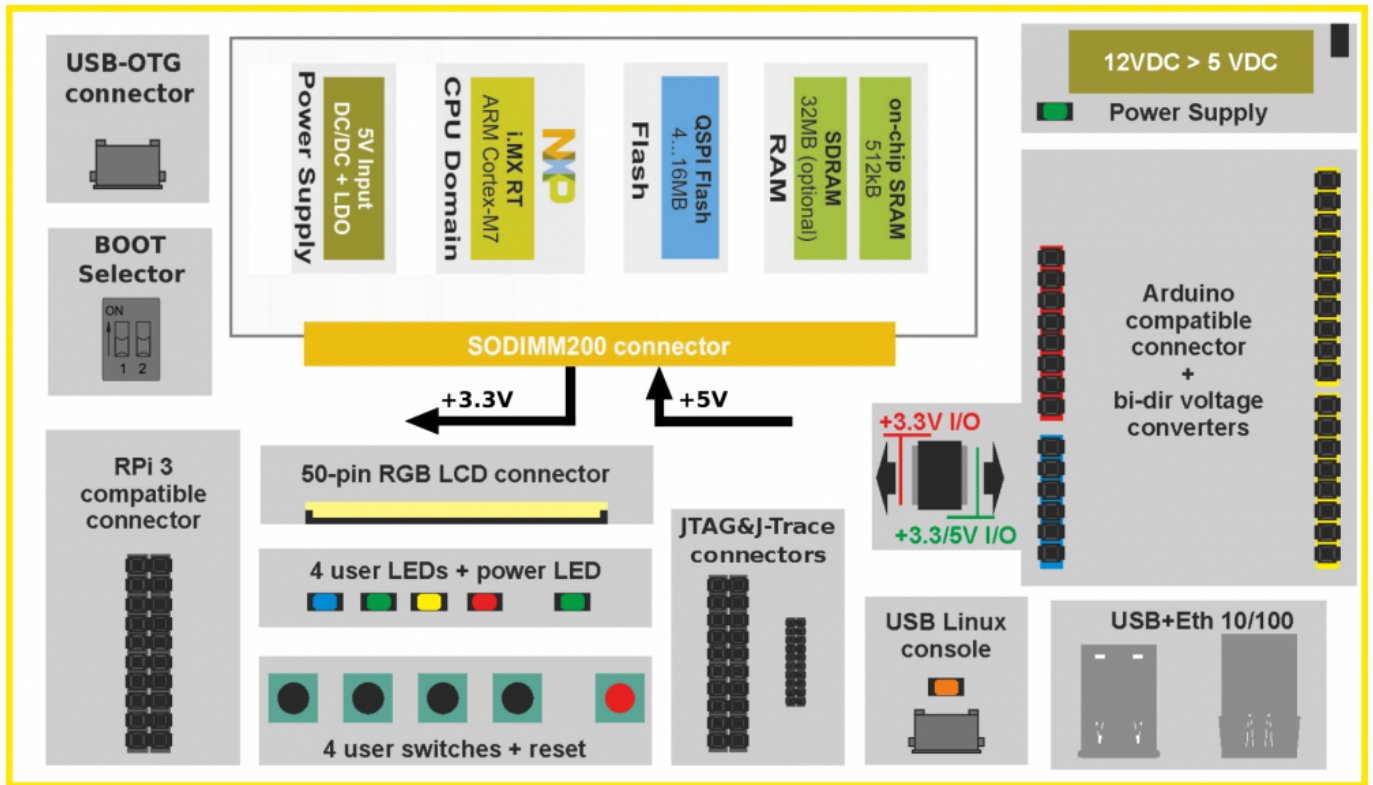
Pictures of VisionCB-RT-STD v1.0 board

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



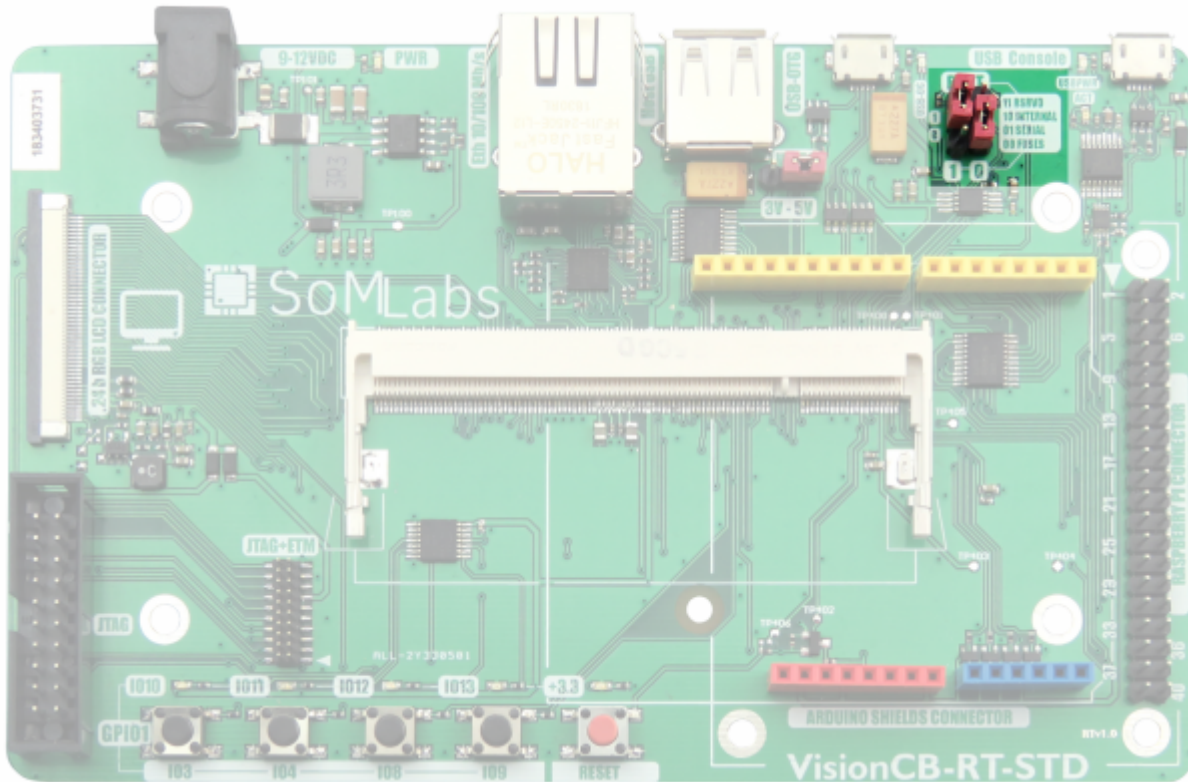
Electrical parameters

Parameter	Value			Units	Comment
	Min.	Typ.	Max.		
Power Supply (J100 input)	9.0	12.0	15.0	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

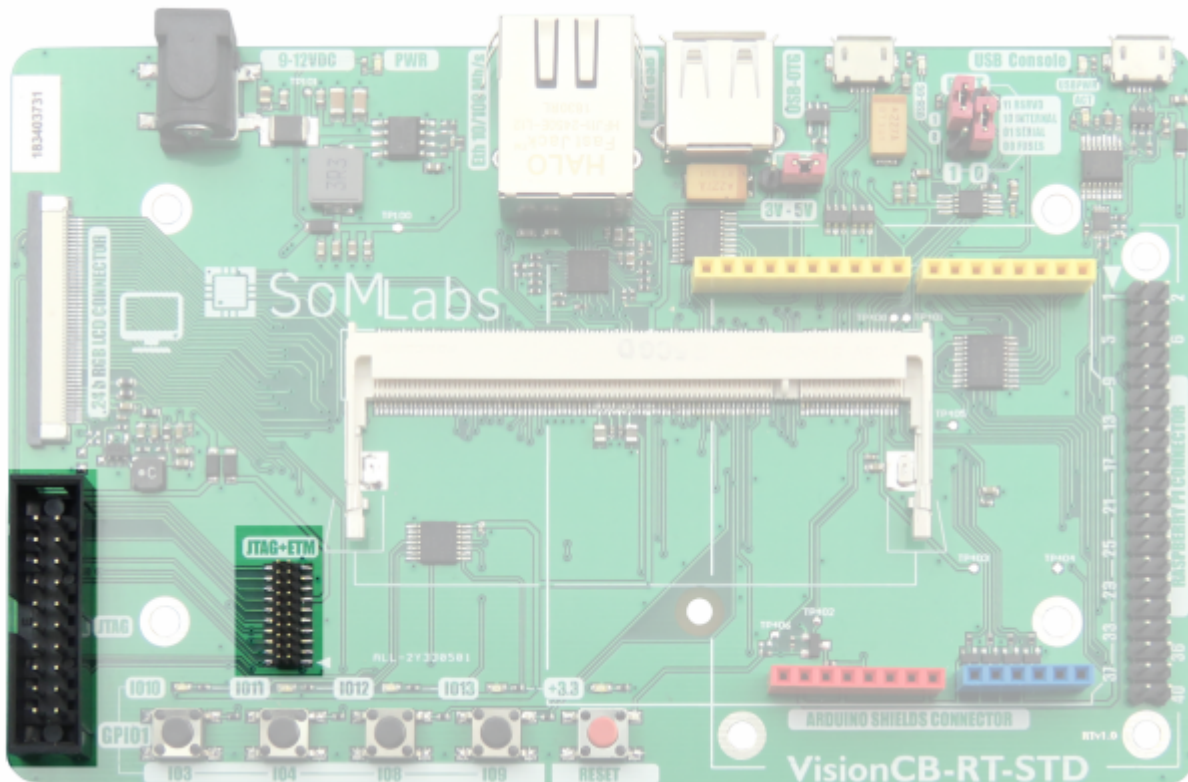


BOOTx		Boot Mode
BOOT1 GPIO_AD_B0_05	BOOT0 GPIO_AD_B0_04	
1	1	Reserved
1	0	Internal
0	1	Serial
0	0	Fuses

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

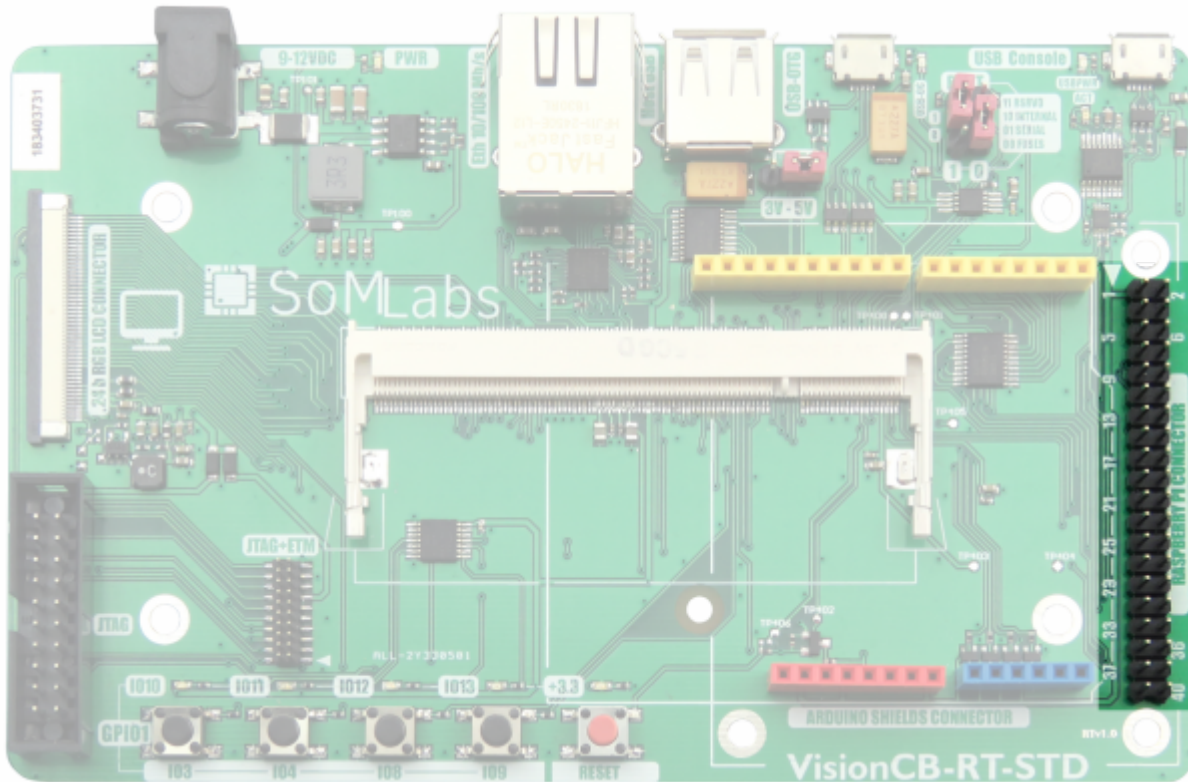
JTAG+ETM Connector	Default function name	MCU pin name
1	VCC-3V3	NA

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)



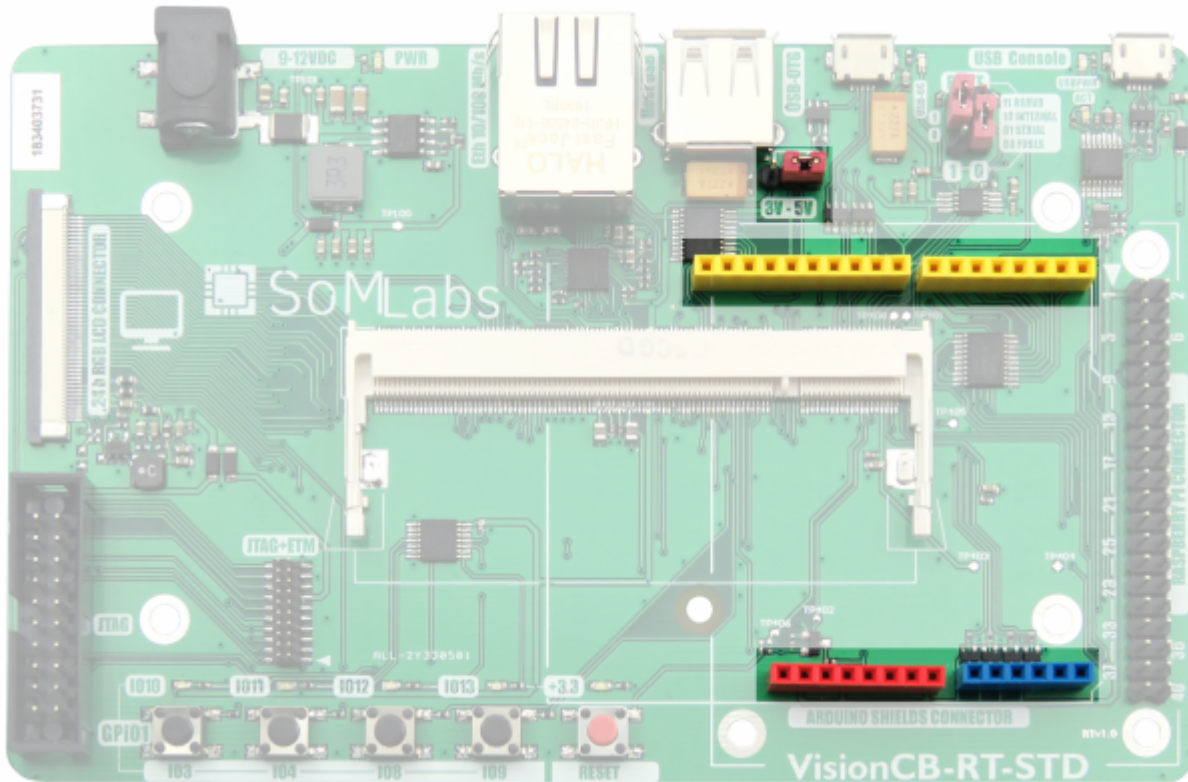
J504 Pin	Default function name	MCU pin name	Description
1	VCC-3V3	NA	+3.3V generated by internal SOM LDO converter (limited load current).
2	VCC-5V0	NA	+5V generated by carrier board built-in DC/DC converter.
3	UART5-RXD	GPIO_B1_13	Default: UART5 Rx/D input or universal GPIO with 3.3V logic levels.
4	VCC-5V0	NA	+5V generated by carrier board built-in DC/DC converter.
5	UART5-TXD	GPIO_B1_12	Default: UART5 Tx/D 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)



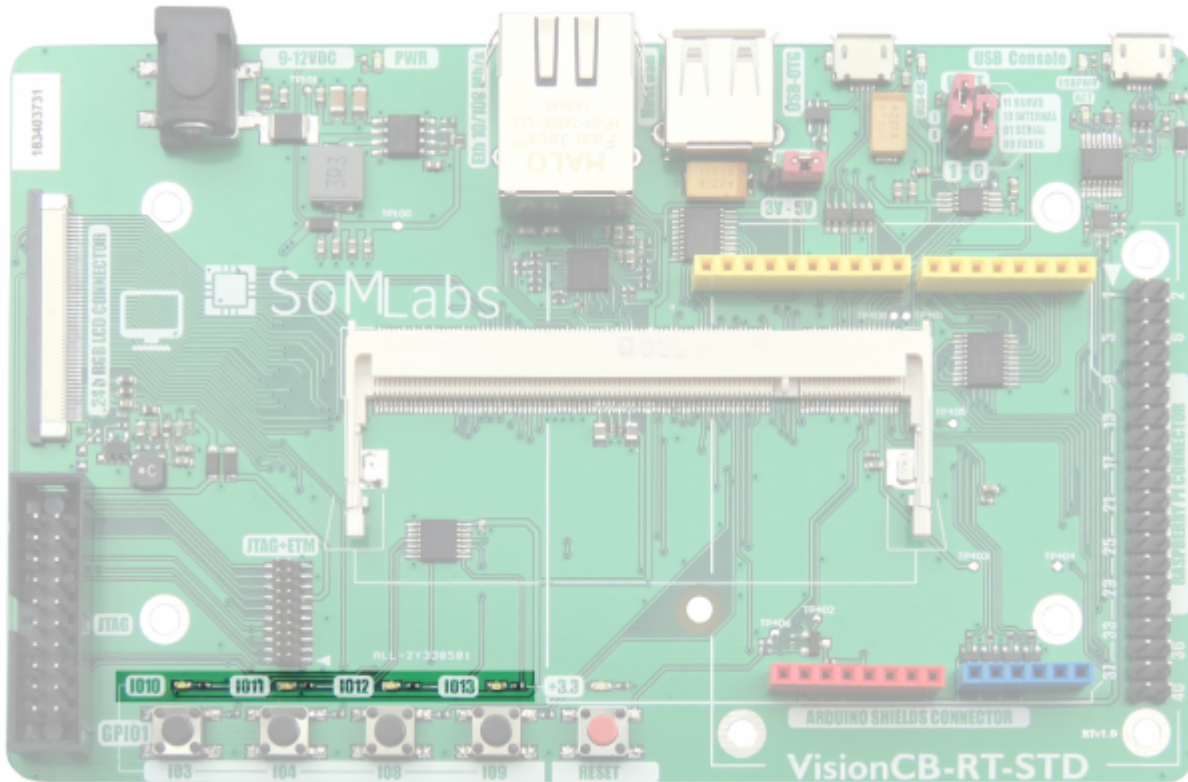
Pin	Arduino name	Default function name	MCU pin name	Description
Power connector J500, red connector				
1	-	-	-	-
2	IOREF	VCC-3V3	-	+3.3V generated by internal SOM LDO converter (load current limited to 500 mA).
3	RESET	POR-B	POR-B	External reset input, active L.
4	3.3V	VCC-3V3	-	Reference voltage +3.3V 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_CRSDV	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

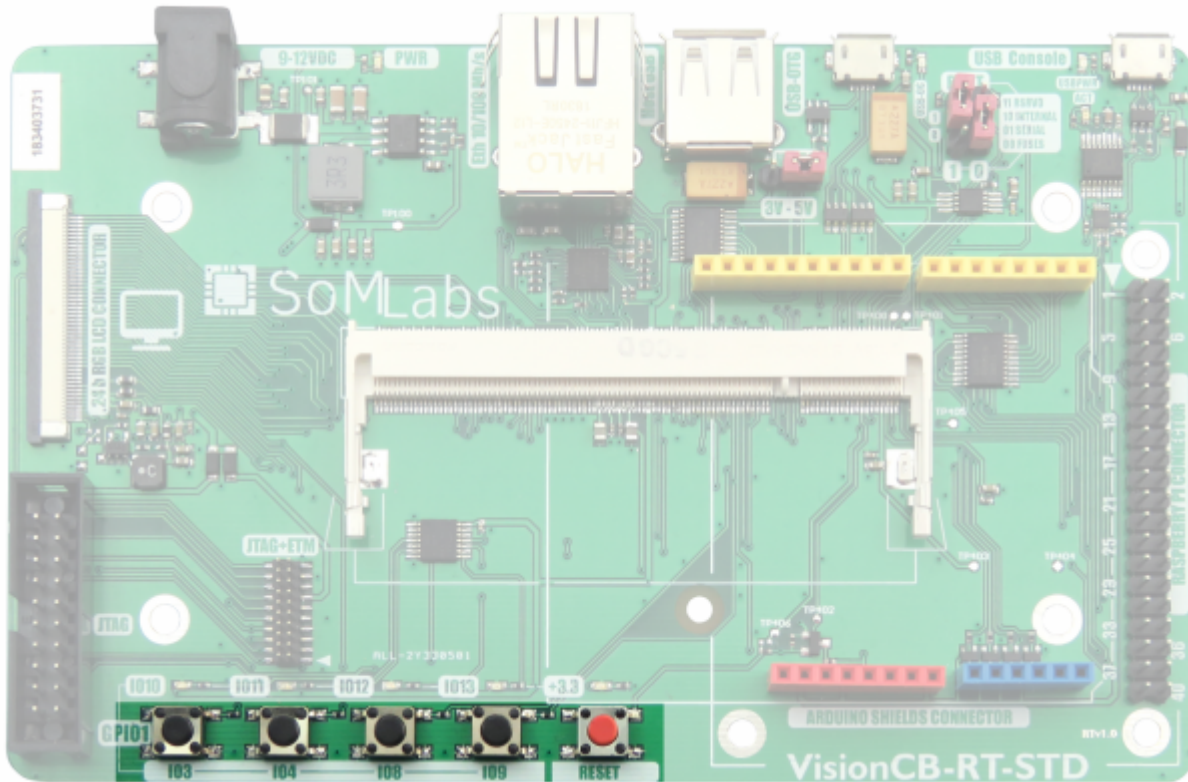


LED	PCB designation	MCU pin name	Description
D400/blue	GPIO10	GPIO_AD_B0_08	Default: JTAG MOD input or universal GPIO with 3.3V logic levels.
D401/green	GPIO11	GPIO_AD_B0_06	Default: JTAG TMS input or universal GPIO with 3.3V logic levels.
D403/yellow	GPIO12	GPIO_AD_B0_10	Default: JTAG TDO input or universal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

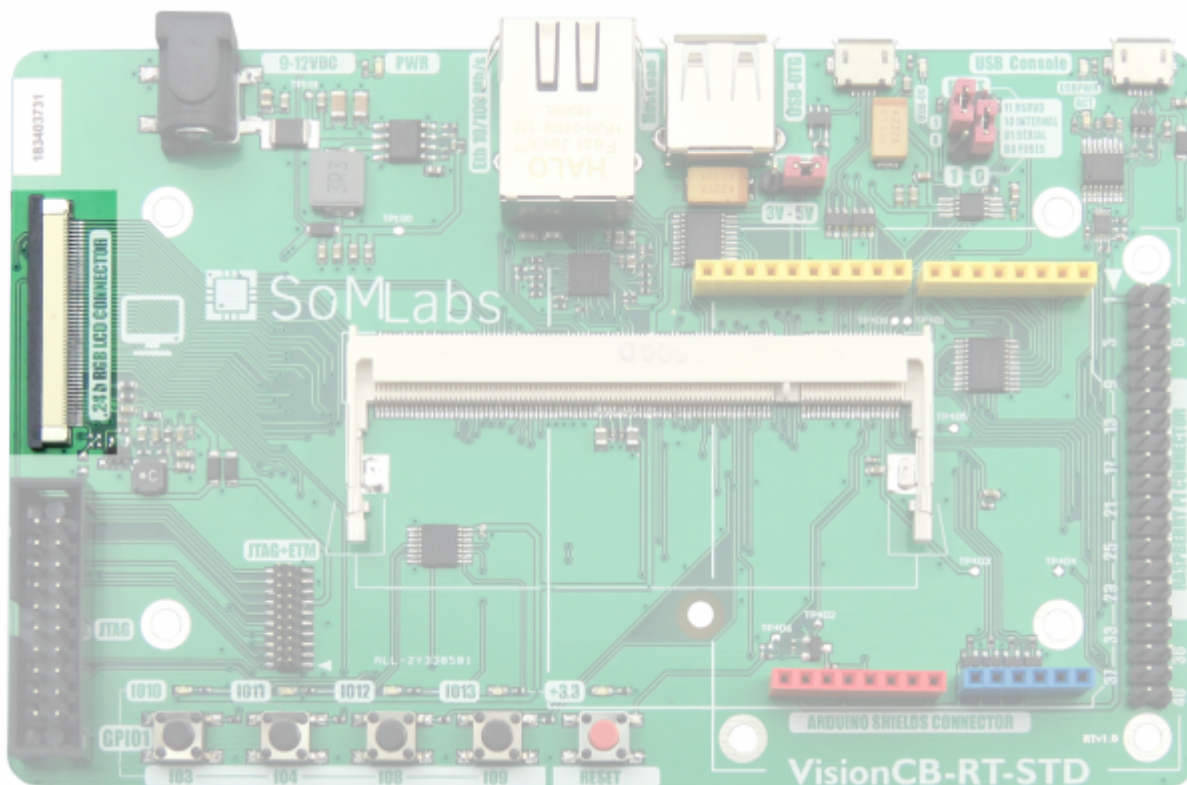


Switch	PCB designation	MCU pin name	Description
S402	GPIO3	GPIO_AD_B0_03	Universal GPIO with 3.3V logic levels.
S403	GPIO4	GPIO_AD_B0_04/BOOT0	Universal GPIO with 3.3V logic levels.
S404	GPIO8	GPIO_AD_B1_09	Universal GPIO with 3.3V logic levels.
S405	GPIO9	GPIO_B1_14	Universal GPIO with 3.3V logic levels.

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)



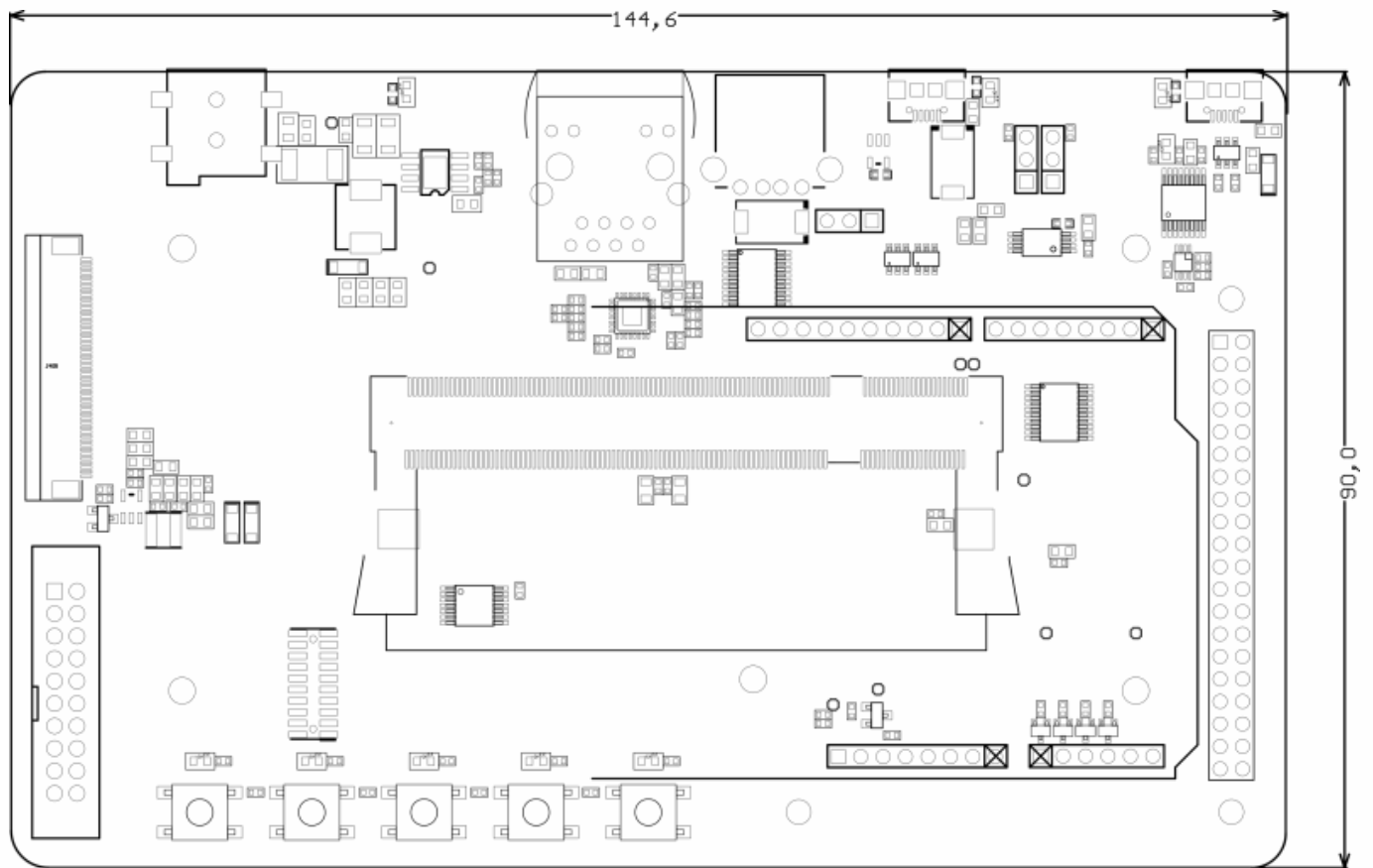
J405 pin	Default function name	MCU pin name	LCD interface name
1	LCD-DATA0	Internally connected to GND	LCD-B0
2	LCD-DATA1	Internally connected to GND	LCD-B1
3	LCD-DATA2	Internally connected to GND	LCD-B2
4	LCD-DATA3	GPIO_B0_04	LCD-B3
5	LCD-DATA4	GPIO_B0_05	LCD-B4
6	LCD-DATA5	GPIO_B0_06	LCD-B5
7	LCD-DATA6	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:

1. When GPIO_AD_B0_11/JTAG-TRSTB:
= '1' LCD module power supply is OFF.
= '0' LCD module power supply is ON.

Dimensions



**SoMLabs**

Lwowska 5
05-120 Legionowo
Poland
Tel. +48 22 767 36 20
Email: contact@somlabs.com
<http://somlabs.com>

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