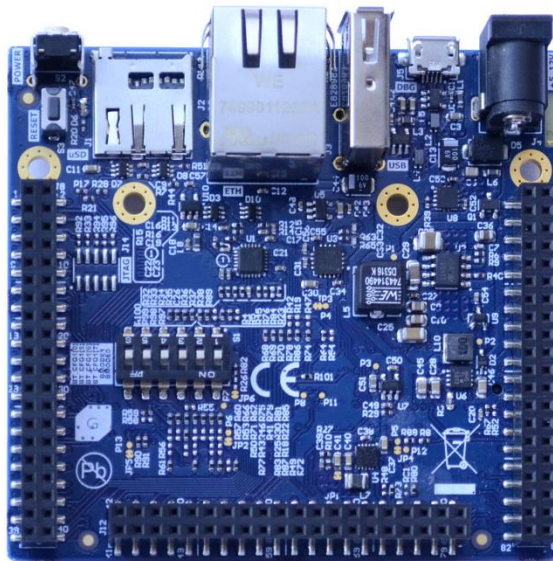


# liteboard

## liteboard Datasheet



**V1.1**  
**GRINN 2017**

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# 1. Summary

## 1.1. Description

The liteboard is single computer board ready to use with the liteSOM modules. The liteboard is equipped with 10/100Mb Ethernet port, USB 2.0 Host, Power supply connector, uSD card slot, LED, boot choose dipswitch, JTAG port (not populated), microUSB for power supply and serial debug, expansion connectors 3x40PIN, dedicated power output for TFT backlight. The liteboard is compatible with linux-friendly liteSOM modules. Additionally, liteboard enables you to implement any kind of application in such areas as IoT, building or industrial automation and many more. The liteboard is targets at companies and individuals who want to develop their products for mass production.

## 1.2. Features

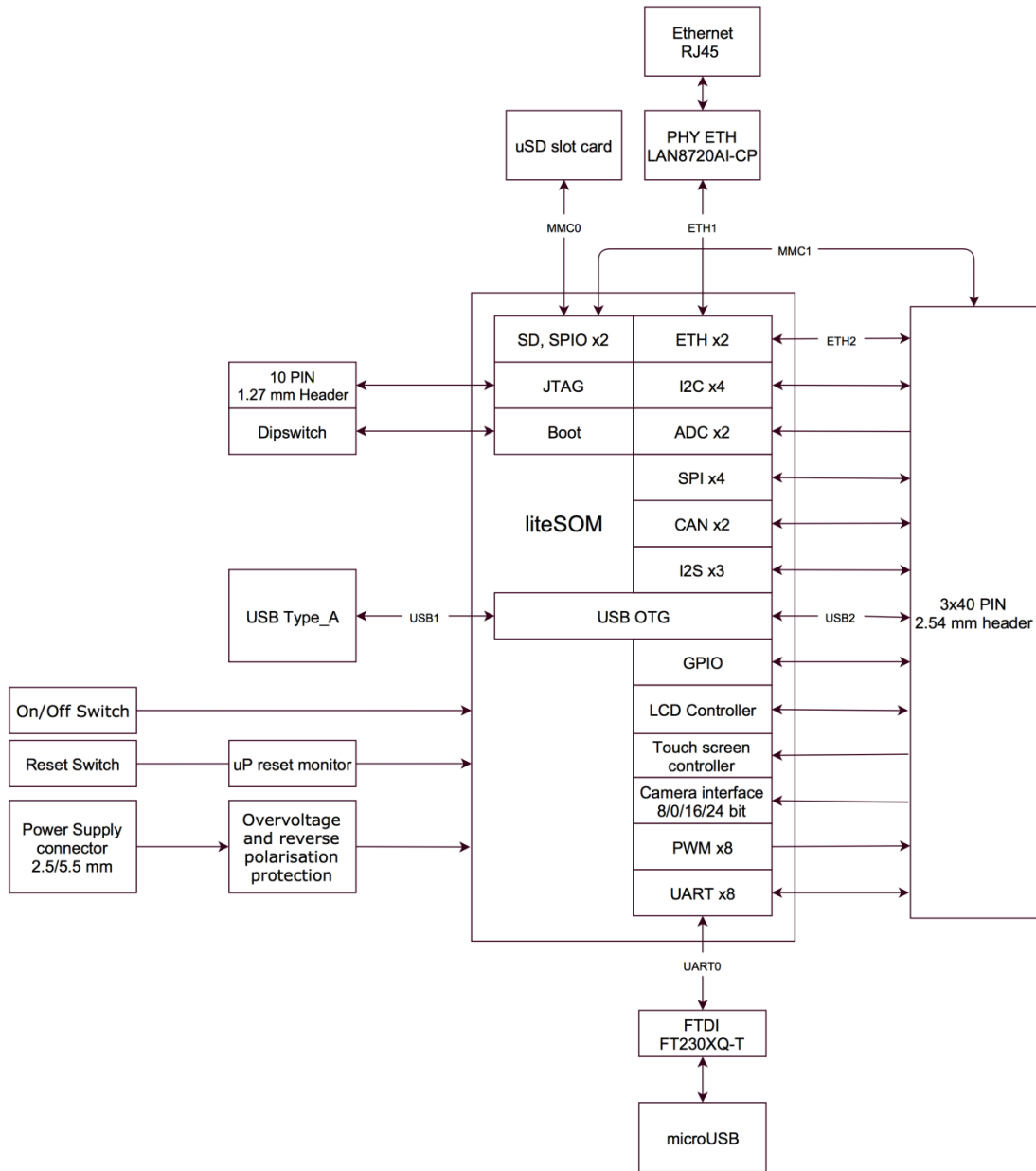
- Small size industrial single board computer ready to use with liteSOM module
- SO-DIMM socket dedicate for the liteSOM
- 10/100 Mb Ethernet, RJ45
- USB 2.0
- micro USB for power supply and serial debug
- micro SD card slot
- 3 x 40 Pins for expansion connectors
- JTAG port
- Boot configuration DIP switch
- Dedicated power output for LCD backlight
- 5-12V power supply
- Compatible with chiliboard expansion sandwiches

## 1.3. Additional information

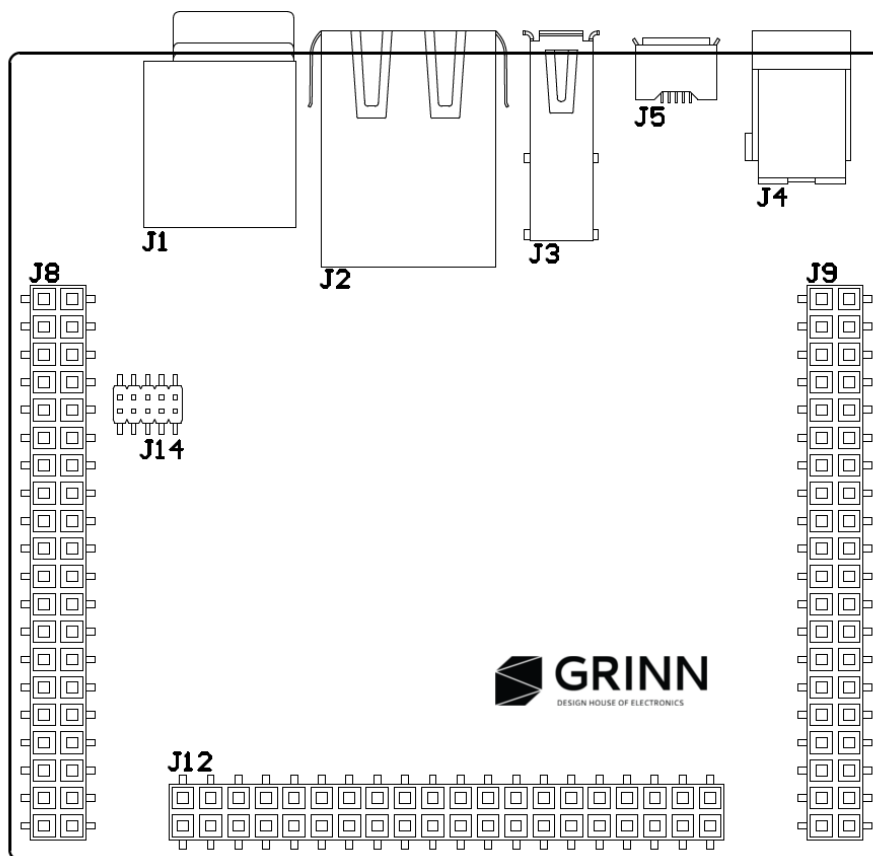
The board circuit diagram and instructions on how to start with software development using liteboard are available on the website: [www.litesom.com](http://www.litesom.com)

## 2. Functional Description

### 2.1. Block Diagram



## 2.2. Connectors on the board



## 2.3. Connectors list

Connector	Description
J1	Micro SD slot card
J2	Ethernet [RJ45]
J3	USB Host [Type A]
J4	Power supply [2.5/5.5mm]
J5	Micro USB [Type B]
J8	40 pins connector for expansion sandwich [2x20, pitch: 2.54 mm]
J9	40 pins connector for expansion sandwich [2x20, pitch: 2.54 mm]
J12	40 pins connector for expansion sandwich [2x20, pitch: 2.54 mm]
J14	JTAG [2x5, pitch: 1.27 mm]

## 2.4. Connectors description

### 2.4.1 $\mu$ SD slot card [ J1 ]

Pin	liteboard Connector	liteSOM Connector	I.MX 6UL Pin	Type	Description
1	SD_DAT2	175	B1	IO	$\mu$ SD Data
2	SD_DAT3	178	A2	IO	$\mu$ SD Data
3	SD_CMD	177	C2	IO	Command line
4	3V3	-	-		VDD 3.3V
5	SD_CLK	181	C1	IO	Clock
6	GND	-	-		GND
7	SD_DAT0	173	B3	IO	$\mu$ SD Data
8	SD_DAT1	176	B2	IO	$\mu$ SD Data
9	SD_CD	44	J14	IO	Card detect

### 2.4.2 Ethernet RJ45 [ J2 ]

The liteboard is equipped with 10/100Mb Ethernet interface based on LAN8720AI-CP transceiver by Microchip. Table below presents the connected LAN8720AI-CP and liteSOM module.

liteboard Connector	liteSOM Connector	I.MX 6UL Pin	Type	Description
ETH_MDIO	32	K17	IO	Multifunction pin.
ETH_MDC	31	L16	IO	Multifunction pin.
ETH_RXD1	99	E17	IO	Multifunction pin.
ETH_RXD0	97	F16	IO	Multifunction pin.
ETH_RXERR	98	D15	IO	Multifunction pin.
ETH_TXEN	94	F15	IO	Multifunction pin.
ETH_TXD0	93	E15	IO	Multifunction pin.
ETH_TXD1	91	E14	IO	Multifunction pin.
ETH_CRSDV	100	E16	IO	Multifunction pin.
ETH_RESETn	4	P8	Input	Connect to global RESETn
ETH_REFCLK	92	F14	IO	Multifunction pin.

### 2.4.3 USB type A [ J3 ]

The liteSOM supports two USB OTG host ports. The liteboard is equipped with USB type A socket. It is driven by liteSOM USB2.0 controller.

Pin	liteboard Connector	liteSOM Connector	I.MX 6UL Pin	Description
1	USB1_VCC	70	T12	USB VCC
2	USB1_D_P	63	U15	USB1 data positive
3	USB1_D_N	65	T15	USB1 data negative
4	GND	-	-	GND

### 2.4.4 Power supply [ J4 ]

The J4 connector is dedicated for 5-12 V DC power supply. We are recommended using the power adapter with 1A current output. The DC power socket is compatible with the standard 2.5mm / 5.5mm power plug. Power input on the liteboard has reverse polarity and overvoltage protection.

### 2.4.5 micro USB Type B connector [ J5 ]

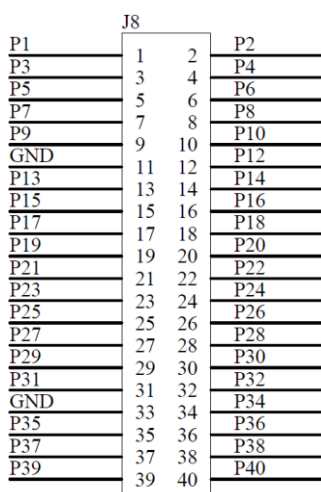
The micro USB port on the liteboard is used for serial interface communication. The default parameters for the serial port are:

- Baud rate: 115200
- Data bits: 8
- Stop bits: 1
- Parity: None

The micro USB port can be also used as the power supply for liteboard with the current up to 500mA. When the expansion board is connected we recommend using external power supply connected to J4.

Pin No	liteboard Connector	liteSOM Connector	I.MX 6UL Pin	Description
1	DBG_USB_VCC	-	-	USB Power supply
2	DBG_RXD	45	K14	RX Debug [FTDI Converter] Input data
3	DBG_TXD	43	K16	TX Debug [FTDI Converter] Output data
4	-	-	-	No connected
5	GND	-	-	GND

### 2.4.6 40 pins connector for expansion sandwich [ J8 ]



Pin No	liteboard Connector	liteSOM Connector	I.MX 6UL Pin	Type	Function	
1	P1	I2S0_DOUT	25	N14	IO	Multifunction pin.
2	P2	I2S0_DIN	21	M14	IO	Multifunction pin.
3	P3	I2S0_WCLK	24	N15	IO	Multifunction pin.
4	P4	I2S0_BCLK	23	N16	IO	Multifunction pin.
5	P5	I2S0_MCLK	22	P14	IO	Multifunction pin.
6	P6	GND	-	-	Ground	GND
8	P7	NAND_CE1n	184	B5	IO	Multifunction pin.
8	P8	NAND_CE0n	183	C5	IO	Multifunction pin.
9	P9	NAND_CLE	182	A4	IO	Multifunction pin.
10	P10	NAND_WPn	152	D5	IO	Multifunction pin.
11	P11	GND	-	-	Ground	GND
12	P12	SPI_CLK	165	D4	IO	Multifunction pin.
13	P13	SPI_CS	168	D3	IO	Multifunction pin.
14	P14	SPI_MISO	170	D1	IO	Multifunction pin.
15	P15	SPI_MOSI	167	D2	IO	Multifunction pin.



16	P16	I2C_SCL	155	E5	IO	Multifunction pin.
17	P17	I2C_SDA	153	F5	IO	Multifunction pin.
18	P18	NAND_REDYn	186	A3	IO	Multifunction pin.
19	P19	UART2_CTS	52	J15	IO	Multifunction pin.
20	P20	UART2_RTS	50	H14	IO	Multifunction pin.
21	P21	UART2_TX	49	J17	IO	Multifunction pin.
22	P22	UART2_RX	51	J16	IO	Multifunction pin.
23	P23	UART3_TX	79	H17	IO	Multifunction pin.
24	P24	UART3_RX	81	H16	IO	Multifunction pin.
25	P25	TS_X_LEFT	34	M16	IO	Multifunction pin.
26	P26	TS_X_RIGHT	35	L17	IO	Multifunction pin.
27	P27	TS_Y_UP	36	L14	IO	Multifunction pin.
28	P28	TS_Y_DOWN	37	L15	IO	Multifunction pin.
29	P29	GND	-	-	Ground	GND
30	P30	GPIO0	38	K13	IO	Multifunction pin.
31	P31	GPIO8	30	N17	IO	Multifunction pin.
32	P32	GPIO5	33	M17	IO	Multifunction pin.
33	P33	GND	-	-	Ground	GND
34	P34	UART5_RX	89	G13	IO	Multifunction pin.
35	P35	UART5_TX	87	F17	IO	Multifunction pin.
36	P36	CAN1_TX	80		IO	Multifunction pin.
37	P37	CAN1_RX	82		IO	Multifunction pin.
38	P38	UART7_RXD	102	A15	IO	Multifunction pin.
39	P39	UART4_RX	85	G16	IO	Multifunction pin.
40	P40	UART4_TX	83	G17	IO	Multifunction pin.

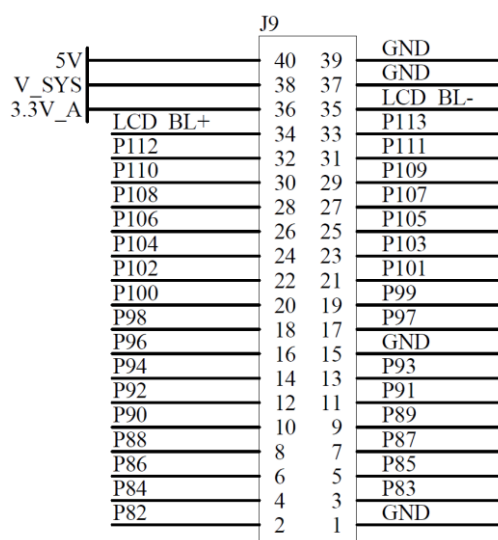
## 2.4.7 40 pins connector for expansion sandwich [ J12 ]

J12	
P41	1
P43	3
P45	5
GND	7
P49	9
P51	11
P53	13
P55	15
P57	17
P59	19
P61	21
P63	23
P65	25
P67	27
GND	29
P71	31
P73	33
P75	35
P77	37
P79	39
P42	2
P44	4
P46	6
P48	8
P50	10
P52	12
P54	14
P56	16
P58	18
P60	20
P62	22
P64	24
P66	26
P68	28
P70	30
P72	32
P74	34
P76	36
P78	38
P80	40

Pin No	liteboard Connector	liteSOM Connector	I.MX 6UL Pin	Type	Function	
1	P41	UART7_TXD	103	B14	IO	Multifunction pin.
2	P42	ETH_MDIO	32	K17	IO	Multifunction pin.
3	P43	ETH_MDC	31	L16	IO	Multifunction pin.
4	P44	USB_OTG2_DRVVBUS	104	A16	IO	Multifunction pin.
5	P45	SNVS_TAMPER7	6	N10	Input	Multifunction pin.
6	P46	USB_OTG2_ID	101	D17	IO	Multifunction pin.
8	P47	GND	-	-	Ground	GND
8	P48	USB_OTG2_D_P	57	U13	IO	Multifunction pin.
9	P49	USB_OTG2_VBUS	56	U12	Input	Multifunction pin.
10	P50	USB_OTG2_D_N	59	T13	IO	Multifunction pin.
11	P51	LCD_RESET	145	E9	IO	Multifunction pin.
12	P52	SDIO_CMD	158	F3	IO	Multifunction pin.
13	P53	ETH2_RX_EN	109	B17	IO	Multifunction pin.
14	P54	GND	-	-	Ground	GND

15	P55	SDIO_DAT3	166	E1	IO	Multifunction pin.
16	P56	ETH2_RXERR	107	D16	IO	Multifunction pin.
17	P57	GND	-	-	Ground	GND
18	P58	ETH2_RX_DATA1	110	C16	IO	Multifunction pin.
19	P59	GND	-	-	Ground	GND
20	P60	UART1_CTS	46	K15	IO	Multifunction pin.
21	P61	GND	-	-	Ground	GND
22	P62	JTAG_MOD	26	P15	Input	Multifunction pin.
23	P63	GND	-	-	Ground	GND
24	P64	CCM_CLK1_P	76	P17	IO	Multifunction pin.
25	P65	SDIO_DAT1	164	E3	IO	Multifunction pin.
26	P66	SDIO_DAT2	163	E2	IO	Multifunction pin.
27	P67	GND	-	-	Ground	GND
28	P68	SDIO_DAT0	162	E4	IO	Multifunction pin.
29	P69	GND	-	-	Ground	GND
30	P70	LCD_DATA18	120	A13	IO	Multifunction pin.
31	P71	LCD_DATA2	140	E10	IO	Multifunction pin.
32	P72	LCD_DATA17	121	B13	IO	Multifunction pin.
33	P73	LCD_DATA9	131	A11	IO	Multifunction pin.
34	P74	LCD_DATA1	141	A9	IO	Multifunction pin.
35	P75	LCD_DATA16	122	C13	IO	Multifunction pin.
36	P76	LCD_DATA8	132	B11	IO	Multifunction pin.
37	P77	LCD_DATA0	142	B9	IO	Multifunction pin.
38	P78	SDIO_CLK	157	F2	IO	Multifunction pin.
39	P79	PWM_Brightness	29	M15	IO	Multifunction pin.
40	P80	GND	-	-	Ground	GND

## 2.4.8 40 pins connector for expansion sandwich [ J9 ]



Pin No	liteboard Connector	liteSOM Connector	I.MX 6UL Pin	Type	Function
1	P81	GND	-	Ground	GND
2	P82	SNVS_TAMPER6	15	Input	Multifunction pin.
3	P83	SNVS_TAMPER2	11	Input	Multifunction pin.
4	P84	SNVS_TAMPER8	18	Input	Multifunction pin.
5	P85	SNVS_TAMPER0	9	Input	Multifunction pin.
6	P86	SNVS_TAMPER9	17	Input	Multifunction pin.
8	P87	SNVS_TAMPER4	13	Input	Multifunction pin.
8	P88	SNVS_TAMPER1	12	Input	Multifunction pin.
9	P89	NAND_DQS	106	IO	Multifunction pin. <sup>1</sup>
10	P90	SNVS_TAMPER5	14	Input	Multifunction pin.
11	P91	LCD_ENABLE	147	IO	Multifunction pin.
12	P92	SNVS_TAMPER3	16	Input	Multifunction pin.
13	P93	LCD_HSYNC	148	IO	Multifunction pin.
14	P94	LCD_VSYNC	146	IO	Multifunction pin.

15	P95	GND	-	-	Ground	GND
16	P96	LCD_CLK	150	A8	IO	Multifunction pin.
17	P97	LCD_DATA7	135	D11	IO	Multifunction pin.
18	P98	LCD_DATA6	136	A10	IO	Multifunction pin.
19	P99	LCD_DATA5	137	B10	IO	Multifunction pin.
20	P100	LCD_DATA4	138	C10	IO	Multifunction pin.
21	P101	LCD_DATA3	139	D10	IO	Multifunction pin.
22	P102	LCD_DATA15	125	D13	IO	Multifunction pin.
23	P103	LCD_DATA14	126	A12	IO	Multifunction pin.
24	P104	LCD_DATA13	127	B12	IO	Multifunction pin.
25	P105	LCD_DATA12	128	C12	IO	Multifunction pin.
26	P106	LCD_DATA11	129	D12	IO	Multifunction pin.
27	P107	LCD_DATA10	130	E12	IO	Multifunction pin.
28	P108	LCD_DATA23	115	B16	IO	Multifunction pin.
29	P109	LCD_DATA22	116	A14	IO	Multifunction pin.
30	P110	LCD_DATA21	117	B14	IO	Multifunction pin.
31	P111	LCD_DATA20	118	C14	IO	Multifunction pin.
32	P112	LCD_DATA19	119	D14	IO	Multifunction pin.
33	P113	RESET	4	P8	Reset	RESET
34	P114	LCD_BL+	-	-	Output	LCD_BL+
35	P115	LCD_BL-	-	-	Output	LCD_BL-
36	P116	3V3	-	-		3.3V_A
37	P117	GND	-	-	Ground	GND
38	P118	5VSYS	-	-		V_SYS
39	P119	GND	-	-	Ground	GND
40	P120	5V	-	-		5V

1 Pins belong to NVCC\_NAND power group. This group is used to internal eMMC connection, which determinates power supply of 3.3V.

## 2.4.9 JTAG [ J11 ]

Pin	liteboard Connector	liteSOM Connector	I.MX 6UL Pin	Type	Description
1	3V3	-	-	Supply	3.3V Supply
2	I2S0_MCLK	22	P14	Input	TMS
3	GND	-	-	GND	GND
4	I2S0_DIN	21	M14	Input	TCK
5	GND	-	-	GND	GND
6	I2S0_WLCK	24	N15	Output	TDO
7	-	-	-	-	No connected
8	I2S0_BCLK	23	N16	Input	TDI
9	GND	-	-	GND	GND
10	I2S0_DOUT	25	N14	Input	RESET

Normally connector J11 is not assembled on the board.

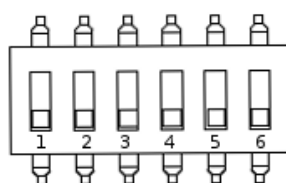
### 3. Boot options

The i.MX 6Ultralite processor supports booting from:

- Memory: NOR, NAND, MMC or EEPROM
- Peripheral: USB or UART

After power-up, list of possible boot method reading configuration pins BT\_MODE[1:0], BT\_CFG1[7:0], BT\_CFG2[7:0], BT\_CFG3[7:0] and BT\_CFG4[7:0]. Only BT\_MODE[1:0], BT\_CFG1[7:5] and BT\_CFG2[3] are exposed on liteboard DIP switches. The other boot pins are set to HIGH.

For choose the boot options is available 6 pins dipswitch (S1).



1	2	3	4	5	6
BOOT_MODE0	BOOT_MODE1	BT_CFG1[7]	BT_CFG1[6]	BT_CFG1[5]	BT_CFG2[3]

BOOT\_MODE [1:0] are used to select system boot mode.

BOOT_MODE0	BOOT_MODE1	Boot Mode
LOW	LOW	Boot from Fuses
HIGH	LOW	Serial Downloader
LOW	HIGH	Internal Boot
HIGH	HIGH	Reserved

The table below shows fuse map for boot configuration.

Type	BT_CFG1[7]	BT_CFG1[6]	BT_CFG1[5]	BT_CFG2[3]
QSPI	LOW	LOW	LOW	FSDLY ( <i>Full Speed Delay Selection</i> ) LOW: one clock delay HIGH: two clock delay
SPI	LOW	LOW	HIGH	Not used
SD/eSD	LOW	HIGH	LOW	Not used

MMC/eMMC	LOW	HIGH	HIGH	Not used
NAND	HIGH	Not used	Not used	Boot Search Count: LOW: 4 HIGH: 8

For complete Boot Mode configuration description see section 8 of i.MX 6UltraLite Reference Manual.

## 3.1. User interface

### 3.1.1. LED

The liteboard is equipped with D6 LED connected to the 3.3V power line.

### 3.1.2. On/Off switch [S2]

Name	liteboard Connector	liteSOM Connector	I.MX 6UL Pin	Description
S2	ONOFF	3	ON/OFF	Switch ON/OFF liteboard

### 3.1.3. Reset switch [S3]

The liteboard is equipped with the microprocessor reset monitor MAX803SQ308T1G by Maxim. It is activated after press the reset switch [S3].

Name	liteboard Connector	liteSOM Connector	I.MX 6UL Pin	Description
S3	RESET	4	PORn	Reset



## 4. Electrical Characteristics

### 4.1. Absolute Maximum Ratings

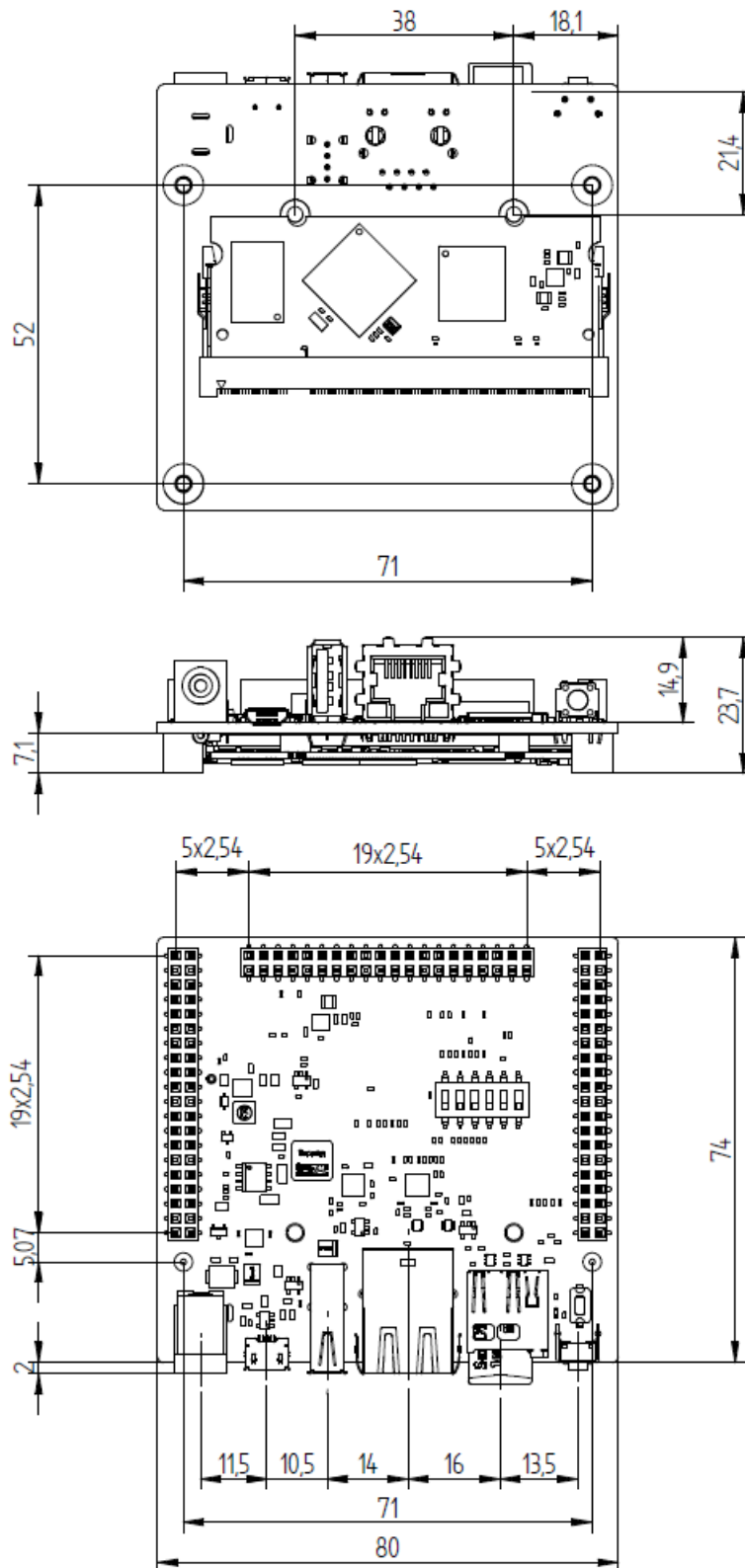
	min.	max.	unit
Supply voltage V_DC		18	V
Supply voltage V_USB		5,5	V
Terminal current V_SYS		1.5	A
Terminal current 3V3		1,5	A
Terminal current LCD_BL-, LCD_BL+		500	mA
Operating ambient temperature (Consumer version)	0	70	°C
Operating ambient temperature (Industrial version)	-40	85	°C

### 4.2. Recommended Operating Conditions

	min.	nom.	max.	unit
Supply voltage V_DC	5.0	6.0	12	V
micro USB VBUS Supply, USB_OTGx_VBUS	4.50	5.0	5.35	V
Current, micro USB_VBUS			500	mA
Output current, V_SYS	0		500 (5V) 250 (3.6V)	mA
Output current, 3.3VD <sup>1</sup>	0		400 (200)	mA

Reference supply voltage for the pins groups: VCC\_GPIO, VCC\_UART, VCC\_LCD, VCC\_ENET, NVCC\_CSI are 3.3V

## 5. Mechanical Characteristics



## 6. Document Revision History

Document Revision	Notes
1.0	Initial revision

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**Grinn sp. z o.o.**  
POLAND  
ul. Wagonowa 2  
53-609 Wrocław  
t. +48 71 716 40 99  
m. office@grinn-global.com  
www.grinn-global.com

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