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StarSBC-6ULL Datasheet and Pinout

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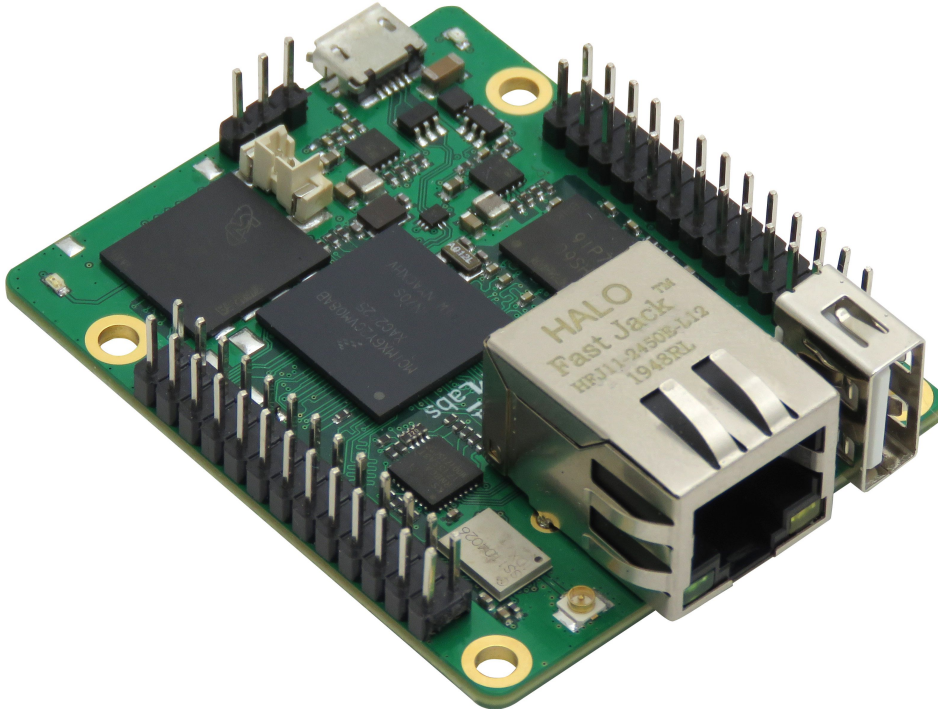
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StarSBC-6ULL Datasheet and Pinout

General description



The StarSBC-6ULL SBC (Single Board Computer) is small but powerful IoT Sensor Hub, optimized for operation in applications requiring a large number of communication interfaces. The StarSBC-6ULL is equipped with on-board PHY 10/100 Mb/s Ethernet interface, Murata 1DX radio module (integrated WiFi/BLE), USB host and USB-OTG interfaces. The StarSBC-6ULL supports connections to a variety of interfaces: I2C, SPI, UART and CAN. Additionally the StarSBC-6ULL module is equipped with easy to use 2x26 pin connectors with 40 GPIOs for any use in user application.

The StarSBC-6ULL can be optionally equipped with communication expander module SLH2-comm, which is equipped with 2 x CAN, 2 x RS485, 2 x RS232 physical layers interfaces.

The StarSBC-6ULL supports industrial grade embedded applications.

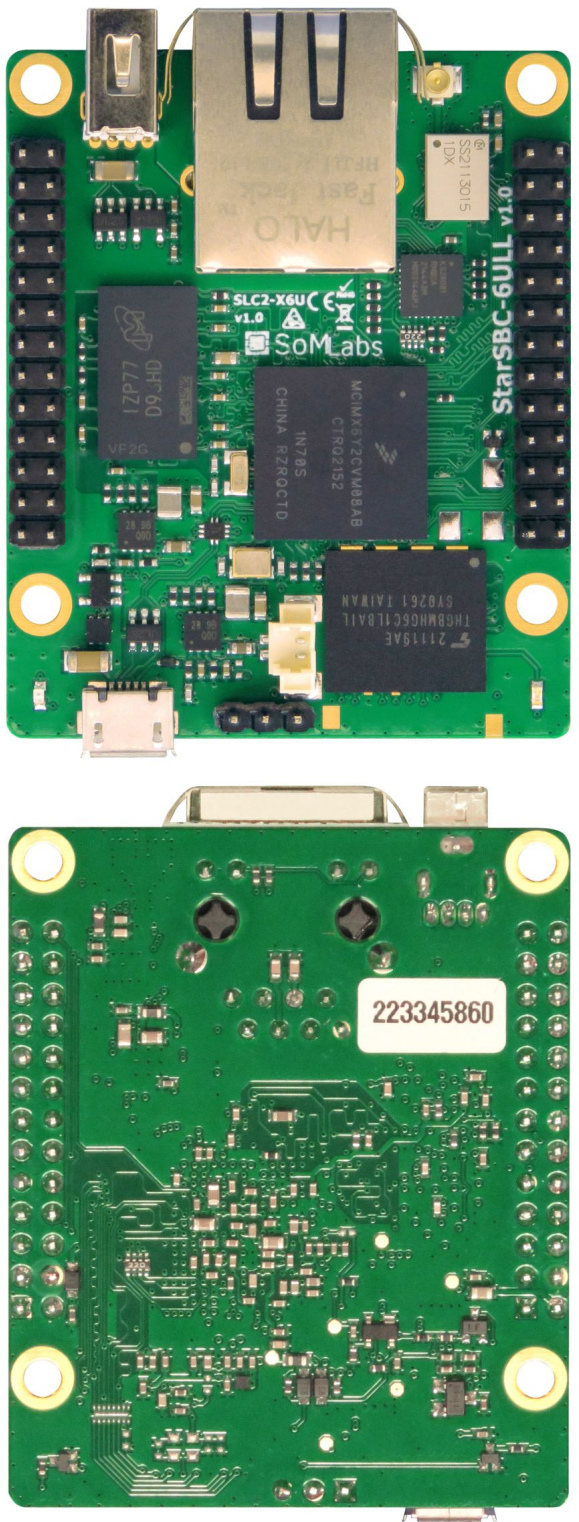
Applications

- IoT Sensor Hubs
- Home Appliances
- IoT gateways
- Protocol converters
- Home Automation - Smart Home
- Point-of-sales (POS) terminals
- Cash Register
- 2D barcode scanners and printers
- Smart grid infrastructure
- Residential gateways
- Outdoor equipment

Features

- Powered by NXP i.MX 6ULL application processor
- Core clock up to 900MHz
- Up to 1GB RAM DDR3L
- Up to 32GB eMMC
- Optional Murata 802.11b/g/n Wi-Fi and Bluetooth v5.1 module
- Power-efficient and cost-optimized solution
- Ideal for industrial IoT and embedded applications
- Integrated security features

Pictures of SBC versions

Version	Photo
eMMC	

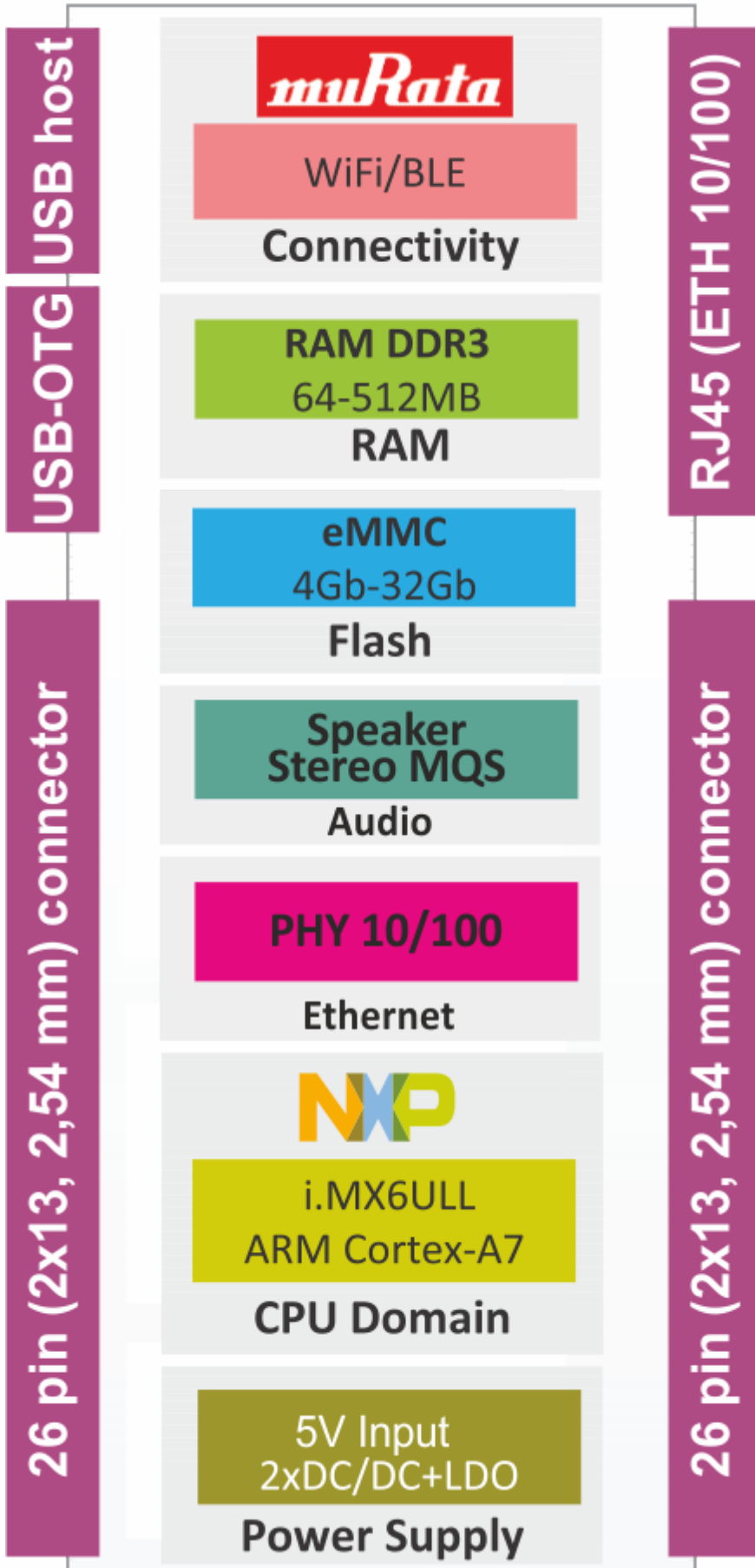
Wi-Fi and Ethernet PHY10/100 are available as an options.

Ordering info

SLC2X6CpuType_Clock_RamSize_FlashSize_SF_TEMP

SLC	Product type SLC - Single Board Computer
2	Form factor 2 - StarSOM
X6	CPU Family X6 - i.MX6
CpuType	CPU Type Y2 - i.MX6 ULL Y2
Clock	CPU Clock Speed 528C - 528MHz 792C - 792MHz 900C - 900MHz
RamSize	DDR3 RAM Size 64R - 64MB 128R - 128MB 256R - 256MB 512R - 512MB
FlashSize	Flash Size Type and Density 04GE - 4GB eMMC 08GE - 8GB eMMC 16GE - 16GB eMMC 32GE - 32GB eMMC
SF	Special Features 0SF - No Special Features 1WB - Built-in Murata 802.11b/g/n Wi-Fi/Bluetooth v5.1 2ET - Built-in Microchip 100Mb Ethernet PHY 3WE - Built-in Murata 802.11b/g/n Wi-Fi/Bluetooth v5.1 and Microchip 100Mb Ethernet PHY
TEMP	Operating Temperature C - Consumer: 0 to +70 C E - Extended: -25 to +70 C I - Industrial: -40 to +85 C

Block Diagram



Operating ranges

Parameter	Value	Unit	Comment
Power Supply	5	V	Connected to J100 or J101 or USB conenctors ¹
GPIO voltage	3.3	V	-
Environment temperature ²	-40...+85	°C	Industrial range w/o WiFi module
	-25...+70		Industrial (extended) range with WiFi module
	0...+70		Consumer range

Note:

1. Power supply can be delivered by two ways: J100/J101 or MicroUSB (OTG).
2. Maximum MPU junction temperature is +105°C (industrial version) or +95°C (consumer version).

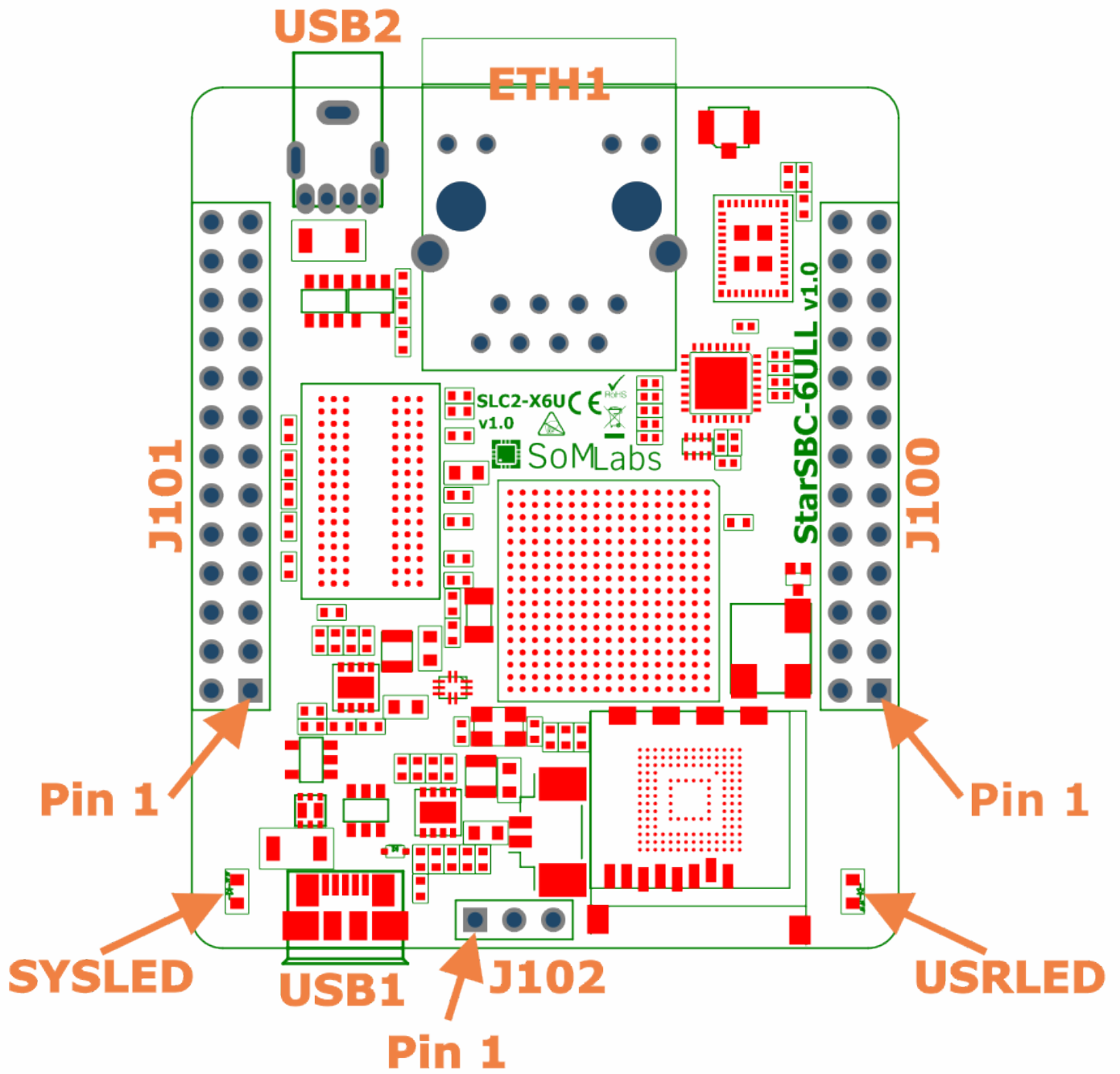
Electrical parameters

SBC signal name	Parameter	Value			Units
		Min.	Typ.	Max.	
+5V	SBC supply voltage ¹	4.85	5	5.15	V
+3.3VO	Supply voltage for external peripherals	3.2	3.3	3.35	V
VGPI0	GPIO Input Voltage	0	3.3	3.6 ²	V
I _{+5V}	Total Supply Current	TBD	TBD	TBD	mA
I _{+3.3VO}	Output current of 3.3V power supply for peripherals	-	-	0.1	A
V _{BATT}	RTC/SNVS Backup Battery Supply	2.66	-	3.6	V

Notes:

1. The external voltage connected to pin 2 of J100 and/or J101 or MicroUSB.
2. Applying the maximum voltage 3.6V results in shorten lifetime. Recommended value is smaller than 3.5V.

GPIO connections



Connector pin number	Default function	GPIO	Ball number BGA289	Notes
J100				
1	+3,3VO			+3,3V power output (max. 100 mA) - paralelly connected to pin 1 of J101
2	+5V			External power supply (power source) 5V - paralelly connected to pin 2 of J101
3	UART8-RXD	ENET2_TX_EN	B15	
4	GND			

5	UART8-TXD	ENET2_TX_DATA1	A16	
6	UART3-TXD	UART3_TX_DATA	H17	
7	PWM5	LED_DATA18	A13	
8	UART3-RXD	UART3_RX_DATA	H16	
9	GND			
10	UART3-CTS	UART3_CTS	H15	
11	UART4-RXD	LCD_ENABLE	B8	
12	UART3-RTS	UART3_RTS	G14	
13	UART4-TXD	LCD_CLK	A8	
14	GND			
15	I2C4-SDA	LCD_DATA02	E10	In I2C mode external pull-up resistor is necessary (no any internal pull-up)
16	I2C3-SDA	LCD_DATA00	B9	In I2C mode external pull-up resistor is necessary (no any internal pull-up)
17	I2C4-SCL	LCD_DATA03	D10	In I2C mode external pull-up resistor is necessary (no any internal pull-up)
18	I2C3-SCL	LCD_DATA01	A9	In I2C mode external pull-up resistor is necessary (no any internal pull-up)
19	ECSPI2-MOSI	UART5_TX_DATA	F17	
20	UART7-RXD	LCD_DATA16	C13	
21	ECSPI2-MISO	UART5_RX_DATA	G13	
22	UART7-TXD	LCD_DATA17	B13	
23	ECSPI2-SCLK	UART4_TX_DATA	G17	
24	UART7-CTS	LCD_DATA07	D11	
25	ECSPI2-CS	UART4_RX_DATA	G16	
26	UART7-RTS	LCD_DATA06	A10	
J101				
1	+3,3V0			+3,3V power output (max. 100 mA) - paralelly connected to pin 1 of J100
2	+5V			External power supply (power source) 5V - paralelly connected to pin 2 of J100
3	USB1-DP			Line connected to USB1 channel through MUX (output ENET2_RX_ER, ball D16 is USB1 connection selector). Connected to USB1-DP MPU line if ENET2_RX_ER="0" (USB1-SEL), in another case USB1-DP MPU line is connected to MicroUSB connector (USB-OTG).
4	GND			
5	USB1-DM			Line connected to USB1 channel through MUX (output ENET2_RX_ER, ball D16 is USB1 connection selector). Connected to USB1-DM MPU line if ENET2_RX_ER="0" (USB1-SEL), in another case USB1-DM MPU line is connected to MicroUSB connector (USB-OTG).
6	GPIO-6	GPIO1_IO06	K17	
7	GPIO3.17	LCD_DATA12	C12	
8	GPIO-7	GPIO1_IO07	L16	
9	GND			
10	GPIO-8	GPIO1_IO08	N17	

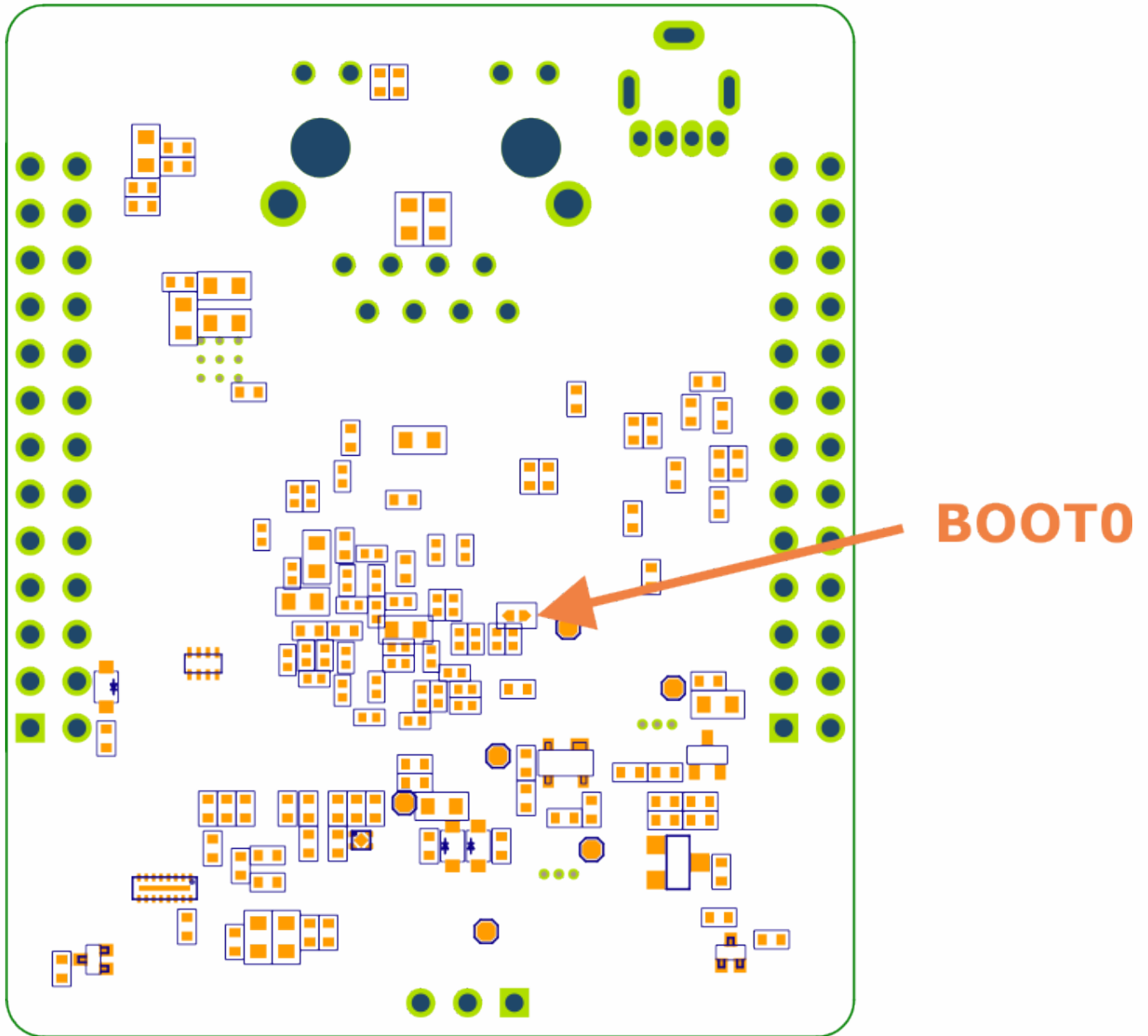
11	CAN1-TX	LCD_DATA08	B11	
12	GPIO-9	GPIO1_IO09	M15	
13	CAN1-RX	LCD_DATA09	A11	
14	GND			
15	CAN2-TX	LCD_DATA10	E12	
16	GPIO3.2	LCD_HSYNC	D9	
17	CAN2-RX	LCD_DATA11	D12	
18	GPIO3.3	LCD_VSYNC	C9	
19	MQS-R	LCD_DATA22	A14	
20	UART2-RXD	UART2_RX_DATA	J16	
21	MQS-L	LCD_DATA23	B16	
22	UART2-TXD	UART2_TX_DATA	J17	
23	GPIO3.25	LCD_DATA20	C14	
24	UART2-CTS	UART2_CTS	J15	
25	GPIO3.26	LCD_DATA21	B14	
26	UART2-RTS	UART2_RTS	H14	
J102				
1	UART1-TXD	UART1_TX_DATA	K14	TxD line of Linux console port (LV-TTL logic levels)
2	UART1-RXD	UART1_RX_DATA	K16	RxD line of Linux console port (LV-TTL logic levels)
3	GND			
Another functions				
	BUZZER	GPIO1_IO05	M17	Electromagnetic speaker control output (thru NPN driver)
	SYSLED	ENET2_TX_CLK	D17	System or user LED control output (heartbeat by default, thru NPN driver)
	USRLED	LCD_DATA14	A12	User LED control output (thru NPN driver)
	WDOG-B	LCD_RESET	E9	Used by system, do not modify default configuration
	ENET-MDIO	ENET2_RX_DATA0	C17	
	ENET-MDC	ENET2_RX_DATA1	C16	
	ENET1-RST	ENET2_RX_EN	B17	
	ENET1-INT	ENET2_TX_DATA0	A15	
	USB1-SEL	ENET2_RX_ER	D16	
	USB1-ID	GPIO1_IO00	K13	
	USB1-VBUS-OC	GPIO1_IO01	L15	
	USB1-VBUS-EN	GPIO1_IO04	M16	
	USB2-VBUS-OC	GPIO1_IO03	L17	
	USB2-VBUS-EN	GPIO1_IO02	L14	
WiFi and BLE module connection				
	BT-ENABLE	CSI_MCLK	F5	
	WLAN-HWAKE	CSI_PIXCLK	E5	
	BT-HWAKE	CSI_VSYNC	F2	
	BT-WAKE	CSI_HSYNC	F3	
	BT-RXD	CSI_DATA00	E4	UART5
	BT-TXD	CSI_DATA01	E3	UART5
	BT-RTS	CSI_DATA02	E2	UART5
	BT-RTS	CSI_DATA03	E1	UART5

	BT-PCM-SYNC	CSI_DATA04	D4	
	BT-PCM-CLK	CSI_DATA05	D3	
	BT-PCM-OUT	CSI_DATA06	D2	
	BT-PCM-IN	CSI_DATA07	D1	
	CLK32kHz	JTAG_CTK	M14	Clock output to 1DX radio module (WiFi/BLE)
	JTAG_MOD	JTAG_MOD	P15	Permanently connected to GND
	BOOT_MODE1	BOOT_MODE1	U10	Permanently connected to GND

Note:

1. WiFi radio module is connected to SDIO1 interface.
2. Power supply (5V) for SBC can be connected to pin 2 of J100 or 101 or MicroUSB connector.

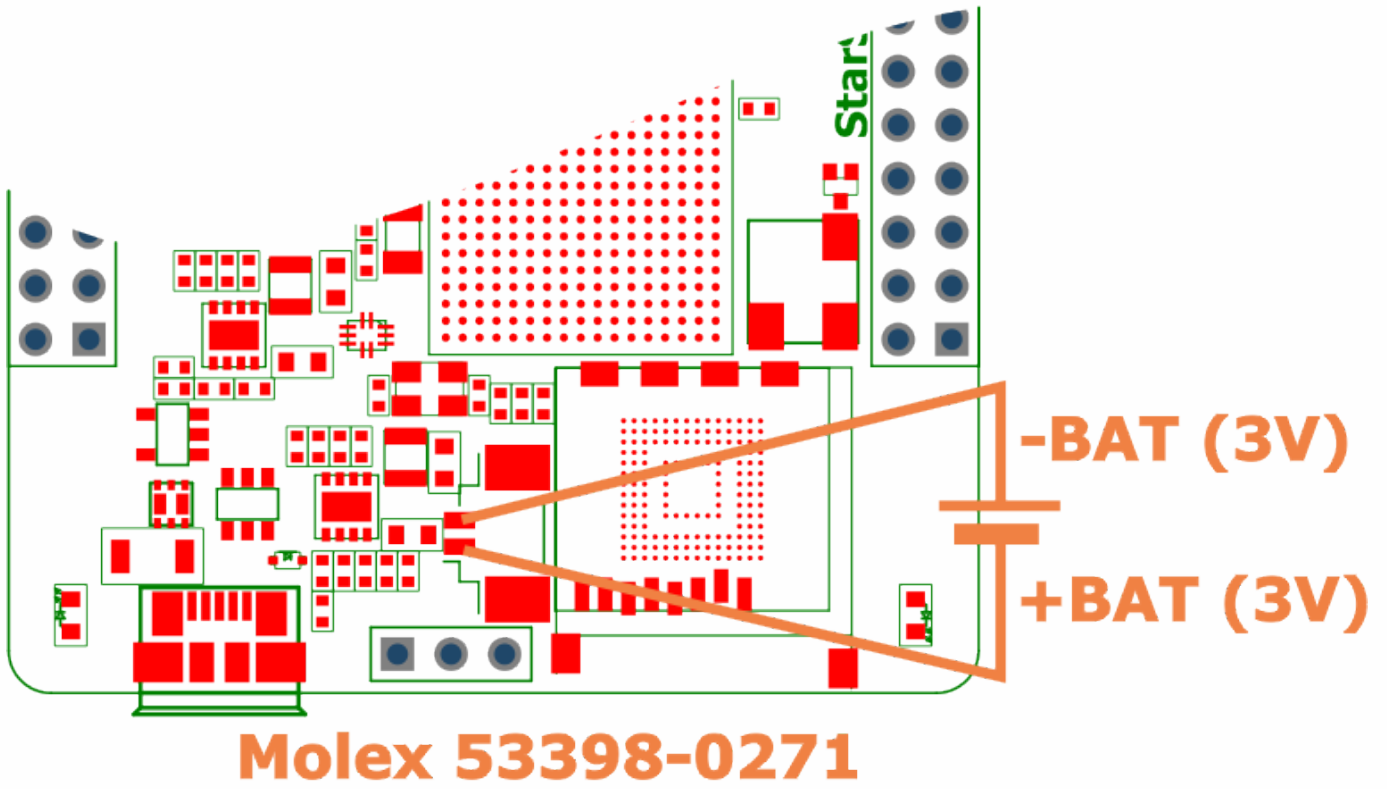
Software loading - BOOT0 jumper



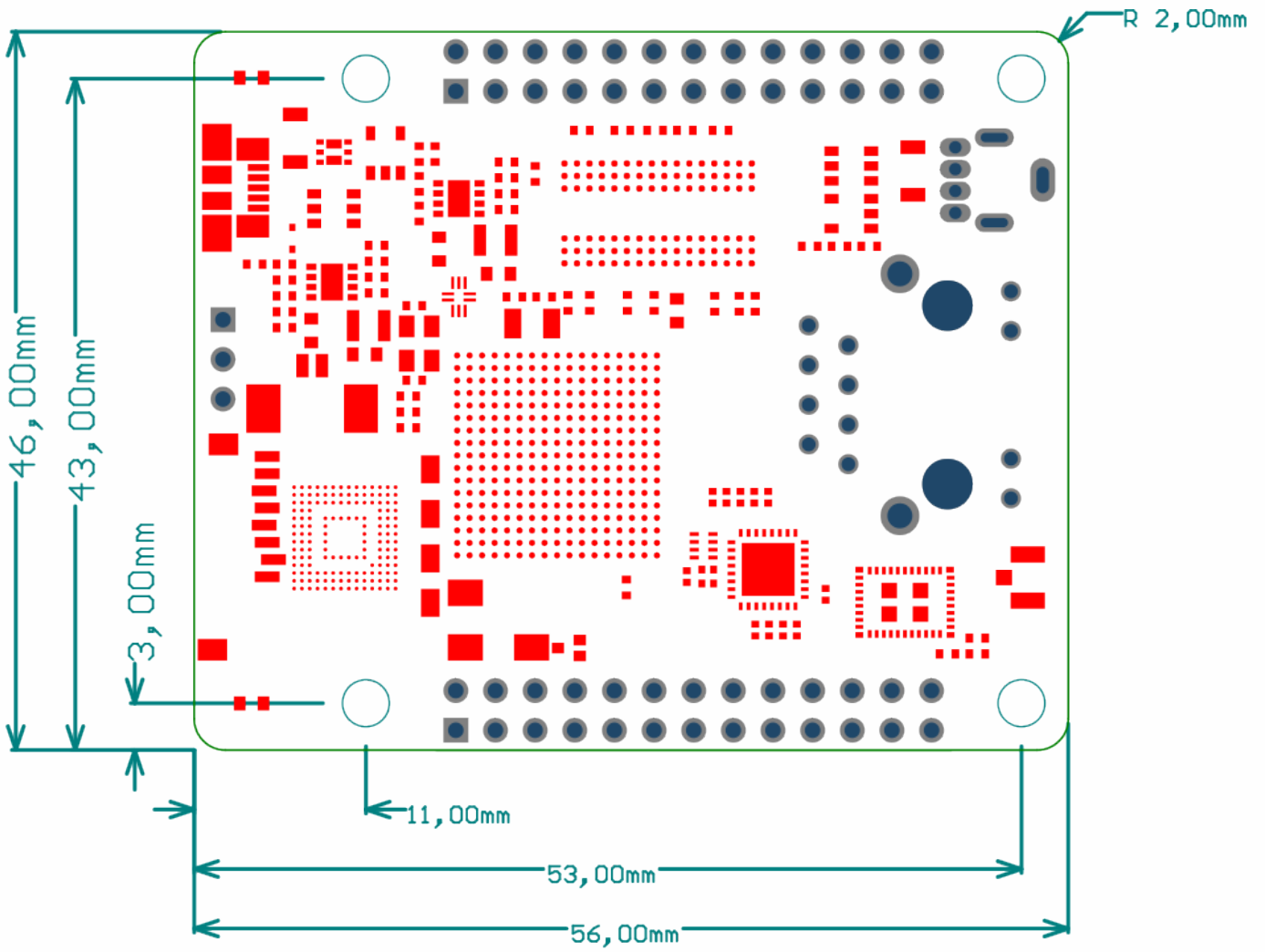
Location of BOOT0 jumper (bottom view)

If BOOT0 jumper is open - MPU starts normally (software from MMC memory is loading).
 If pins of BOOT0 jumper are connected to each other, bootloader starts (active on USB1).

RTC battery connection



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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