ESOM-MT-1200 USER Manual

Arm-Based MediaTek Genio 1200 System on Module

Vecow

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Record of Revision

Version	Date	Page	Description	Remark
1.00	2024/04/10		Official Release	

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CE

The products described in this manual complies with all applicable European Union (CE) directives if it has a CE marking. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques.

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Order Information

Part Number	Description
ESOM-MT-1200	Arm-Based MediaTek Genio 1200 System on Module
ESOM-MT-1200-EV	Arm-Based MediaTek Genio 1200 SOM Evaluation Kit

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1

GENERAL INTRODUCTION

1.1 Overview

The Vecow ESOM-MT-1200 is powered by the MediaTek Genio 1200 processor, featuring a quad-core Cortex-A78 processor and integrating with Arm Mali-G57 GPU. Designed for AIoT applications, the ESOM-MT-1200 delivers powerful and efficient performance. It supports 8GB LPDDR4 memory, digital display, and MIPI DSI display for advanced multimedia capabilities. The system supports Yocto 3.1 operating systems for upgradeability and scalability.

1.2 Features

- Octa-core MediaTek Genio 1200 processor with quad Cortex-A78 and quad Cortex-A55, 4.8 AI TOPS
- Integrated Mali-G57 GPU and H.265/H.264 4K video decoding
- Onboard 8GB LPDDR4X memory and 64GB eMMC
- Supports 2 4-lane MIPI CSI-2 camera with internal ISP for dual 16MP
- Supports 2 Digital Display, 1 DP, 1 eDP and 1 4-lane MIPI DSI, 4K resolution
- Supports 1 PCIe x2, 2 USB 3.0, 1 Gigabit Ethernet
- Supports Yocto 3.1 operating system

1.3 Product Specification

1.3.1 Specifications of ESOM-MT-1200

System	
Processor	MediaTek Genio 1200 Processor with Quad-core Cortex-A78 @2.2GHz and Quad Cortex-A55 @2.2GHz
Memory	8GB LPDDR4X SDRAM
eMMC	64GB eMMC
Flash	8Mb NOR Flash
OS	Linux Yocto 3.1
I/O Interface	
Internal I/O	4 board to board Connector
Graphics	
Graphics Processor	• ARM Mali-G57 high-performance GPU • 3D graphics accelerator capable of processing 17600M pixel/sec @ 880MHz • Graphics engine supporting OpenGL® ES 3.2, OpenCL 2.2, and Vulkan 1.1 hardware acceleration
Video	• Video Encode: HEVC: 4K2K@60fps H.264: 4K2K@60fps • Video Decode: HEVC: 4K2K@90fps H.264: 4K2K@90fps
Display	Supports dual independent display: • 1 Digital Display TX: 4K @60Hz • 1 Digital Display RX: 4K @60Hz • 1 DisplayPort TX: 4K @60Hz • 1 eDP : 4K @60Hz • 1 MIPI DSI: 4K @60Hz
Camera	• Two 4-lane MIPI CSI-2 • Integrated image signal processor supports single 48MP @30fps or dual 16MP @30fps
Audio	
Audio Interface	Line-out and Mic-in
Ethernet	
LAN	10/100/1000 Mbps Ethernet LAN by Realtek RTL8211F

Expansion	
PCIe	1 PCIe Gen3 x2
USB	• 2 USB 3.0 • 2 USB 2.0
UART	• 1 4-wire UART • 2 2-wire UART
SDIO	1 SDIO
SPI	2 SPI
I2C	2 I2C
PWM	2 PWM
GPIO	8 GPIO
Power	
Power Input	4.2V DC-in
Mechanical	
Dimension (W x L)	82 mm x 55 mm (3.2" x 2.1")
Environment	
Operating Temperature	-25°C to 70°C (-13°F to 158°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	5% to 95% humidity, non-condensing
Relative Humidity	95% at 85°C
EMC	CE, FCC

1.3.2 Specifications of ESOM-MT-1200-EV

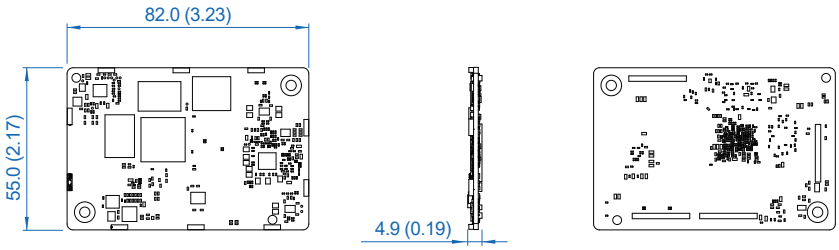
System	
Processor	MediaTek Genio 1200 Processor with Quad-core Cortex-A53 @2.0GHz
Memory	8GB LPDDR4X SDRAM
eMMC	64GB eMMC
OS	Linux Yocto 3.1
Graphics	
Display	• Supports dual independent display: • 1 Digital Display TX: 4K @60Hz • 1 DisplayPort TX: 4K @60Hz • 1 eDP : 1080p @60Hz • 1 MIPI DSI: 4K @60Hz
Camera	• One 4-lane MIPI CSI-2 • Integrated image signal processor supports single 48MP@30fps or dual 16MP @30fps
Ethernet	
LAN 1	• 10/100 Mbps Ethernet LAN, RJ45 Connector
LAN 2	• 10/100/1000 Base-T Ethernet GigE LAN, RJ45 Connector
Audio	
Audio Interface	2 Audio Jack for Mic-in, Line-out
Expansion	
M.2	• 1 M.2 Key B Socket (2280) • 1 M.2 Key E Socket (2230)
Mini PCIe	• 1 Mini PCIe Socket for PCIe/USB 2.0/SIM Card • 2 Mini PCIe Socket for PCIe
I/O Interface	
Front I/O	• Power Button with LED • 1 3-pin DC-in Connector • 2 RJ45 Connector • 2 USB 3.0 Type A • 1 Digital Display (1 TX) • 1 DisplayPort (TX) • 1 COM RS-232/422/485 Connector • 1 Micro USB 2.0 OTG Port • 1 Micro USB 2.0 Debug Port • 2 Nano SIM • 2 Audio Jack

Rear I/O	• Reset Button • 1 RJ45 Ethernet Connector • 2 USB 2.0 Type A • 1 Digital Display • 1 COM RS-232 Connector • 1 IR Receiver • 1 DC-in Power Jack
Internal I/O	• 4 board to board Connector • 1 eDP Connector • 1 MIPI DSI Connector • 1 MIPI CSI-2 Connector • 1 SATA Data Connector • 1 SATA Power Connector • 1 M.2 Key B 2280 Socket • 1 M.2 Key E 2230 Socket • 3 Full-size mini PCIe Socket • 1 USB 2.0 Header • 1 Micro SD Slot • 1 GPIO Connector • 1 RS-232 Header • 2 SPI & I2C Header • 1 Fan Connector • 1 RTC Battery Socket • 1 PWM Header
Mechanical	
Dimension (W x L)	203 mm x 146 mm (7.99" x 5.74")
Environment	
Operating Temperature	0°C to 55°C (32°F to 131°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	5% to 95% humidity, non-condensing
Relative Humidity	95% at 85°C
EMC	CE, FCC

1.4 Mechanical Dimension

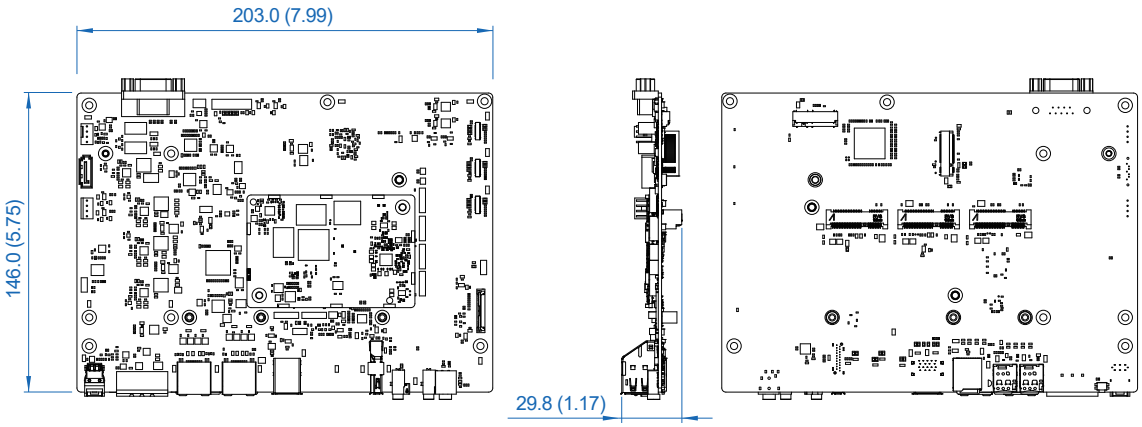
1.4.1 Dimensions of ESOM-MT-1200

Unit : mm (inch)



1.4.2 Dimensions of ESOM-MT-1200-EV

Unit : mm (inch)



2

GETTING TO KNOW YOUR ESOM-MT-1200

2.1 Packing List

2.1.1 ESOM-MT-1200 Packing List

Item	Description	Qty
1	ESOM-MT-1200: System on Module with MediaTek Genio 1200 quad-core Processor, 2GB LPDDR4 SDRAM, 16GB eMMC	1

2.1.2 ESOM-MT-1200-EV Packing List

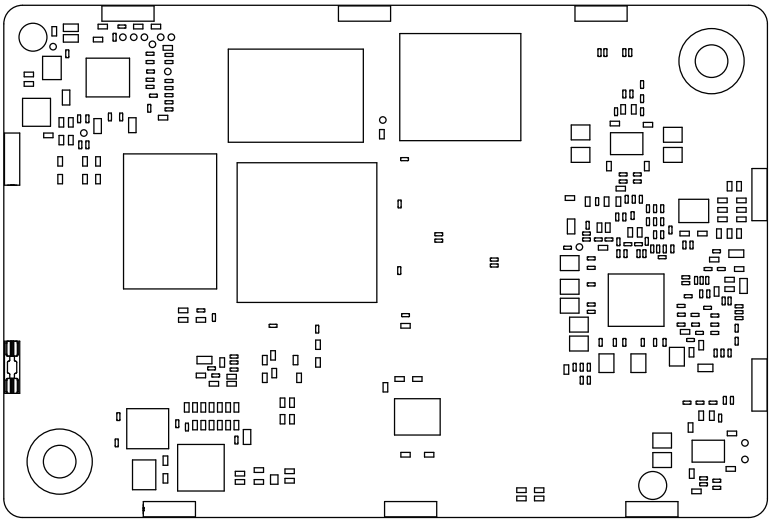
Item	Description	Qty
1	ESOM-MT-1200-EV: MediaTek Genio 1200 SOM Evaluation Kit	1

Item	Description	Outlook	Usage	P/N	Qty
1	Heat Sink		Heat Sink	62-09H1644-10A	1
2	PH-M3x4L,Ni+Ny		M.2	53-2426204-80B	2
3	PH-M2.5x6L,Ni		Mini PCIe	53-2426906-30B	3
4	COM Cable		Cable	61-1300042-100	1
5	DC-IN Cable		Cable	61-1430212-010	1

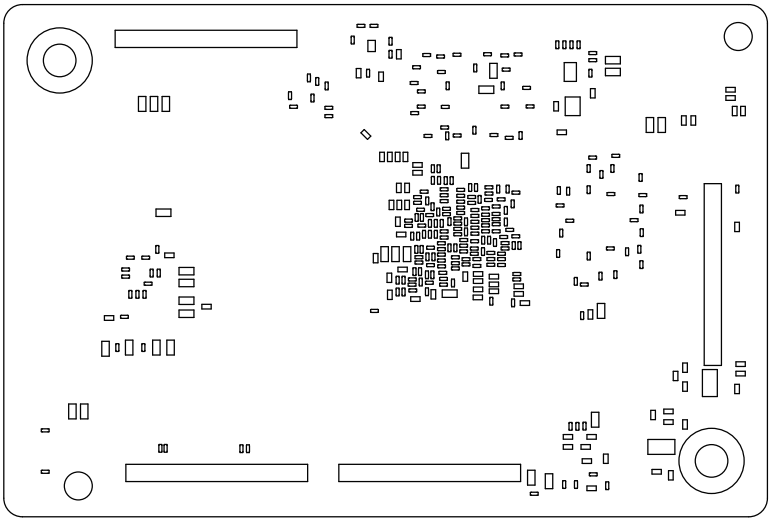
Item	Description	Outlook	Usage	P/N	Qty
6	USB to Micro USB Cable		Cable	61-192U2MU-100	1
7	WiFi & BT Antenna		Antenna	76-4142EXB-006	1
8	Power Adapter		PowerAdaptor	71-7442500-3W4	1
9	Power Cord		Power Cord	71-BPWCDUS-004	1
10	USB Stick		SW Package	81-6PKB000-001	1
11	5MP CSI-2 Camera		Camera	76-5M12000-009	1
12	10.1”LCD Touch Panel		Panel	74-71M1010-001	1

2.2 ESOM-MT-1200 Pinout Table

2.2.1 Top Side View



2.2.2 Bottom Side View



2.2.3 Pinout Table

The pin assignment of J1 is listed in the following table.

J1			
Pin No.	Function	Pin No.	Function
1	VCC4V2	2	VCC4V2
3	VCC4V2	4	VCC4V2
5	VCC4V2	6	VCC4V2
7	VCC4V2	8	VCC4V2
9	VCC4V2	10	VCC4V2
11	VCC4V2	12	VCC4V2
13	VCC4V2	14	VCC4V2
15	VCC4V2	16	VCC4V2
17	VCC4V2	18	VCC4V2
19	VCC4V2	20	GND
21	VCC4V2	22	DSI0_D2N_T0B
23	VBUS	24	DSI0_D2P_T0A
25	VBUS	26	GND
27	VBUS	28	DSI0_D0P_T0C
29	VBUS	30	DSI0_D0N_T1A
31	GND	32	GND
33	MSDC1_DAT0_R	34	DSI0_CKP_T1B
35	MSDC1_DAT1_R	36	DSI0_CKN_T1C
37	GND	38	GND
39	MSDC1_CMD_R	40	DSI0_D1N_T2B
41	GND	42	DSI0_D1P_T2A
43	MSDC1_DAT2_R	44	GND
45	MSDC1_DAT3_R	46	DSI0_D3P_T2C
47	GND	48	DSI0_D3N
49	MSDC1_CLK_R	50	GND
51	GND	52	NC
53	USB_DP_P2	54	NC
55	USB_DM_P2	56	GND
57	GND	58	NC
59	USB_DM_P3	60	NC
61	USB_DP_P3	62	GND
63	GND	64	NC
65	IDDIG	66	NC
67	USB_DRVVBUS	68	GND
69	GND	70	NC
71	UART1_TXD	72	NC
73	UART1_RXD	74	GND

J1			
Pin No.	Function	Pin No.	Function
75	GND	76	AUXIN3
77	DISP1_PWM0	78	AUXIN2
79	GND	80	GND
81	LCM1_LED_EN	82	UART0_TXD
83	GPIO109_1V8	84	UART0_RXD
85	GPIO31_1V8	86	GND
87	HDMITX_CEC	88	VMCH_PMU
89	HDMITX_HTPLG	90	VMCH_PMU

The pin assignment of J2 is listed in the following table.

J2			
Pin No.	Function	Pin No.	Function
1	SD_DET_N_PMU	2	FAN_PWM
3	GND	4	GPIO106_1V8
5	MDI0-	6	EDPBL_EN
7	MDI0+	8	GPIO96_1V8
9	GND	10	GND
11	MDI1-	12	PWM
13	MDI1+	14	GND
15	GND	16	DISP_PWM1
17	MDI2-	18	GND
19	MDI2+	20	UART2_RXD
21	GND	22	UART2_TXD
23	MDI3-	24	UART2_CTS
25	MDI3+	26	UART2_RTS
27	GND	28	GND
29	RTL8211_LED0	30	GPIO61_1V8
31	RTL8211_LED1	32	GPIO62_1V8
33	RTL8211_LED2	34	GND
35	GND	36	VBUSVALID
37	SYSRSTB	38	GPIO64_1V8
39	GND	40	GND
41	SPIM1_MOSI	42	I2SO1_D3
43	SPIM1_CSB	44	I2SO1_D1
45	SPIM1_MISO	46	I2SO1_D0
47	GND	48	I2SO1_MCK
49	SPIM1_CLK	50	GND
51	GND	52	I2SO1_WS

J2			
Pin No.	Function	Pin No.	Function
53	NC	54	I2SO1_D2
55	HDMIRX_PWR5V	56	I2SO1_BCK
57	HDMIRX_SDA	58	GND
59	HDMIRX_SCL	60	SD_DET_N_SOC
61	GND	62	GPIO59_1V8
63	HDMIRX21_CLK_M	64	GND
65	HDMIRX21_CLK_P	66	GPIO57_1V8
67	GND	68	GPIO58_1V8
69	HDMIRX21_CH0_M	70	GND
71	HDMIRX21_CH0_P	72	I2SIN_MCK
73	GND	74	GND
75	HDMIRX21_CH1_M	76	I2SIN_BCK
77	HDMIRX21_CH1_P	78	GND
79	GND	80	I2SIN_D0
81	HDMIRX21_CH2_M	82	I2SIN_WS
83	HDMIRX21_CH2_P	84	GND
85	GND	86	POWER_SCL
87	NC	88	POWER_SDA
89	NC	90	HDMIRX_HTPLG

The pin assignment of J3 is listed in the following table.

J3			
Pin No.	Function	Pin No.	Function
1	VRTC	2	PCIE_PERESET_N
3	PWRKEY_SW	4	PCIE_WAKE_N
5	DP_HPD_1V8	6	GND
7	GND	8	PCIE_CLKREQ_N
9	GPIO22_1V8	10	GND
11	GND	12	HDMITX_SCL
13	CMMCLK1	14	HDMITX_SDA
15	GND	16	GND
17	CMMCLK2	18	EARCRX_DP
19	GND	20	EARCRX_DM
21	HDMITX21_CLK_M	22	GND
23	HDMITX21_CLK_P	24	SSUSB_RXP
25	GND	26	SSUSB_RXN
27	HDMITX21_CH0_M	28	GND

J3			
Pin No.	Function	Pin No.	Function
29	HDMITX21_CH0_P	30	SSUSB_TXP
31	GND	32	SSUSB_TXN
33	HDMITX21_CH1_M	34	GND
35	HDMITX21_CH1_P	36	EDP_LN3_TXP
37	GND	38	EDP_LN3_TXN
39	HDMITX21_CH2_M	40	GND
41	HDMITX21_CH2_P	42	EDPAUXN
43	GND	44	EDPAUXP
45	USB_DP_P0	46	GND
47	USB_DM_P0	48	EDP_LN0_TXP
49	GND	50	EDP_LN0_TXN
51	DP_LN3_TXN	52	GND
53	DP_LN3_TXP	54	EDP_LN2_TXP
55	GND	56	EDP_LN2_TXN
57	DPAUXP	58	GND
59	DPAUXN	60	EDP_LN1_TXP
61	GND	62	EDP_LN1_TXN
63	DP_LN2_TXP	64	GND
65	DP_LN2_TXN	66	USB_DM_P1
67	GND	68	USB_DP_P1
69	DP_LN1_TXP	70	GND
71	DP_LN1_TXN	72	SSUSB_TXN1
73	GND	74	SSUSB_TXP1
75	DP_LN0_TXP	76	GND
77	DP_LN0_TXN	78	SSUSB_RXN1
79	GND	80	SSUSB_RXP1
81	PCIE_CKRXN_P	82	GND
83	PCIE_CKRXP_P	84	EAR_MIC_P
85	GND	86	EAR_MIC_N
87	AVSS30_AUD	88	GND
89	GND	90	HP_EINT

The pin assignment of J4 is listed in the following table.

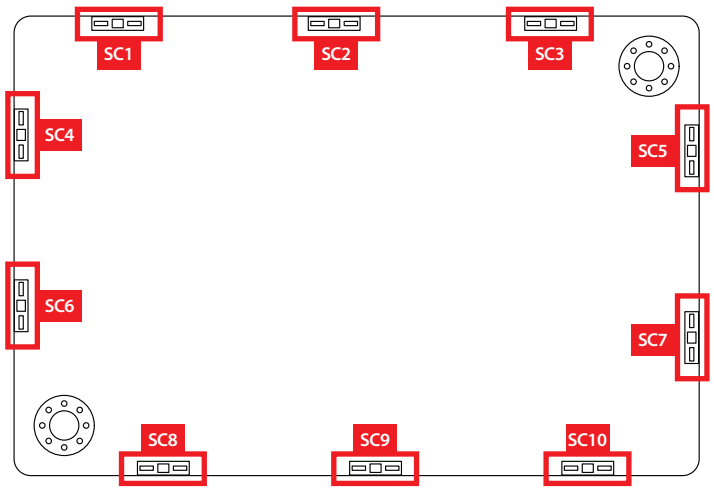
J4			
Pin No.	Function	Pin No.	Function
1	CAM_SDA0	2	SPIM0_CLK
3	CAM_SCL0	4	GND
5	CAM_SDA1	6	SPIM0_CSB
7	CAM_SCL1	8	SPIM0_MOSI
9	DMIC3_DAT	10	SPIM0_MISO
11	DMIC3_SCK	12	GND
13	SDA2	14	GPIO1_1V8
15	SCL2	16	GPIO4_1V8
17	DMIC4_DAT	18	GPIO3_1V8
19	DMIC4_SCK	20	GPIO0_1V8
21	GND	22	GPIO2_1V8
23	CSI0A_L0P	24	GPIO6_1V8
25	CSI0A_L0N	26	EDP_HPD_1V8
27	GND	28	GND
29	CSI0A_L2N	30	CSI0D_L1N
31	CSI0A_L2P	32	CSI0D_L1P
33	GND	34	GND
35	CSI0A_L1P	36	CSI0D_L0N
37	CSI0A_L1N	38	CSI0D_L0P
39	GND	40	GND
41	CSI0B_L0P	42	CSI0C_L1P
43	CSI0B_L0N	44	CSI0C_L1N
45	GND	46	GND
47	CSI0B_L1N	48	CSI0C_L2N
49	CSI0B_L1P	50	CSI0C_L2P
51	GND	52	GND
53	CSI1A_L1N_T1A	54	CSI0C_L0N
55	CSI1A_L1P_T0C	56	CSI0C_L0P
57	GND	58	GND
59	CSI1A_L2N_T1C	60	PCIEG3_LN0_RXP
61	CSI1A_L2P_T1B	62	PCIEG3_LN0_RXN
63	GND	64	GND
65	CSI1B_L0P_T0A	66	PCIEG3_LN1_TXN
67	CSI1B_L0N_T0B	68	PCIEG3_LN1_TXP
69	GND	70	GND
71	CSI1B_L1P_T0C	72	PCIEG3_LN1_RXP
73	CSI1B_L1N_T1A	74	PCIEG3_LN1_RXN

J4			
Pin No.	Function	Pin No.	Function
75	GND	76	GND
77	CSI1A_L0N_T0B	78	PCIEG3_LN0_TXN
79	CSI1A_L0P_T0A	80	PCIEG3_LN0_TXP
81	GND	82	GND
83	AU_HPR	84	PCIEG3_CLKP
85	AU_REFN	86	PCIEG3_CLKN
87	AU_HPL	88	GND
89	GND	90	HOMEKEY_SW

2.3 ESOM-MT-1200 I/O Connectors

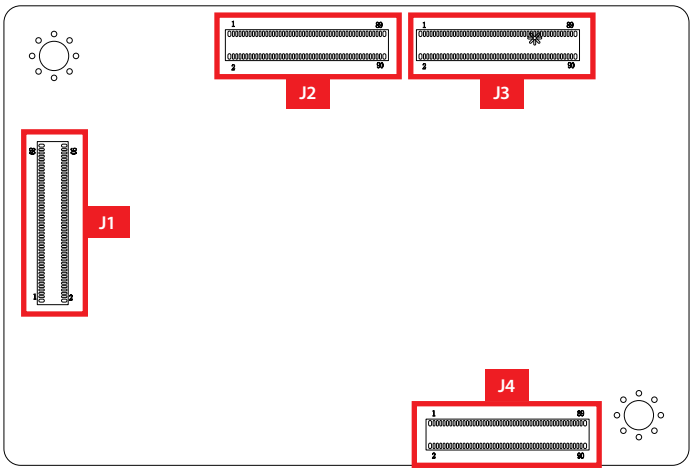
2.3.1 Shielding can clip (SC1~SC10)

There are ten shielding can clips on the front side of ESOM-MT-1200 for connect shielding case.



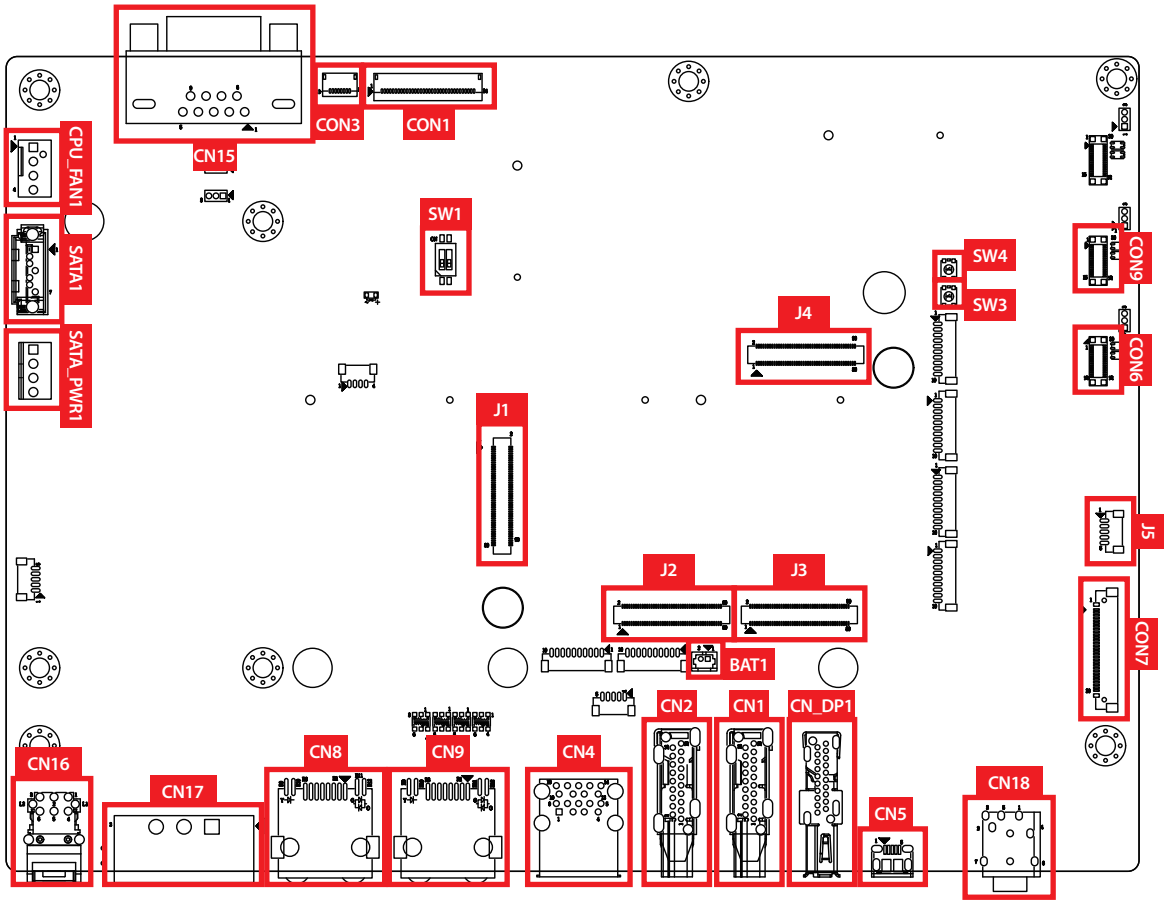
2.3.2 90-Pin board to board connector (J1~J4)

There are four 90-pin board-to-board connector on the rear side of ESOM-MT-1200 for connect to carrier board.

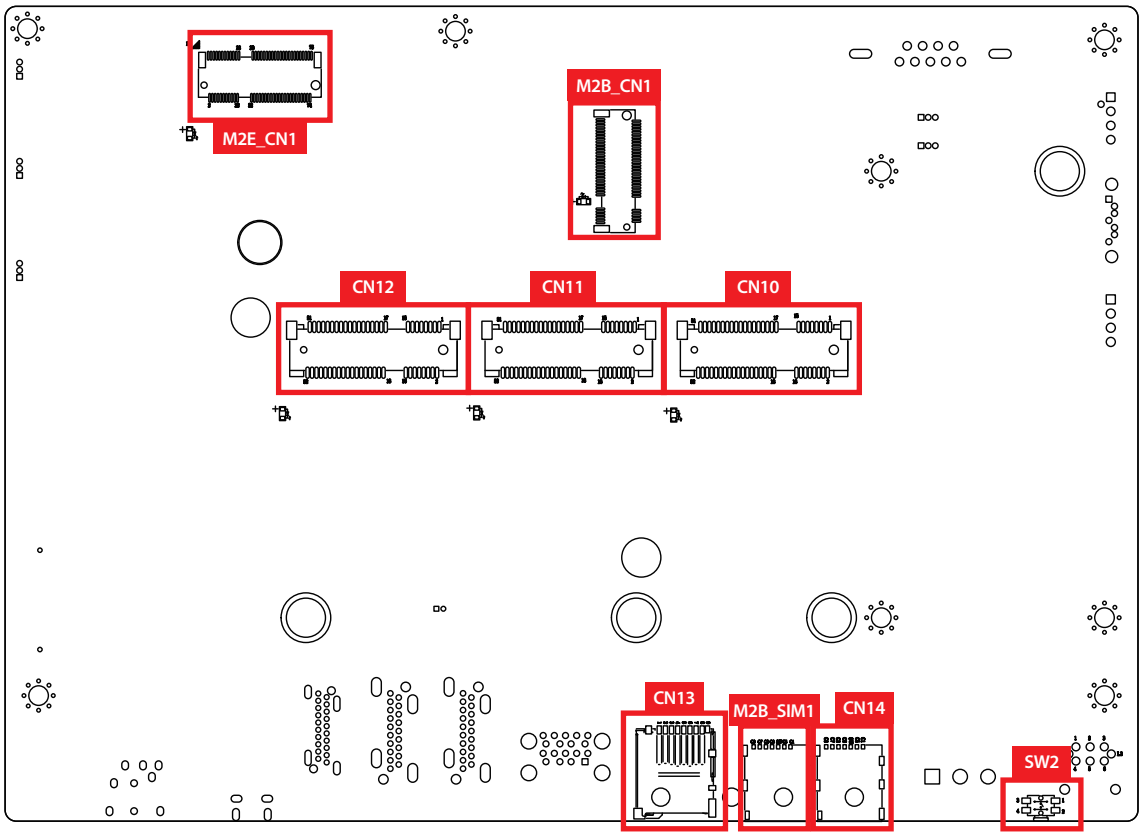


2.4 Carrier Board Connectors

2.4.1 Top View

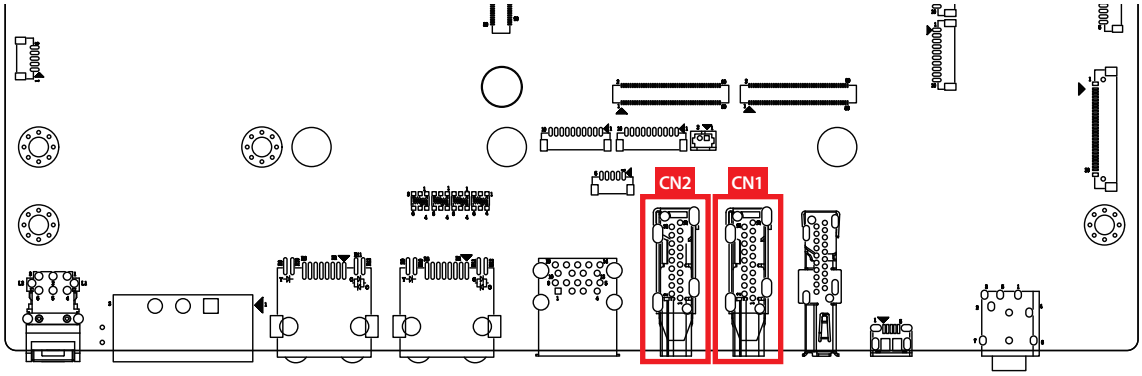


2.4.2 Bottom View



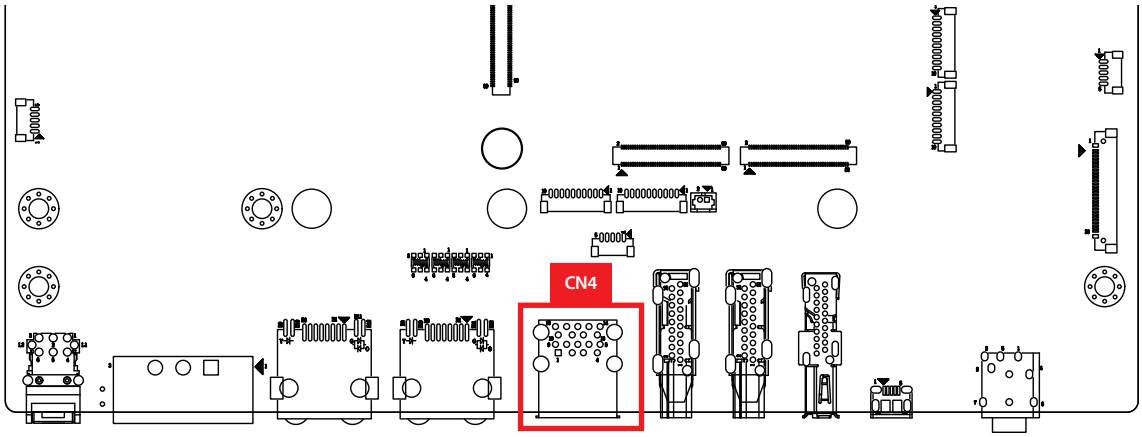
2.4.3 HDMI connector (CN1, CN2)

There are two HDMI connectors on the front side of ESOM-MT-1200-CB. The two HDMI ports included one HDMI TX (CN1) for transmitting HDMI signal, support 3840 x 2160 @60Hz.



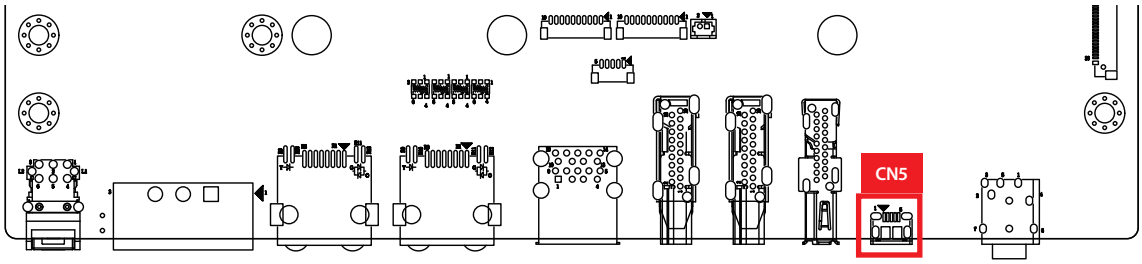
2.4.4 Dual USB 3.0 connector (CN4)

There are two USB 3.0 ports on front side of ESOM-MT-1200-CB. There are two USB 3.0 ports available supporting up to 5Gbps per second data rate in the ESOM-MT-1200-CB. The top port is a pure USB port, the bottom port can be changed OTG function and pure USB by DIP switch (SW1).



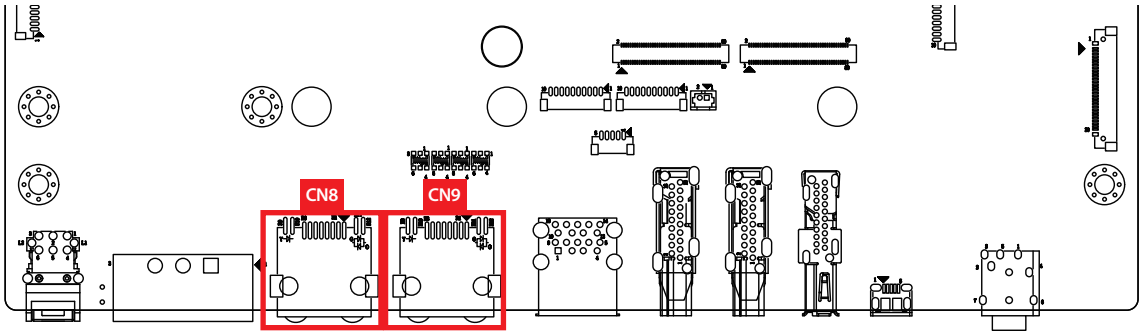
2.4.5 Micro USB 2.0 connector (CN5)

There is a Micro USB 2.0 port on the front side of ESOM-MT-1200-CB. It is used for console debug port.



2.4.6 10/100/1000Mbps Ethernet Port (CN8, CN9)

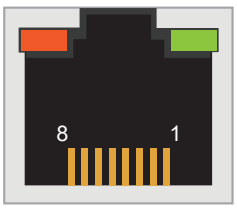
There are two 10/100/1000 Mbps Ethernet ports. The Ethernet port uses a RJ-45. Using suitable RJ-45 cable, you can connect the ESOM-MT-1200-CB to a computer or to any other devices with Ethernet connection, for example, a hub or a switch. The pinouts of the 10/100/1000 Mbps Ethernet ports are listed below.



Pin No.	10/100 Mbps	1000 Mbps
1	TD+	MDI0_P
2	TD-	MDI0_N
3	RD+	MDI1_P
4	----	MDI2_P
5	----	MDI2_N
6	RD-	MDI1_N
7	----	MDI3_P
8	----	MDI3_N

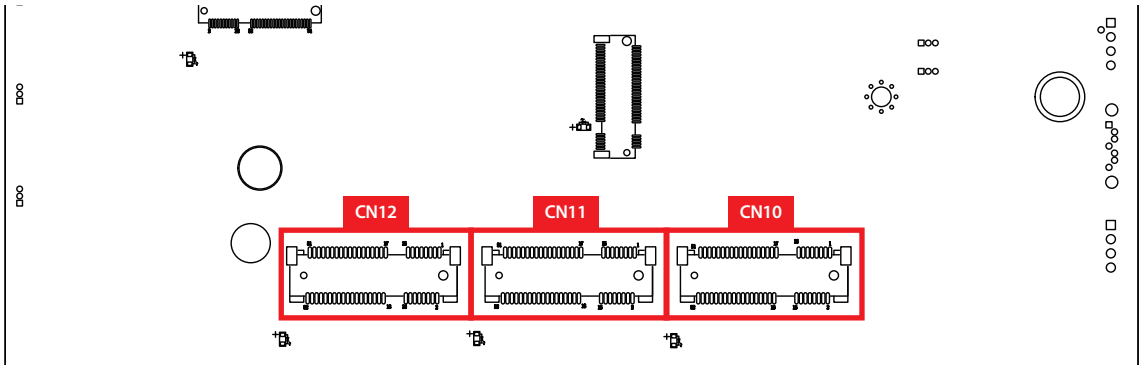
10Mbps Ethernet network, the right LED indicator one remains off and the left twinkling orange. When the cable is properly connected to a 100Mbps Ethernet network, the right LED one become solid green and the left twinkling orange. When the cable is properly connected to a 1000Mbps Ethernet network, the right LED one become solid orange and the left twinkling orange.

LED Location	LED color	10Mbps	100Mbps	1000Mbps
Right	Green/ Orange	Off	Solid Green	Solid Orange
Left	Orange	Twinkling Orange	Twinkling Orange	Twinkling Orange



2.4.7 Mini PCIe slot (CN10, CN11, CN12)

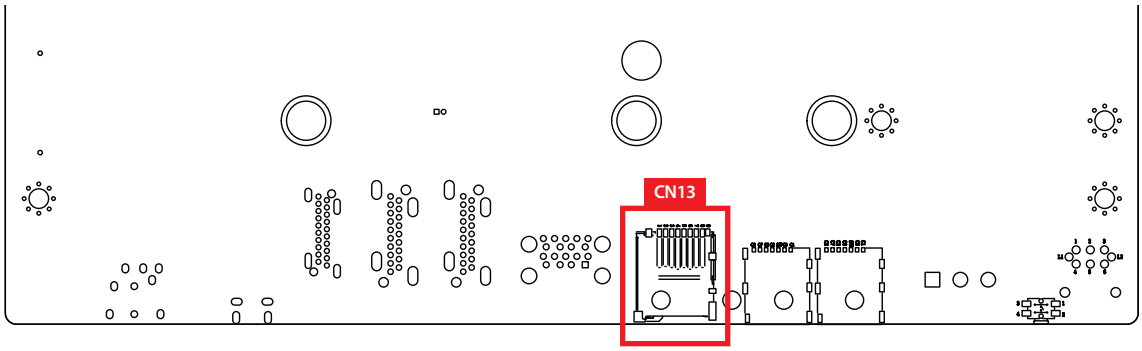
There are three mini PCIe slot on the rear side of ESOM-MT-1200-CB. It is used for wireless networking options such as a 4G module, but only CN12 has USB 2.0 and UIM signal. The pin define are listed in the following table.



Pin No.	Signal	Pin No.	Signal
51	Reserved	52	+3.3V
49	Reserved	50	GND
47	Reserved	48	+1.5V
45	Reserved	46	LED_WPAN
43	Reserved	44	LED_WLAN
41	+3.3V	42	LED_WWAN
39	+3.3V	40	GND
37	GND	38	NC/USB_D+ (Only CN12)
35	GND	36	NC/USB_D- (Only CN12)
33	PETp0	34	GND
31	PETn0	32	SMB_DATA
29	GND	30	SMB_CLK
27	GND	28	+1.5V
25	PERp0	26	GND
23	PERn0	24	+3.3V
21	GND	22	PERST#
19	Reserved	20	Reserved
17	Reserved	18	GND
Mechanical Key			
15	GND	16	NC/UIM_VPP (Only CN12)
13	REFCLK+	14	NC/UIM_RESET (Only CN12)
11	REFCLK-	12	NC/UIM_CLK (Only CN12)
9	GND	10	NC/UIM_DATA (Only CN12)
7	CLKREQ#	8	NC/UIM_PWR (Only CN12)
5	Reserved	6	+1.5V
3	Reserved	4	GND
1	WAKE#	2	+3.3V

2.4.8 Micro SD card slot (CN13)

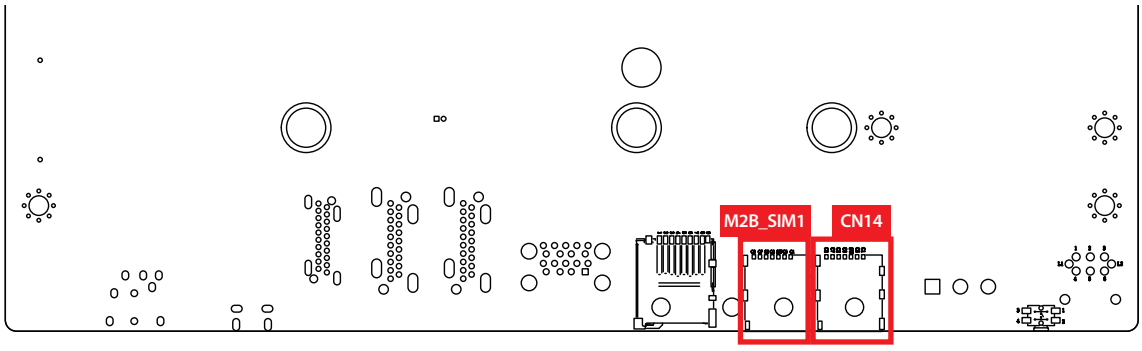
There is a Micro SD Slot on the rear side of ESOM-MT-1200-CB. The external Micro SD card slot provides additional storage expansion. If you would like to replace or insert the card, it must be ensure the system is powered off. The pin define are listed in the following table.



Pin No.	Definition	Pin No.	Definition
1	DAT2	6	GND
2	DAT3	7	DAT0
3	CMD	8	DAT1
4	VCC	9	GND
5	CLK	10	Card detect

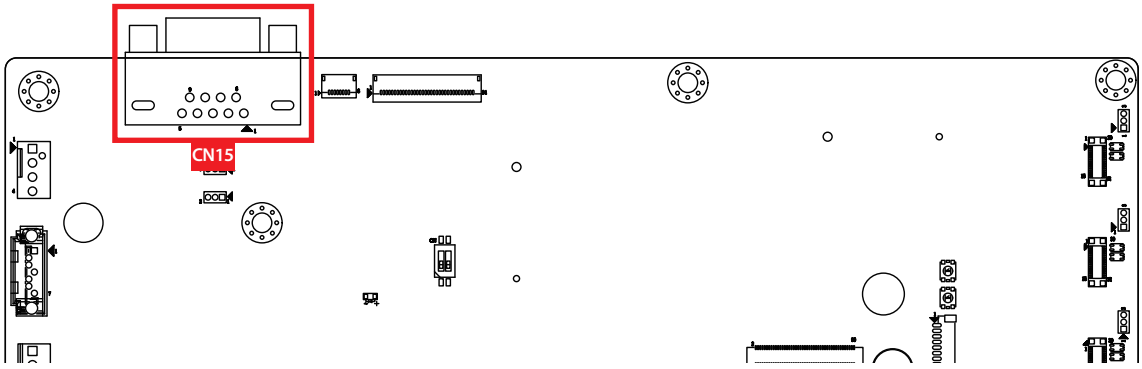
2.4.9 Nano SIM Card Slot (CN14, M2B_SIM1)

There are two Nano SIM card slot on the rear side of ESOM-MT-1200-CB. It supports 4G SIM cards, and when a LTE module is installed in the mini PCIe and M.2 key B slot. The SIM card slot do not support hot-plug. Please make sure to unplug the system power before inserting the SIM card.



2.4.10 DB9 connector (CN15)

There is a COM port on the front side of ESOM-MT-1200-CB. It can be configured for RS-232, RS-422, or RS-485 by GPIO control. The pin define are listed in the following table.



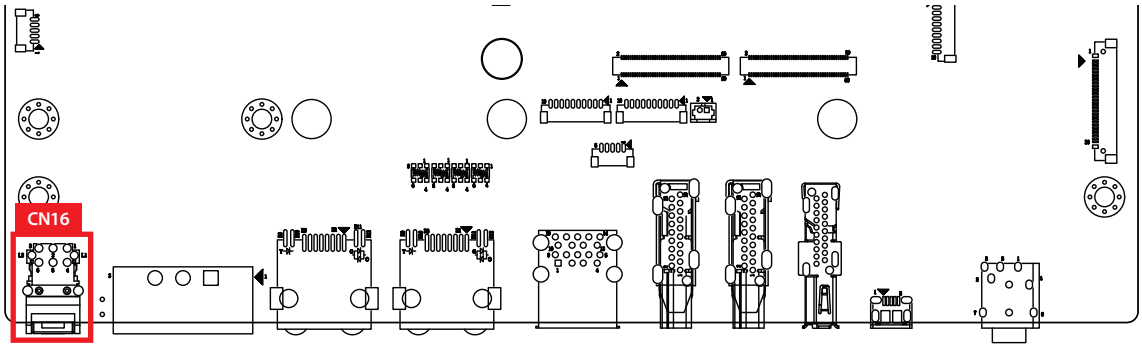
Pin No.	RS-232	RS-422 (5-wire)	RS-485 (3-wire)
1	-----	TX-	RS485-
2	RX	TX+	RS485+
3	TX	RX+	-----
4	-----	RX-	-----
5	GND	GND	GND
6	-----	-----	-----
7	RTS	-----	-----
8	CTS	-----	-----
9	-----	-----	-----

The GPIO configuration listed in the following table.

COM mode	GPIO58	GPIO64
RS-232	1	0
RS-422	1	1
RS-485	0	1

2.4.11 Power button (CN16)

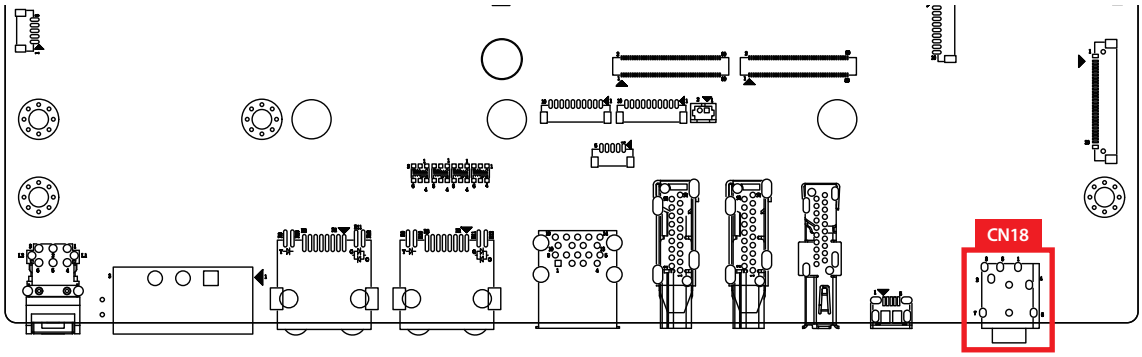
There is a power button on the front side of ESOM-MT-1200-CB. The Power Button is a non-latched switch with dual color LED indication. To boot on the system, please press the button for more than 3 seconds. To shut down the system, please press the button for more than 3 seconds. More detail LED indications are listed as follows:



LED Color	System Status
Solid Blue	System working
Solid Orange	System off

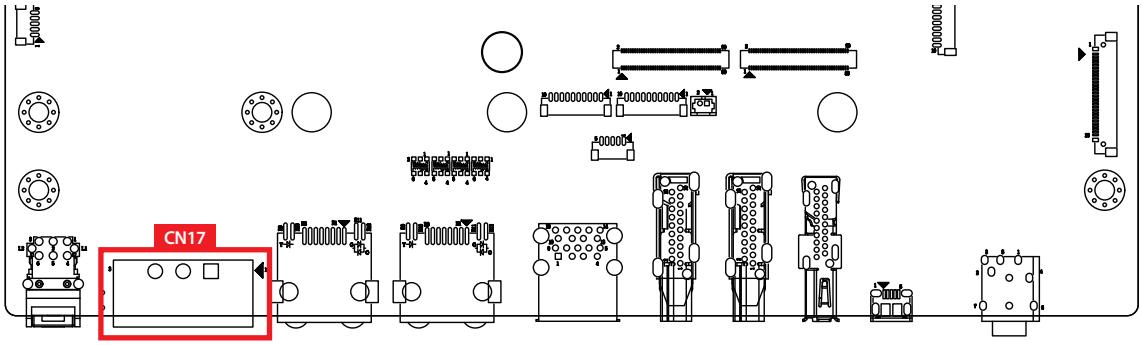
2.4.12 Earphone jack with mic input (CN18)

There is a 3.5mm earphone jack located on the front side of ESOM-MT-1200-CB. It is for line-out (no audio amplifier is build-in) and mic-in function.



2.4.13 Power terminal block (CN17)

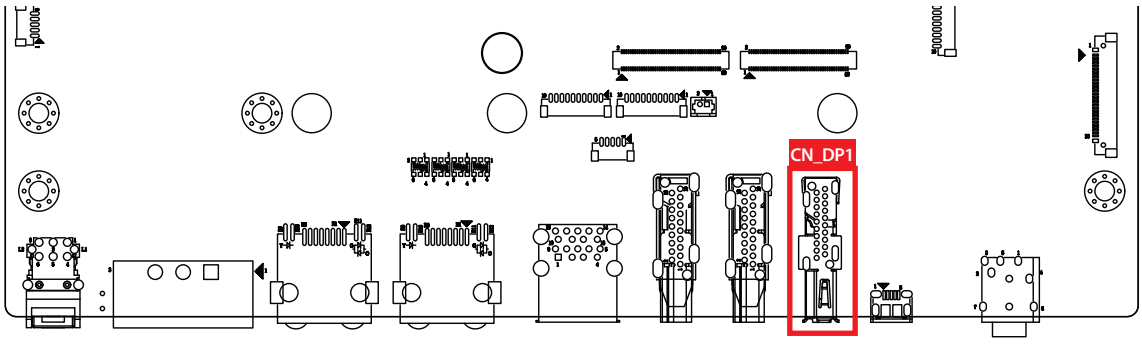
There is a power terminal block on the front side of ESOM-MT-1200. The terminal block is used for supplying 12V-DC power from a compliant adapter. The pin define are listed in the following table.



Pin No.	Definition	Pin No.	Definition
1	V+	2	V-
3	Chassis Ground		

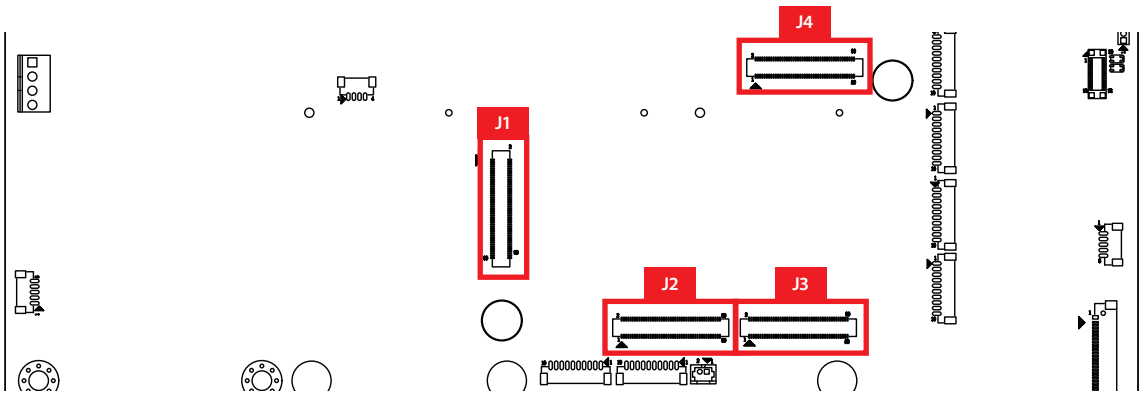
2.4.14 Display port connector (CN_DP1)

There is a Display port connector on the front side of ESOM-MT-1200-CB. The Display port support 3840 x 2160 @60Hz.



2.4.15 90-Pin board to board connectors (J1, J2, J3, J4)

There are four 90-pin board-to-board connector on the front side of ESOM-MT-1200-CB for connect to SOM board.



The pin define of J1 is listed in the following table.

Pin No.	Definition	Pin No.	Definition
1	VCC4V2	2	VCC4V2
3	VCC4V2	4	VCC4V2
5	VCC4V2	6	VCC4V2
7	VCC4V2	8	VCC4V2
9	VCC4V2	10	VCC4V2
11	VCC4V2	12	VCC4V2
13	VCC4V2	14	VCC4V2
15	VCC4V2	16	VCC4V2
17	VCC4V2	18	VCC4V2
19	VCC4V2	20	GND
21	VCC4V2	22	DSI0_D2N_T0B
23	VBUS	24	DSI0_D2P_T0A
25	VBUS	26	GND
27	VBUS	28	DSI0_D0P_T0C
29	VBUS	30	DSI0_D0N_T1A
31	GND	32	GND
33	MSDC1_DAT0_R	34	DSI0_CKP_T1B
35	MSDC1_DAT1_R	36	DSI0_CKN_T1C
37	GND	38	GND
39	MSDC1_CMD_R	40	DSI0_D1N_T2B
41	GND	42	DSI0_D1P_T2A
43	MSDC1_DAT2_R	44	GND
45	MSDC1_DAT3_R	46	DSI0_D3P_T2C
47	GND	48	DSI0_D3N

Pin No.	Definition	Pin No.	Definition
49	MSDC1_CLK_R	50	GND
51	GND	52	NC
53	USB_DP_P2	54	NC
55	USB_DM_P2	56	GND
57	GND	58	NC
59	USB_DM_P3	60	NC
61	USB_DP_P3	62	GND
63	GND	64	NC
65	IDDIG	66	NC
67	USB_DRVVBUS	68	GND
69	GND	70	NC
71	UART1_TXD	72	NC
73	UART1_RXD	74	GND
75	GND	76	AUXIN3
77	DISP1_PWM0	78	AUXIN2
79	GND	80	GND
81	LCM1_LED_EN	82	UART0_TXD
83	GPIO109_1V8	84	UART0_RXD
85	GPIO31_1V8	86	GND
87	HDMITX_CEC	88	VMCH_PMU
89	HDMITX_HTPLG	90	VMCH_PMU

The pin define of J2 is listed in the following table.

Pin No.	Definition	Pin No.	Definition
1	SD_DET_N_PMU	2	FAN_PWM
3	GND	4	GPIO106_1V8
5	MDI0-	6	EDPBL_EN
7	MDI0+	8	GPIO96_1V8
9	GND	10	GND
11	MDI1-	12	PWM
13	MDI1+	14	GND
15	GND	16	DISP_PWM1
17	MDI2-	18	GND
19	MDI2+	20	UART2_RXD
21	GND	22	UART2_TXD

Pin No.	Definition	Pin No.	Definition
23	MDI3-	24	UART2_CTS
25	MDI3+	26	UART2_RTS
27	GND	28	GND
29	RTL8211_LED0	30	GPIO61_1V8
31	RTL8211_LED1	32	GPIO62_1V8
33	RTL8211_LED2	34	GND
35	GND	36	VBUSVALID
37	SYSRSTB	38	GPIO64_1V8
39	GND	40	GND
41	SPIM1_MOSI	42	I2SO1_D3
43	SPIM1_CSB	44	I2SO1_D1
45	SPIM1_MISO	46	I2SO1_D0
47	GND	48	I2SO1_MCK
49	SPIM1_CLK	50	GND
51	GND	52	I2SO1_WS
53	NC	54	I2SO1_D2
55	HDMIRX_PWR5V	56	I2SO1_BCK
57	HDMIRX_SDA	58	GND
59	HDMIRX_SCL	60	SD_DET_N_SOC
61	GND	62	GPIO59_1V8
63	HDMIRX21_CLK_M	64	GND
65	HDMIRX21_CLK_P	66	GPIO57_1V8
67	GND	68	GPIO58_1V8
69	HDMIRX21_CH0_M	70	GND
71	HDMIRX21_CH0_P	72	I2SIN_MCK
73	GND	74	GND
75	HDMIRX21_CH1_M	76	I2SIN_BCK
77	HDMIRX21_CH1_P	78	GND
79	GND	80	I2SIN_D0
81	HDMIRX21_CH2_M	82	I2SIN_WS
83	HDMIRX21_CH2_P	84	GND
85	GND	86	POWER_SCL
87	NC	88	POWER_SDA
89	NC	90	HDMIRX_HTPLG

The pin define of J3 is listed in the following table.

Pin No.	Definition	Pin No.	Definition
1	VRTC	2	PCIE_PERESET_N
3	PWRKEY_SW	4	PCIE_WAKE_N
5	DP_HPD_1V8	6	GND
7	GND	8	PCIE_CLKREQ_N
9	GPIO22_1V8	10	GND
11	GND	12	HDMITX_SCL
13	CMMCLK1	14	HDMITX_SDA
15	GND	16	GND
17	CMMCLK2	18	EARCRX_DP
19	GND	20	EARCRX_DM
21	HDMITX21_CLK_M	22	GND
23	HDMITX21_CLK_P	24	SSUSB_RXP
25	GND	26	SSUSB_RXN
27	HDMITX21_CH0_M	28	GND
29	HDMITX21_CH0_P	30	SSUSB_TXP
31	GND	32	SSUSB_TXN
33	HDMITX21_CH1_M	34	GND
35	HDMITX21_CH1_P	36	EDP_LN3_TXP
37	GND	38	EDP_LN3_TXN
39	HDMITX21_CH2_M	40	GND
41	HDMITX21_CH2_P	42	EDPAUXN
43	GND	44	EDPAUXP
45	USB_DP_P0	46	GND
47	USB_DM_P0	48	EDP_LN0_TXP
49	GND	50	EDP_LN0_TXN
51	DP_LN3_TXN	52	GND
53	DP_LN3_TXP	54	EDP_LN2_TXP
55	GND	56	EDP_LN2_TXN
57	DPAUXP	58	GND
59	DPAUXN	60	EDP_LN1_TXP
61	GND	62	EDP_LN1_TXN
63	DP_LN2_TXP	64	GND
65	DP_LN2_TXN	66	USB_DM_P1
67	GND	68	USB_DP_P1
69	DP_LN1_TXP	70	GND

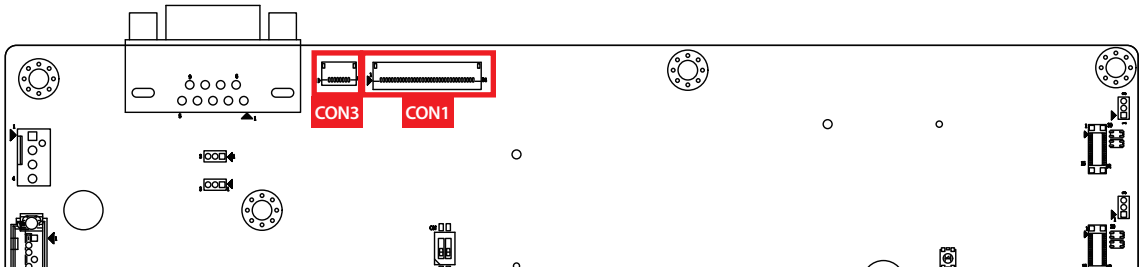
Pin No.	Definition	Pin No.	Definition
71	DP_LN1_TXN	72	SSUSB_TXN1
73	GND	74	SSUSB_TXP1
75	DP_LN0_TXP	76	GND
77	DP_LN0_TXN	78	SSUSB_RXN1
79	GND	80	SSUSB_RXP1
81	PCIE_CKRXN_P	82	GND
83	PCIE_CKRXP_P	84	EAR_MIC_P
85	GND	86	EAR_MIC_N
87	AVSS30_AUD	88	GND
89	GND	90	HP_EINT

The pin define of J4 is listed in the following table.

Pin No.	Definition	Pin No.	Definition
1	CAM_SDA0	2	SPIM0_CLK
3	CAM_SCL0	4	GND
5	CAM_SDA1	6	SPIM0_CSB
7	CAM_SCL1	8	SPIM0_MOSI
9	DMIC3_DAT	10	SPIM0_MISO
11	DMIC3_SCK	12	GND
13	SDA2	14	GPIO1_1V8
15	SCL2	16	GPIO4_1V8
17	DMIC4_DAT	18	GPIO3_1V8
19	DMIC4_SCK	20	GPIO0_1V8
21	GND	22	GPIO2_1V8
23	CSI0A_L0P	24	GPIO6_1V8
25	CSI0A_L0N	26	EDP_HPD_1V8
27	GND	28	GND
29	CSI0A_L2N	30	CSI0D_L1N
31	CSI0A_L2P	32	CSI0D_L1P
33	GND	34	GND
35	CSI0A_L1P	36	CSI0D_L0N
37	CSI0A_L1N	38	CSI0D_L0P
39	GND	40	GND
41	CSI0B_L0P	42	CSI0C_L1P

Pin No.	Definition	Pin No.	Definition
43	CSI0B_L0N	44	CSI0C_L1N
45	GND	46	GND
47	CSI0B_L1N	48	CSI0C_L2N
49	CSI0B_L1P	50	CSI0C_L2P
51	GND	52	GND
53	CSI1A_L1N_T1A	54	CSI0C_L0N
55	CSI1A_L1P_T0C	56	CSI0C_L0P
57	GND	58	GND
59	CSI1A_L2N_T1C	60	PCIEG3_LN0_RXP
61	CSI1A_L2P_T1B	62	PCIEG3_LN0_RXN
63	GND	64	GND
65	CSI1B_L0P_T0A	66	PCIEG3_LN1_TXN
67	CSI1B_L0N_T0B	68	PCIEG3_LN1_TXP
69	GND	70	GND
71	CSI1B_L1P_T0C	72	PCIEG3_LN1_RXP
73	CSI1B_L1N_T1A	74	PCIEG3_LN1_RXN
75	GND	76	GND
77	CSI1A_L0N_T0B	78	PCIEG3_LN0_TXN
79	CSI1A_L0P_T0A	80	PCIEG3_LN0_TXP
81	GND	82	GND
83	AU_HPR	84	PCIEG3_CLKP
85	AU_REFN	86	PCIEG3_CLKN
87	AU_HPL	88	GND
89	GND	90	HOMEKEY_SW

2.4.16 MIPI DSI 4-Lane connector and touchscreen connector (CON1, CON3)



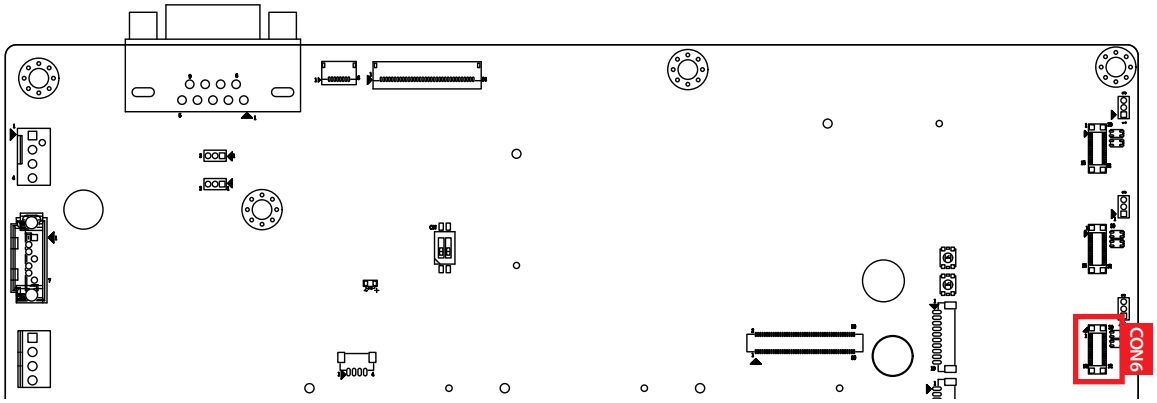
There is a MIPI DSI 4-Lane connector on the front side of ESOM-MT-1200-CB. It is for connecting to the MIPI LCD display. The pin define of CON1 is listed in the following table.

Pin No.	Definition	Pin No.	Definition
1	+3.3V	2	+3.3V
3	Reserved	4	LCM_LED_EN_3V3
5	LCM_PWM	6	I2C_3V3_SDA
7	I2C_3V3_SCL	8	Reserved
9	GND	10	DSI_D2P
11	DSI_D2N	12	GND
13	DSI_D1P	14	DSI_D1N
15	GND	16	DSI_CLKP
17	DSI_CLKN	18	GND
19	DSI_D0P	20	DSI_D0N
21	GND	22	DSI_D3P
23	DSI_D3N	24	GND
25	GND	26	GND
27	GND	28	Reserved
29	AGING	30	Reserved
31	LED_BL	32	LED_BL
33	LED_BL	34	LED_BL

There is a touchscreen connector on the front side of ESOM-MT-1200-CB. It is for connecting to the MIPI LCD touchscreen. The pin define of CON3 is listed in the following table.

Pin No.	Definition	Pin No.	Definition
1	GND	2	Reserved
3	Reserved	4	TP_3V3_INT
5	I2C_3V3_SCL	6	I2C_3V3_SDA
7	+3.3V	8	Reserved

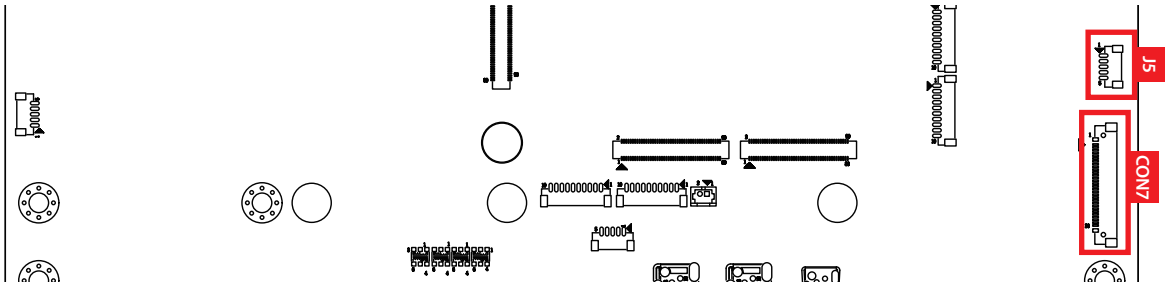
2.4.17 MIPI CSI 4-Lane Connectors (CON6)



There are one MIPI CSI 4-lane connectors on the ESOM-MT-1200-CB for connecting the camera module. The pin define are listed in the following table.

Pin No.	Definition	Pin No.	Definition
1	CMMCLK	2	DGND
3	MDP0	4	MDN0
5	DGND	6	MDN1
7	MDP1	8	DGND
9	MCN	10	MCP
11	DGND	12	NC
13	NC	14	AVDD2V8
15	AGND	16	DVDD_1V0
17	DOVDD1V8	18	DGND
19	SCL	20	SDA
21	RESET	22	NC
23	DVDD_1V0	24	DGND
25	MDP3	26	MDN3
27	DGND	28	MDN2
29	MDP2	30	DGND

2.4.18 eDP connector and touchscreen connector (CON7, J5)



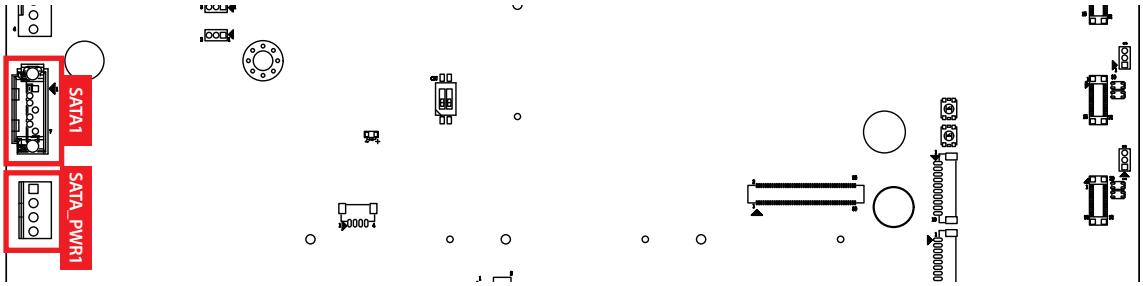
There is a eDP connector on the front side of ESOM-MT-1200-CB. It is for connecting to the eDP LCD display. The pin define of CON7 is listed in the following table.

Pin No.	Definition	Pin No.	Definition
1	CABC_EN	2	H_GND
3	LANE1_N	4	L LANE1_P
5	H_GND	6	LANE0_N
7	LANE0_P	8	H_GND
9	AUX_CH_P	10	AUX_CH_N
11	H_GND	12	LCD_VCC
13	LCD_VCC	14	NC
15	H_GND	16	H_GND
17	EDP_HPD	18	BL_GND
19	BL_GND	20	BL_GND
21	BL_GND	22	BL_ENABLE
23	BL_PWM	24	NC
25	NC	26	BL_POWER
27	BL_POWER	28	BL_POWER
29	BL_POWER	30	NC

There is a touchscreen connector on the front side of ESOM-MT-1200-CB. It is for connecting to the eDP LCD touchscreen. The pin define of J5 is listed in the following table.

Pin No.	Definition	Pin No.	Definition
1	+5V	2	USB D-
3	USB D+	4	GND
5	GND		

2.4.19 SATA and SATA power connector (SATA1, SATA_PWR1)



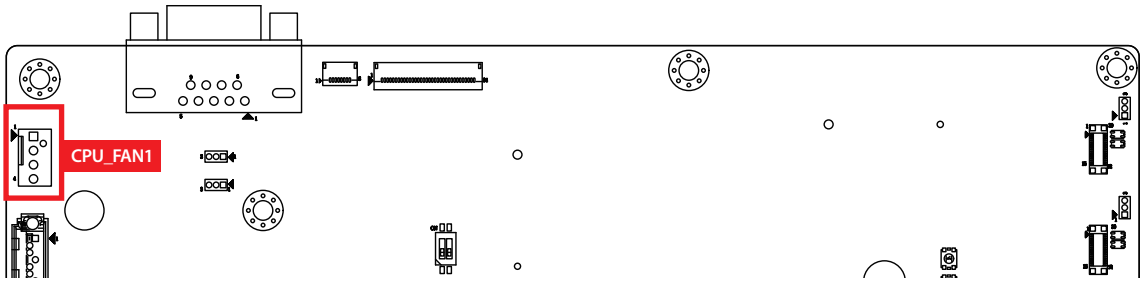
There is a high performance Serial ATA (SATA) on the ESOM-MT-1200-CB. It support higher storage capacity with less cabling effort and smaller required space. The pin define of SATA1 is listed in the following table.

Pin No.	Definition	Pin No.	Definition
1	GND	2	TX+
3	TX-	4	GND
5	RX-	6	RX+
7	GND		

The ESOM-MT-1200-CB also equip with a SATA power connector. The one port supports 5V (Up to 2A) and 12V (Up to 2A) current to the hard drive or SSD. The pin define of SATA_PWR1 is listed in the following table.

Pin No.	Definition	Pin No.	Definition
1	+12V	2	GND
3	GND	4	+5V

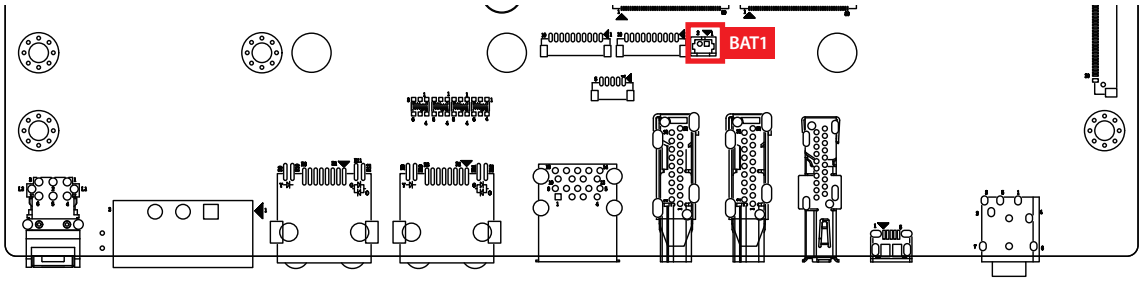
2.4.20 FAN header (CPU_FAN1)



There is a FAN header on the front side of ESOM-MT-1200-CB. The FAN header support for additional thermal requirements. The pin define are listed in the following table.

Pin No.	Definition	Pin No.	Definition
1	GND	2	+12V
3	FAN_TAC	4	FAN PWM

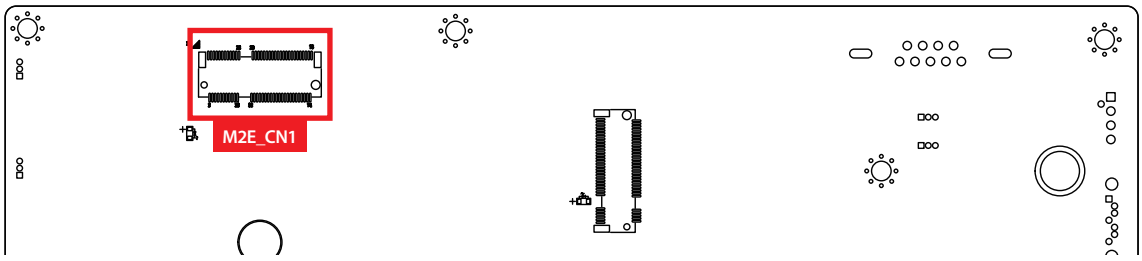
2.4.21 RTC Battery Connector (BAT1)



There is a RTC battery connector on the front side of ESOM-MT-1200-CB. It can support lithium battery, and provides power to the MCU to maintain the real time clock when the board is not connected to the DC adapter. The pin define are listed in the following table.

Pin No.	Function
1	VRTC
2	GND

2.4.22 M.2 key E slot for USB 2.0, PCIe Gen2x1 support (M2E_CN1)

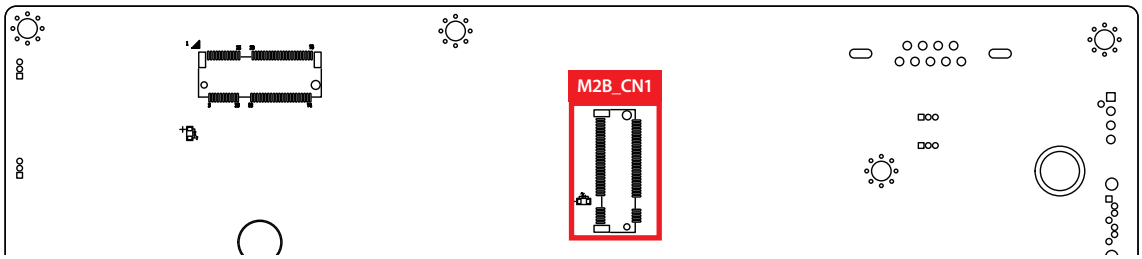


There is a M.2 key E slot on the rear side of ESOM-MT-1200-CB. M.2 key E slot is suitable for applications that use wireless connectivity including Wi-Fi, Bluetooth, NFC or GNSS. Module card types include 2230. The pin define are listed in the following table.

Pin No.	definition	Pin No.	definition
75	GND	74	+3.3V
73	NC	72	+3.3V
71	NC	70	NC
69	GND	68	NC
67	NC	66	NC
65	NC	64	NC
63	GND	62	ALERT#

Pin No.	definition	Pin No.	definition
61	NC	60	I2C_CLK2
59	NC	58	I2C_DAT2
57	GND	56	W_DISABLE1#
55	PEWAKE0#	54	W_DISABLE2#
53	CLKREQ0#	52	PERST0#
51	GND	50	SUSCLK
49	REFCLKn0	48	NC
47	REFCLKp0	46	NC
45	GND	44	NC
43	PERn0	42	NC
41	PERp0	40	NC
39	GND	38	NC
37	PETn0	36	NC
35	PETp0	34	NC
33	GND	32	NC
Mechanical Key			
23	NC		
21	NC	22	NC
19	NC	20	NC
17	NC	18	GND
15	NC	16	LED2#
13	NC	14	NC
11	NC	12	NC
9	NC	10	NC
7	GND	8	NC
5	USB D-	6	LED1#
3	USB D+	4	+3.3V
1	GND	2	+3.3V

2.4.23 M.2 key B slot for USB 3.1 support (M2B_CN1)

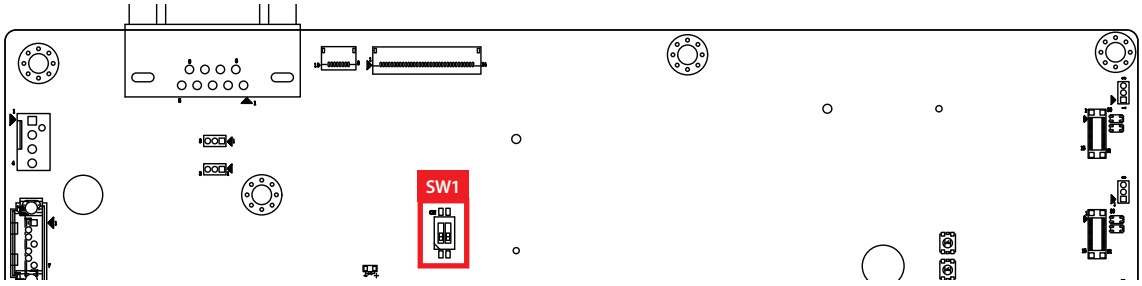


There is a M.2 key B slot on the rear side of ESOM-MT-1200-CB. It is used for wireless networking options such as a 5G module. Module card types include 2280. The pin define are listed in the following table.

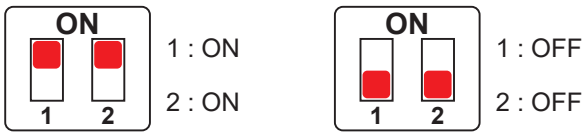
Pin No.	definition	Pin No.	definition
75	NC	74	+3.3V
73	GND	72	+3.3V
71	GND	70	+3.3V
69	NC	68	NC
67	NC	66	SIM_DETECT
65	NC	64	NC
63	NC	62	NC
61	NC	60	NC
59	NC	58	NC
57	GND	56	NC
55	NC	54	NC
53	NC	52	NC
51	GND	50	NC
49	NC	48	NC
47	NC	46	NC
45	GND	44	NC
43	NC	42	NC
41	NC	40	NC
39	GND	38	DEVSLP
37	USB TX+	36	UIM_PWR
35	USB TX-	34	UIM_DATA
33	GND	32	UIM_CLK
31	USB RX+	30	UIM_RESET
29	USB RX-	28	NC
27	GND	26	NC

Pin No.	definition	Pin No.	definition
25	NC	24	NC
23	NC	22	NC
21	NC	20	NC
Mechanical Key			
11	GND		
9	USB D-	10	LED1#
7	USB D+	8	W_DISABLE#
5	GND	6	FULL_CARD_PWR_OFF
3	GND	4	+3.3V
1	NC	2	+3.3V

2.4.24 DIP switch for USB OTG function (SW1)

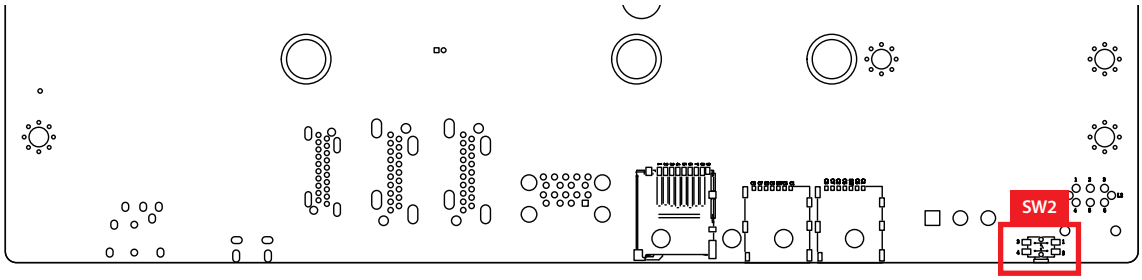


There are two function selected by SW1. When the SW1 is switched to “on”, the USB 3.0 Type A bottom port will be changed a pure master USB 3.0 signal. When it is switched to “off”, the USB 3.0 Type A bottom port will be changed OTG mode slave device, the device mode can be downloaded image to eMMC storage by master. Default setting is “on”.

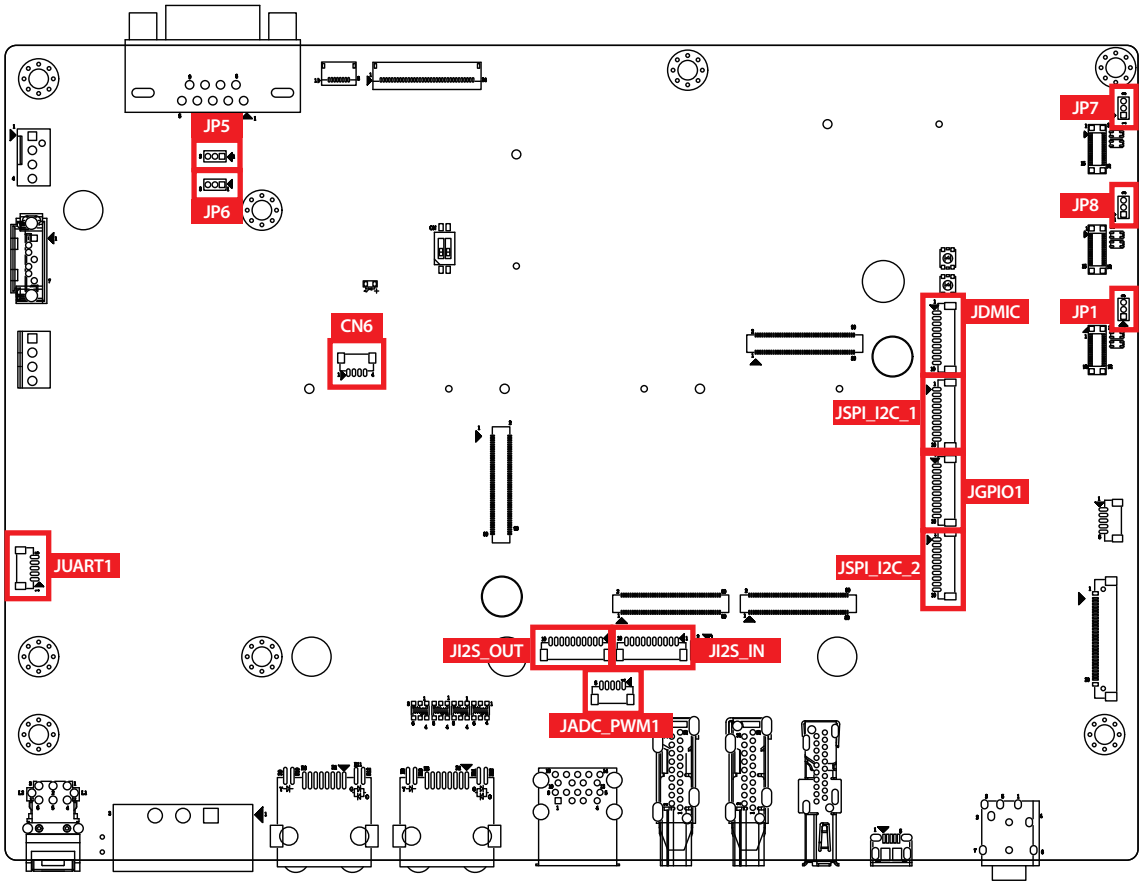


2.4.25 Reset Button (SW2)

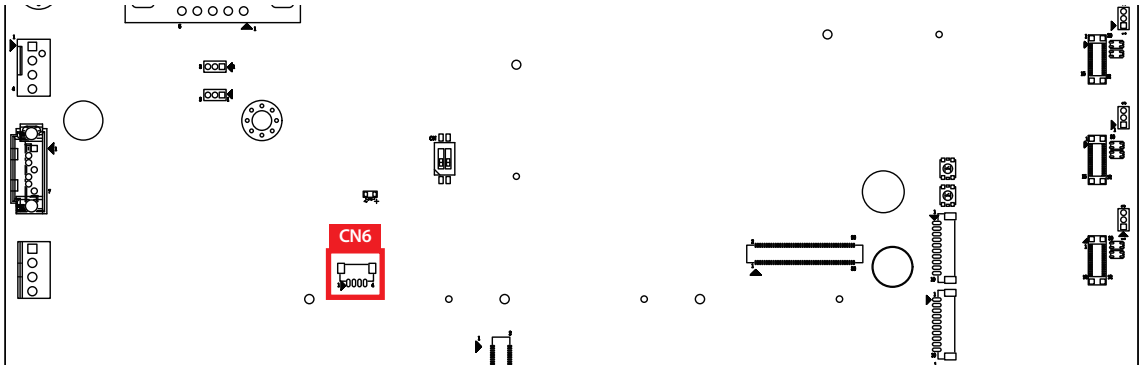
There is a reset button on the rear side of ESOM-MT-1200-CB, which allows users to reboot or reset the system forcibly.



2.5 Carrier Board Headers



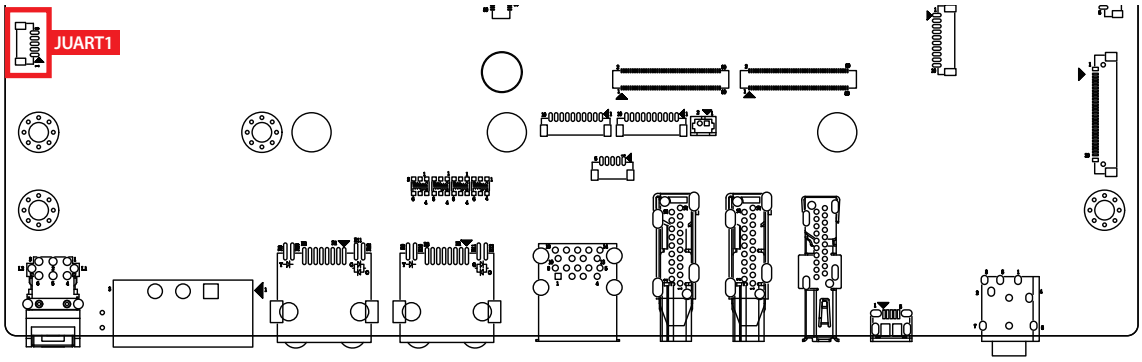
2.5.1 USB 2.0 header (CN6)



There is a USB 2.0 header available supporting up to 480Mbps per second data rate on the ESOM-MT-1200-CB. The pin define are listed in the following table.

Pin No.	Definition	Pin No.	Definition
1	+5V	2	USB D-
3	USB D+	4	GND

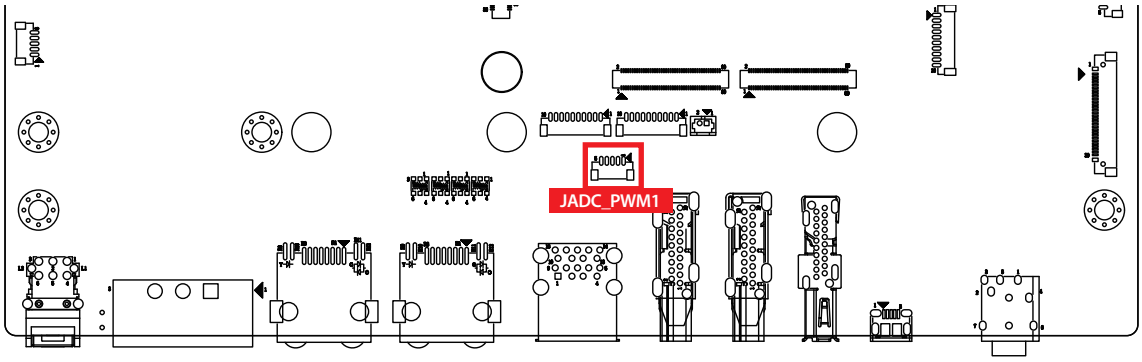
2.5.2 RS-232 header (JUART1)



There is a RS-232 header on the front side of ESOM-MT-1200-CB. The pin header supports RS-232 (TX/RX) mode and is used to control peripheral equipment. The pin define are listed in the following table.

Pin No.	Definition	Pin No.	Definition
1	RS232_TX	2	RS232_RX
3	GND	4	NC
5	NC		

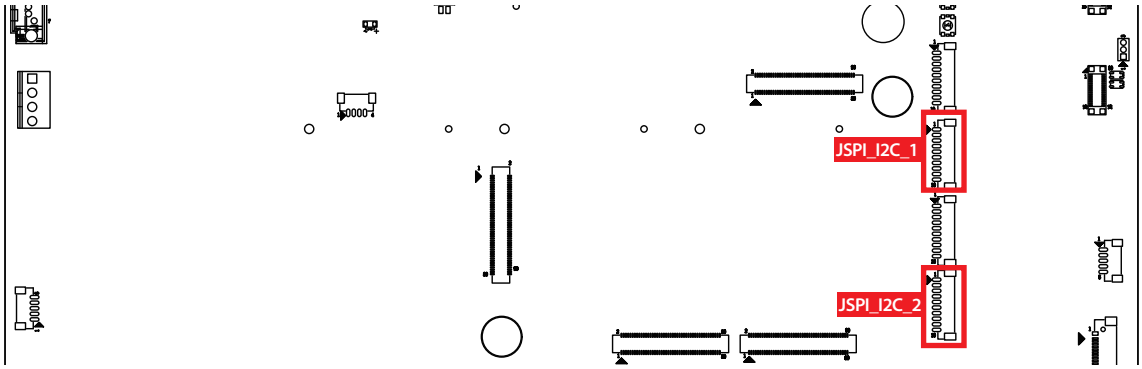
2.5.3 ADC, PWM header (JADC_PWM1)



There is an ADC and PWM header on the front side of ESOM-MT-1200-CB. It is for connecting the ADC and PWM devices. The PWM signal with voltage 1.8V level, ADC signal with voltage 1.45V level. The pin define are listed in the following table.

Pin No.	Definition	Pin No.	Definition
1	+1.8V	2	Reserved
3	AUXIN	4	GND
5	PWM		

2.5.4 SPI, I2C header (JSPI_I2C_1, JSPI_I2C_2)



There are two SPI and I2C header on the front side of ESOM-MT-1200-CB. It is for connecting the SPI and I2C devices. The all signals with voltage 3.3V level.

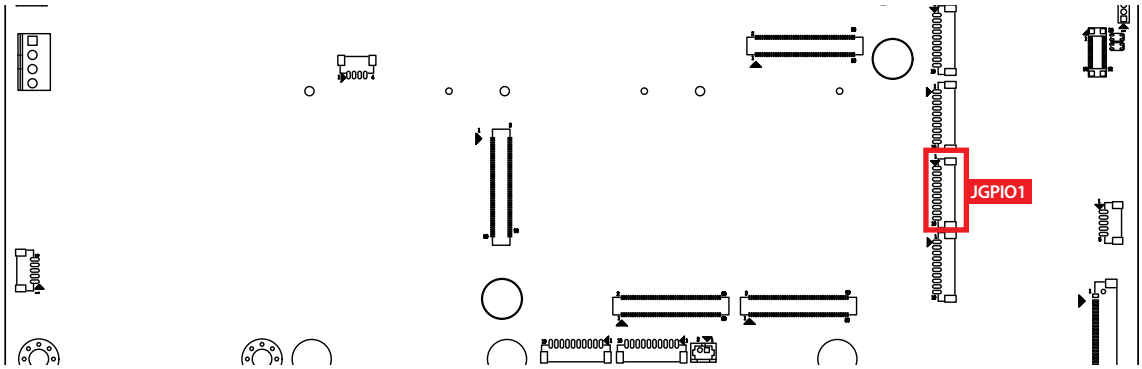
The pin define of JSPI_I2C_1 is listed following table.

Pin No.	Definition	Pin No.	Definition
1	GND	2	I2C_SCL1
3	I2C_SDA1	4	GND
5	SPIM0_CLK	6	SPIM0_CSB
7	SPIM0_MISO	8	SPIM0_MOSI
9	GND	10	+3.3V

The pin define of JSPI_I2C_2 is listed following table.

Pin No.	Definition	Pin No.	Definition
1	GND	2	I2C_SCL0
3	I2C_SDA0	4	GND
5	SPIM1_CLK	6	SPIM1_CSB
7	SPIM1_MISO	8	SPIM1_MOSI
9	GND	10	+3.3V

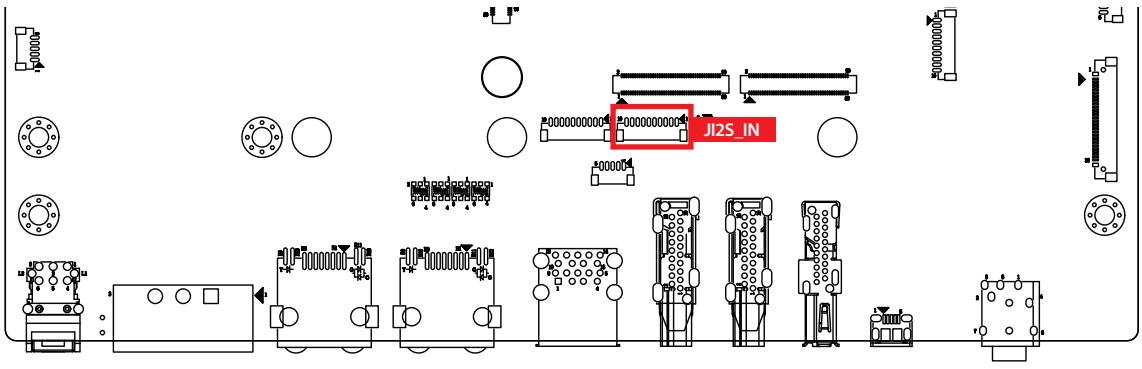
2.5.5 GPIO header (JGPIO1)



There is a 8-bit GPIO header on the front side of ESOM-MT-1200-CB. It is for connecting the 8 I/O expander GPIO devices. The all signals with voltage 3.3V level. The pin define are listed in the following table.

Pin No.	Definition	Pin No.	Definition
1	+3.3V	2	GPIO1
3	GPIO2	4	GPIO3
5	GPIO4	6	GPIO22
7	GPIO31	8	GPIO57
9	GPIO59	10	GND

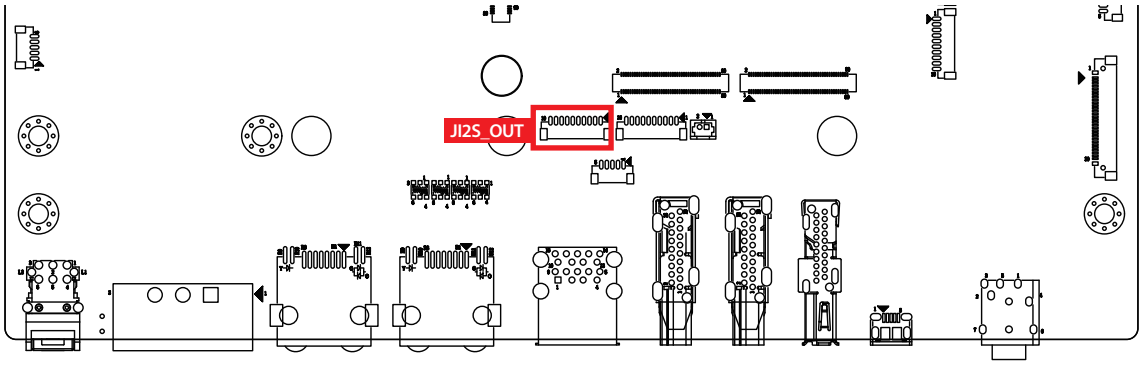
2.5.6 I2S input header (JI2S_IN)



There is a I2S input header on the front side of ESOM-MT-1200-CB. It is for connecting the I2S output device. The all signals with voltage 1.8 level. The pin define are listed in the following table.

Pin No.	Definition	Pin No.	Definition
1	+1.8V	2	I2C_SDA2
3	I2C_SCL2	4	GND
5	I2SIN_MCK	6	I2SIN_BCK
7	I2SIN_WS	8	GND
9	I2SIN_D0	10	GND

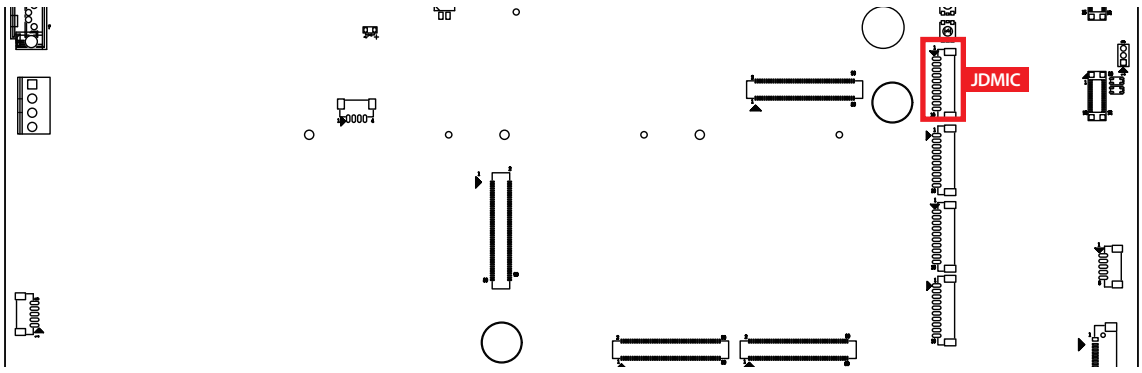
2.5.7 I2S output header (JI2S_OUT)



There is a I2S output header on the front side of ESOM-MT-1200-CB. It is for connecting the I2S input device. The all signals with voltage 1.8V level. The pin define are listed in the following table.

Pin No.	Definition	Pin No.	Definition
1	+1.8V	2	GND
3	I2SO1_MCK	4	I2SO1_BCK
5	I2SO1_WS	6	I2SO1_D0
7	I2SO1_D1	8	I2SO1_D2
9	I2SO1_D3	10	GND

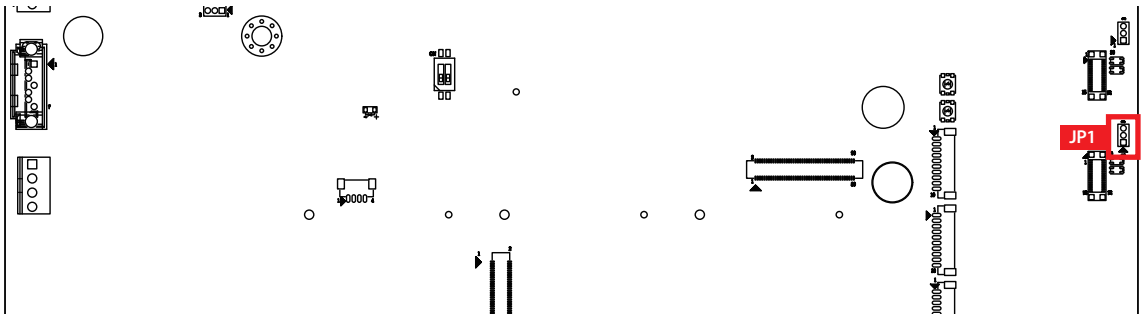
2.5.8 DMIC header (JDMIC)



There is a digital mic header on the front side of ESOM-MT-1200-CB. It is for connecting the two sets of digital mic input devices (PDM). The all signals with voltage 1.8V level. The pin define are listed in the following table.

Pin No.	Definition	Pin No.	Definition
1	+1.8V	2	I2C_SDA2
3	I2C_SCL2	4	GND
5	DMIC3_SCK	6	DMIC3_DAT
7	GND	8	DMIC4_SCK
9	DMIC4_DAT	10	GND

2.5.9 Camera sensor input voltage setting of CON6 (JP1)



JP1 Pin define:

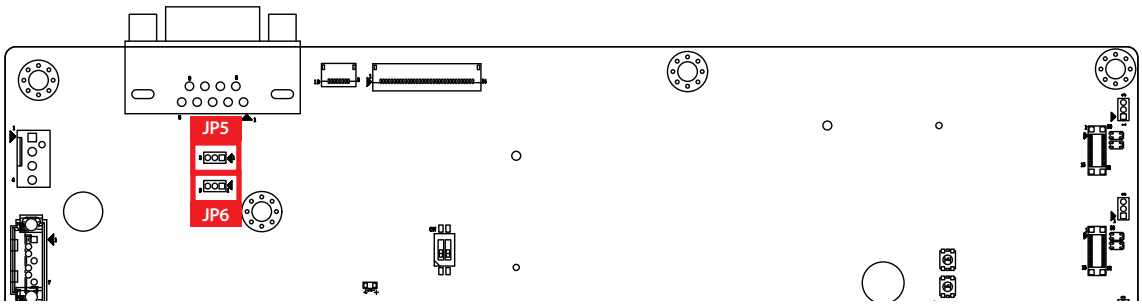
Pin No.	Definition	Pin No.	Definition
1	CAM_1V	2	VCAMD3_EXT
3	CAM_1V2		

JP1 Jumper setting:

Jumper pin	VCAMD3_EXT Voltage
*1-2	+1V
2-3	+1.2V

JP1 provides camera sensor voltage selection of CON6. Closing pin1 and pin2 is for IMX214; closing pin2 and pin3 is for IMX258.

2.5.10 COM port terminal resistor 120 ohm setting (JP5, JP6)



JP5 Pin define:

Pin No.	Definition	Pin No.	Definition
1	----	2	COM1_RXD_JP
3	COM1_DCD		

JP6 Jumper setting:

Pin No.	Definition	Pin No.	Definition
1	----	2	COM1_TXD_JP
3	COM1_DTR		

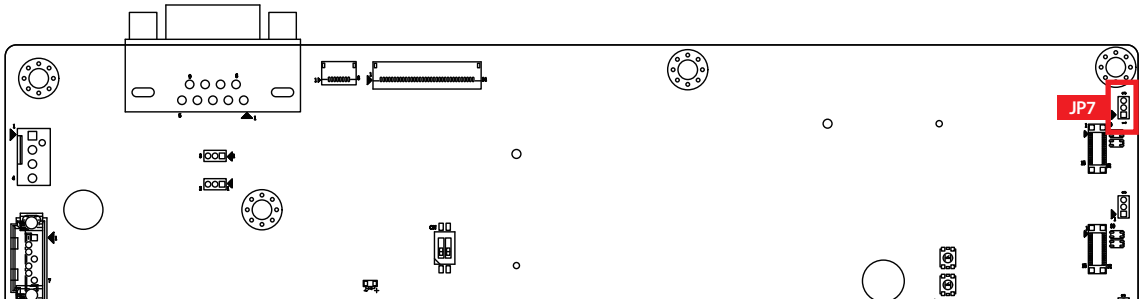
COM mode terminal resistor configuration table:

JP5 Jumper pin	JP6 Jumper pin	Mode
*1-2	*1-2	RS-232
1-2	2-3	RS-422
2-3	1-2	RS-485

There are two pin header (JP5 & JP6) to set terminal resistor of COM (CN15) function.

The COM port can be configured for RS-232, RS-422 or RS-485, the default setting is RS-232 mode.

2.5.11 Camera sensor input voltage setting of CON8 (JP7)



JP7 Pin define:

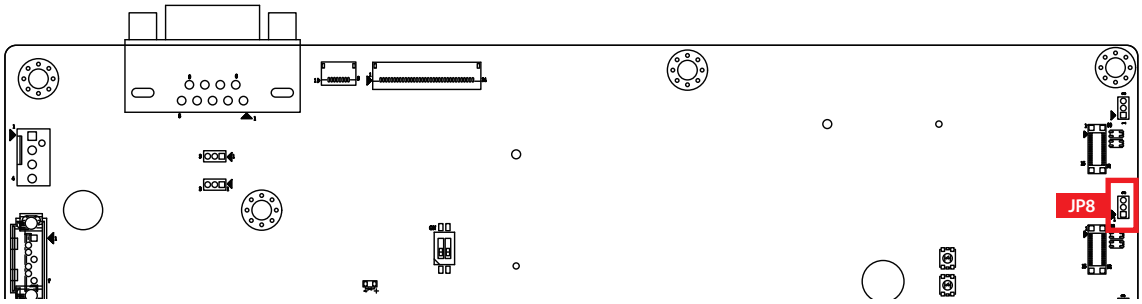
Pin No.	Definition	Pin No.	Definition
1	CAM_1V	2	VCAMD1_EXT
3	CAM_1V2		

JP7 Jumper setting:

Jumper pin	VCAMD3_EXT Voltage
*1-2	+1V
2-3	+1.2V

JP7 provides camera sensor voltage selection of CON8. Closing pin1 and pin2 is for IMX214; closing pin2 and pin3 is for IMX258.

2.5.12 Camera sensor input voltage setting of CON9 (JP8)



JP8 Pin define:

Pin No.	Definition	Pin No.	Definition
1	CAM_1V	2	VCAMD2_EXT
3	CAM_1V2		

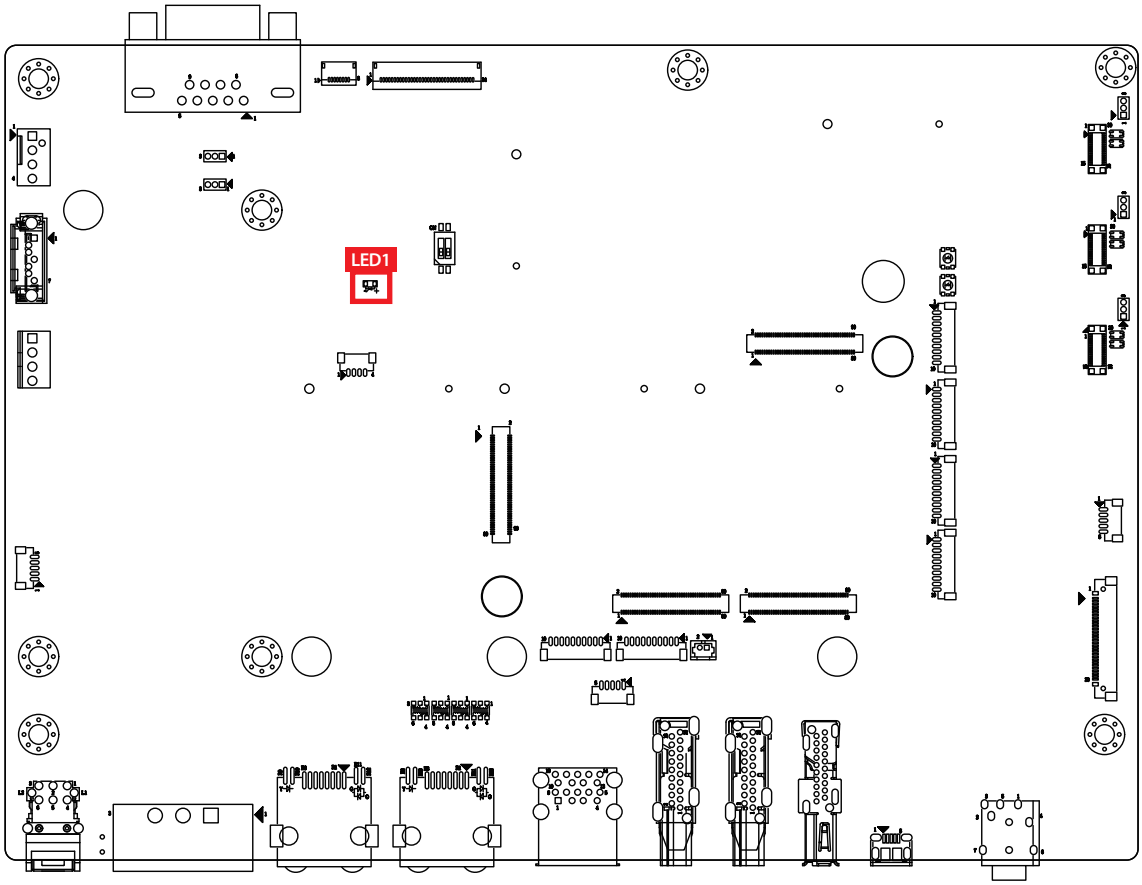
JP8 Jumper setting:

Jumper pin	VCAMD3_EXT Voltage
*1-2	+1V
2-3	+1.2V

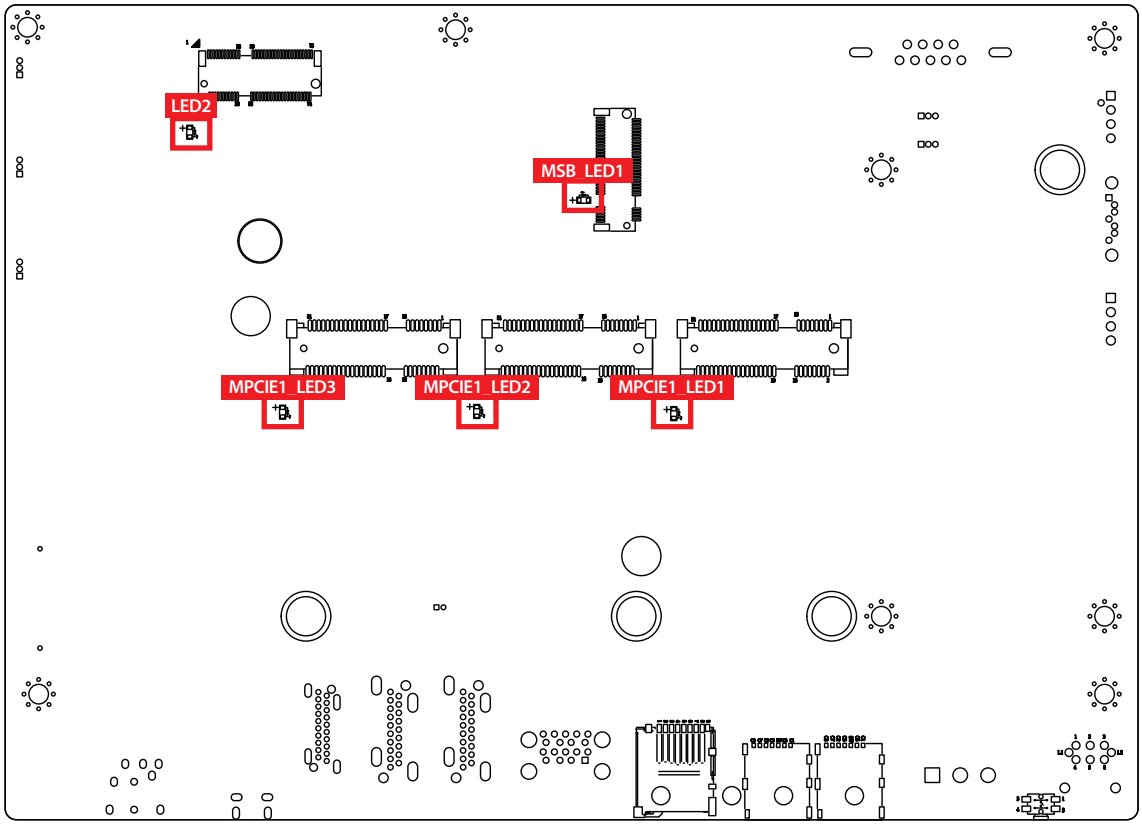
JP8 provides camera sensor voltage selection of CON9. Closing pin1 and pin2 is for IMX214; closing pin2 and pin3 is for IMX258.

2.6 LED Definition

2.6.1 Top View



2.6.2 Bottom View

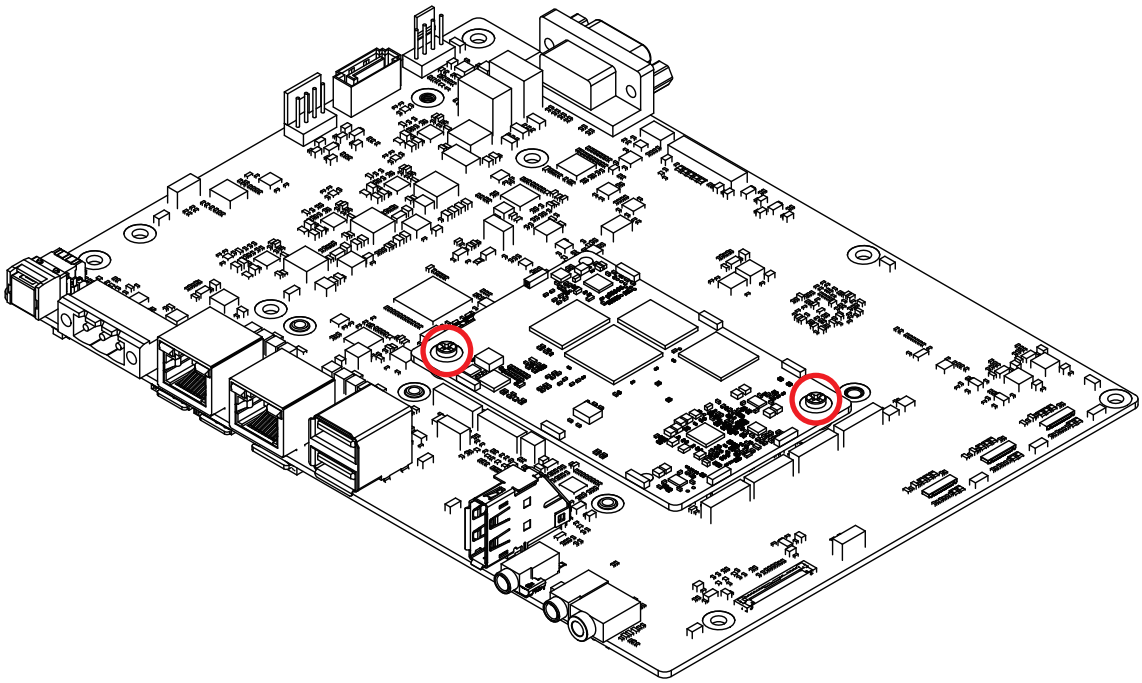


2.6.3 LED Function description

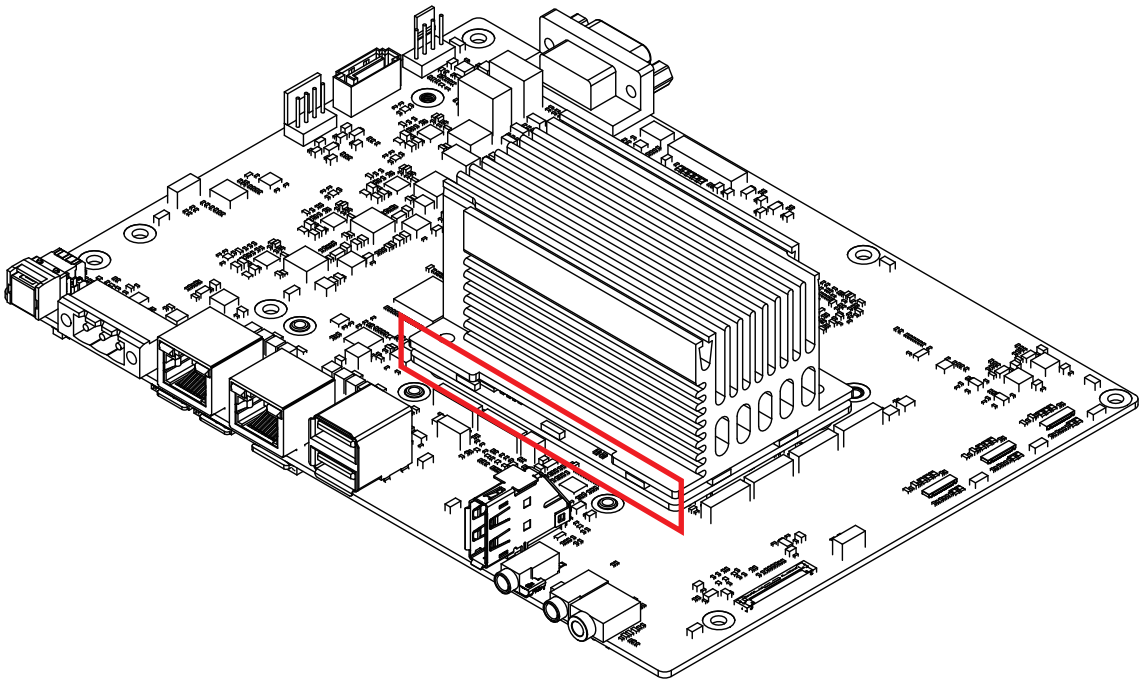
Part location	Definition
LED1	LED indicator for USB Hub to SATA bridge connection status.
LED2	LED indicator for detect device status on the M.2 Key E.
M2B_LED1	LED indicator for detect device status on the M.2 Key B.
MPCIE1_LED1	LED indicator for WLAN is active on the Mini PCIe 1 (CN10).
MPCIE1_LED2	LED indicator for WLAN is active on the Mini PCIe 2 (CN11).
MPCIE1_LED3	LED indicator for WLAN is active on the Mini PCIe 3 (CN12).

2.7 Heat Sink Installation

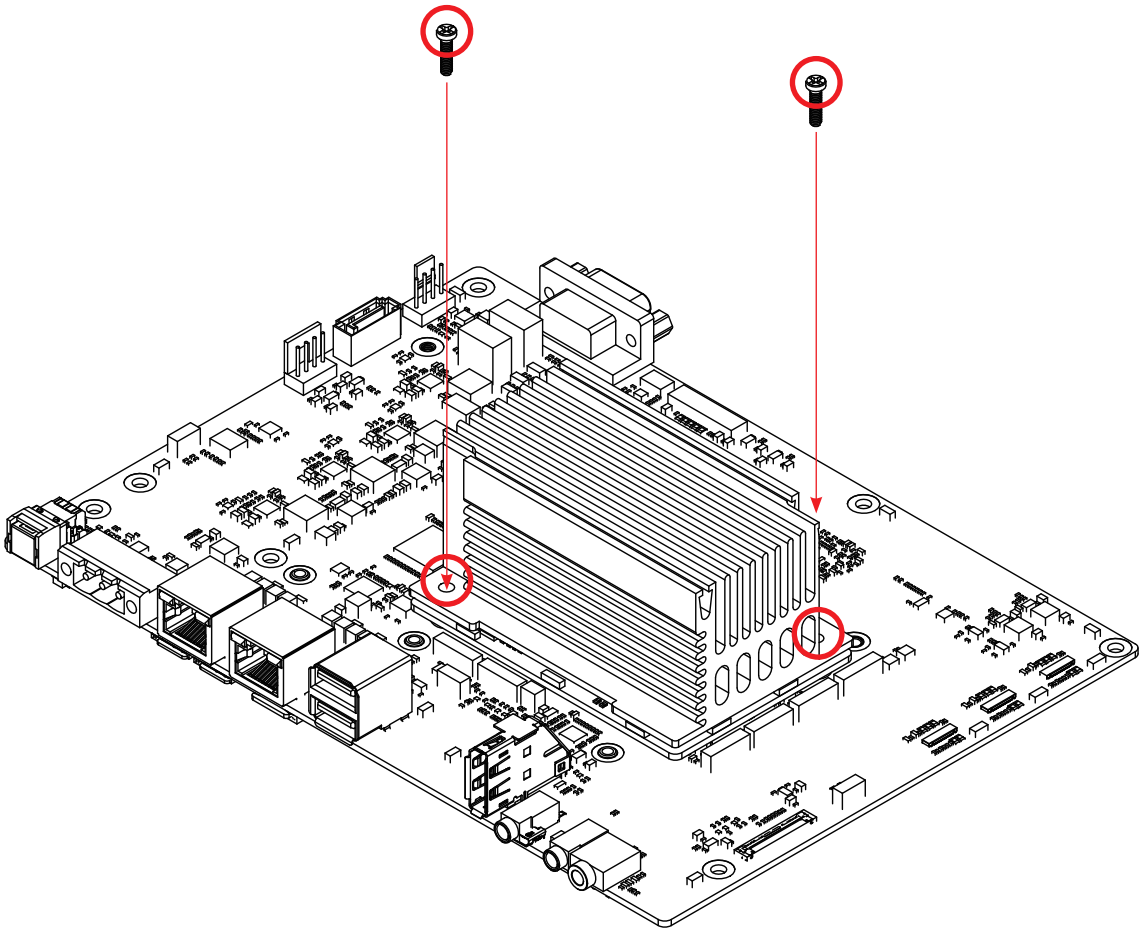
Step 1 Remove two PH-M2.5x10L Ni+Ny screws.



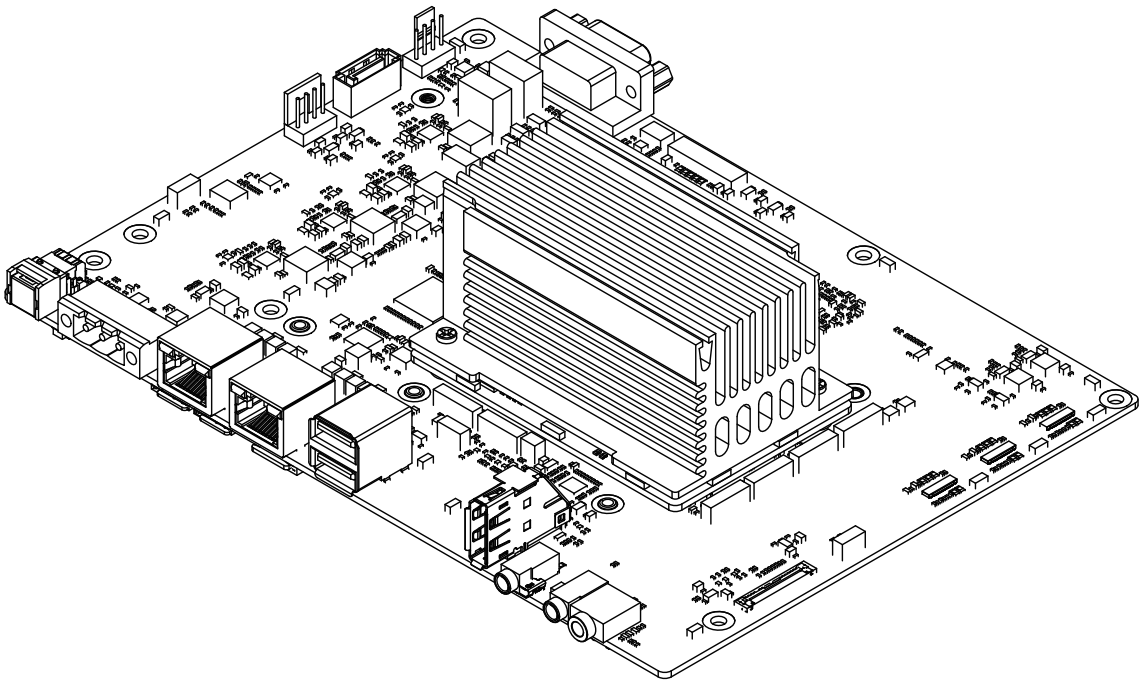
Step 2 Remove film on heat sink and face the groove to I/O.



Step 3 Fasten two pcs M2.5x10L Ni+Nyscrews.



Step 4 Finish



3

YOCTO SOFTWARE SETUP

3.1 Prepare Environment

3.1.1 Hardware

- Host PC with Ubuntu 18.04 later.
- USB Type A to A cable.

- 12V power adapter.

3.1.2 Software

On Linux, follow these steps to setup required software, USB device rules and install AIoT Tools.

- Git

```
add-apt-repository ppa:git-core/ppa

apt update

apt-get install git
```

- Python3

If you don't have Python and pip installed on your Ubuntu, run following commands to install them.

```
sudo apt update

sudo apt-get install python3

sudo apt-get install python3-pip
```

You can check Python and pip versions by running the following commands:

```
python3 --version
```

Python 3.9.2

```
pip3 --version
```

pip 21.2.4 from /usr/bin/pip3 (python 3.9)

If your version of pip3 is older than 20.3. Please upgrade it by running:

```
pip3 install --upgrade pip
```

- Fastboot

AIoT tools use fastboot to flash image, so you also need to install the fastboot executable. Run following commands to install packages:

```
sudo apt update

sudo apt-get install android-tools-adb android-tools-fastboot
```

- USB Device rules

Add new udev rule and add your user account to plugdev group:

```
echo 'SUBSYSTEM=="usb", ATTR{idVendor}=="0e8d",ATTR{idProduct}
=="201c", MODE="0660", $ GROUP="plugdev"' | sudo tee -a /etc/udev/
rules.d/96-rity.rules
```

```
sudo udevadm control --reload-rules

sudo udevadm trigger

sudo usermod -a -G plugdev $USER
```

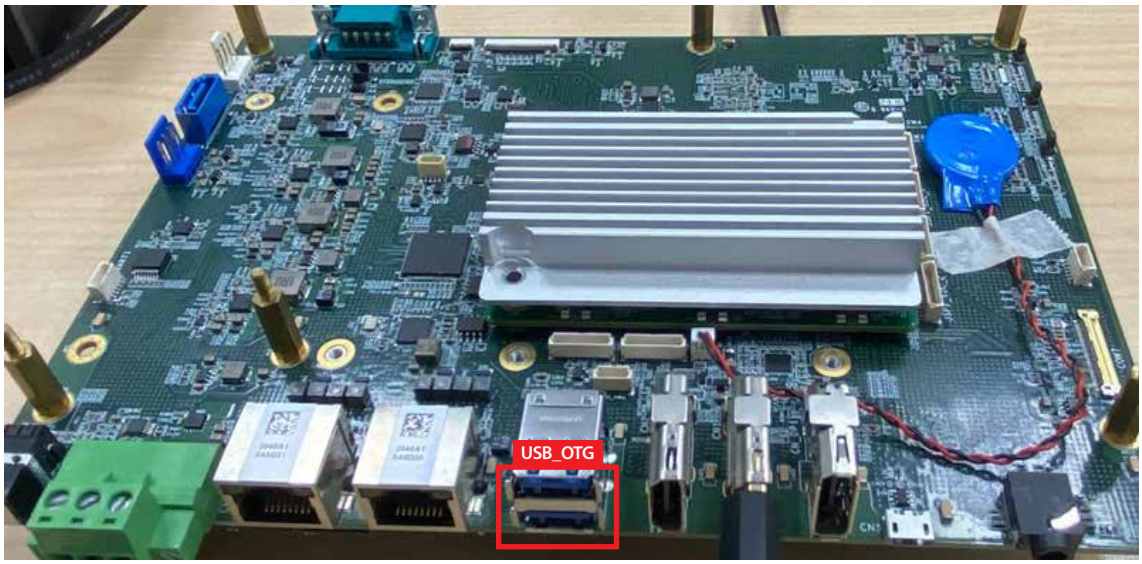
- AIoT Tools

After finishing installation of required packages and necessary configuration, we are now ready to install AIoT Tools:

```
pip3 install -U -e "git+https://gitlab.com/mediatek/aiot/bsp/aiot-tools.git#egg=aiot-tools"
```

3.1.3 Check hardware and software are ready

- Connect USB port of Host PC to the USB OTG port of ESOM-MT-1200 via type A cable.



- Run “aiot-config” command to check everything is OK . (On Host PC)

```
aiot-config
```

fastboot: OK
udev rules: OK

3.2 Install Yocto Image to Target

Remove 12v adapter and type A cable from ESOM-MT-1200.

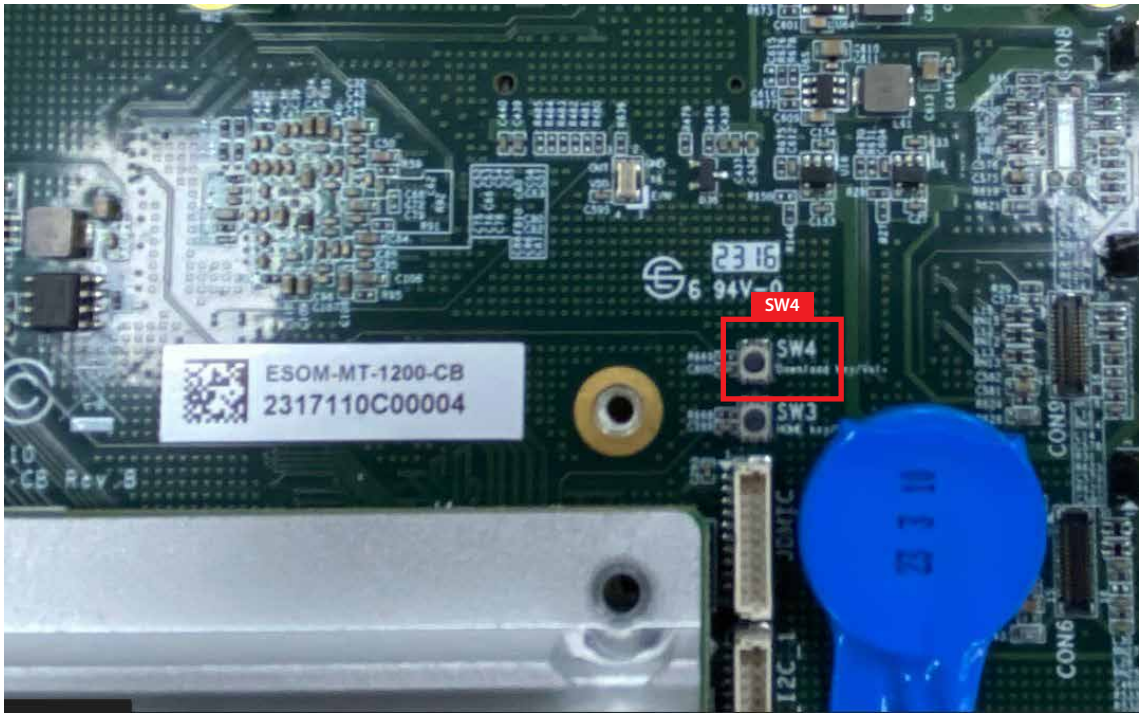
3.2.1 On Host PC

- Enter images folder.
- Run “aiot-flash --path image_path” as below:

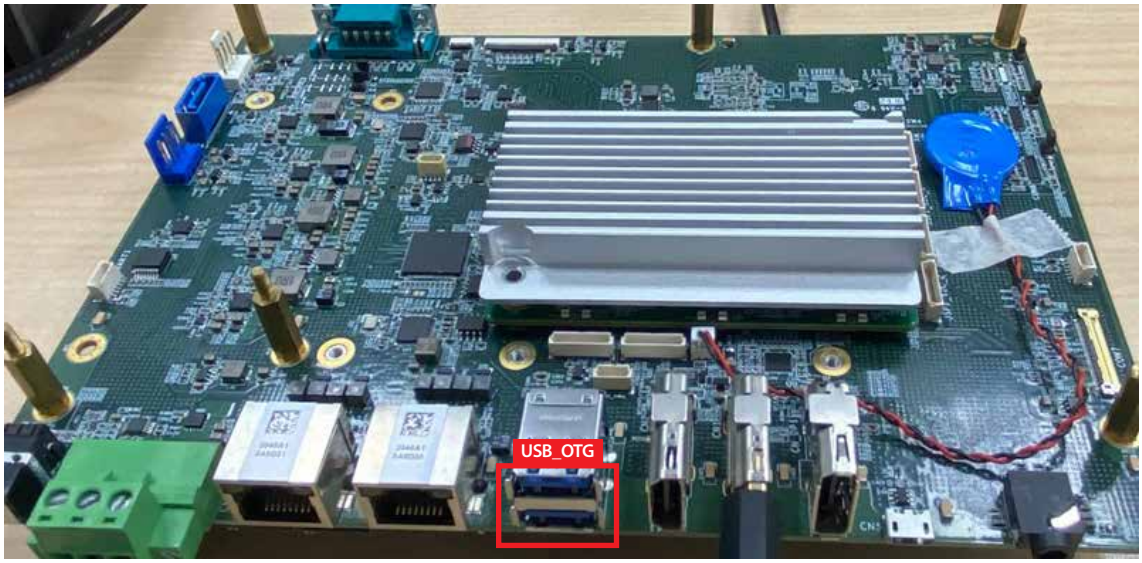
```
okd-build@okdbuild-desktop:~/WORK_AREA1/MTK/ESOM-MT-1200/Yocto/old-v22-bsp$ aiot-flash --path /home/okd-build/WORK_AREA1/MTK/ESOM-MT-1200/Yocto/old-v22-bsp/aiot-yocto_img_230725
AIoT Tools: v1.3.0
Yocto Image:
        name:     Rity Demo Image (rity-demo-image)
        distro:   Rity Demo Layer 22.2-release (rity-demo)
        codename: kirkstone
        machine:  i1200-demo
        overlays: []

WARNING:aiot:No 'ftdi-cbus' device found
```

3.2.2 On ESOM-MT-1200

- Press ‘SW4’ button. (Don’t release the button)



- Connect USB port of Host PC to the USB OTG port of ESOM-MT-1200 via type A cable.



- Release ‘SW4’ button to enter recovery mode to flash image on ESOM-MT-1200.

```
Looking for MediaTek SoC matching USB device 0e8d:0003
Opening /dev/ttyACM0 using baudate=115200
Connected to MediaTek MT8195 SoC
Sending bootstrap to address: 0x201000
Jumping to bootstrap at address 0x201000 in AArch64 mode
erasing mmc0
< waiting for any device >
Erasing 'mmc0'                                  (bootloader) request sz: 0xe8f800000, real erase len: 0x0
OKAY [  0.453s]
Finished. Total time: 0.457s
erasing mmc0boot0
Erasing 'mmc0boot0'                             (bootloader) request sz: 0x800000, real erase len: 0x800000
OKAY [  0.004s]
Finished. Total time: 0.008s
erasing mmc0boot1
Erasing 'mmc0boot1'                             (bootloader) request sz: 0x800000, real erase len: 0x800000
OKAY [  0.004s]
Finished. Total time: 0.008s
flashing mmc0=/home/okd-build/WORK_AREA1/MTK/ESOM-MT-1200/Yocto/old-v22-bsp/aiot-yocto_img_230725/rity-demo-image-i1200-demo.wic.img
Sending sparse 'mmc0' 1/10 (262140 KB)          OKAY [114.844s]
Writing 'mmc0'                                  OKAY [  9.476s]
Sending sparse 'mmc0' 2/10 (262140 KB)          OKAY [ 34.061s]
Writing 'mmc0'                                  OKAY [ 10.312s]
Sending sparse 'mmc0' 3/10 (235912 KB)          OKAY [ 28.645s]
Writing 'mmc0'                                  OKAY [  8.483s]
Sending sparse 'mmc0' 4/10 (242344 KB)          OKAY [ 18.844s]
Writing 'mmc0'                                  OKAY [  8.689s]
Sending sparse 'mmc0' 5/10 (231036 KB)          OKAY [ 10.155s]
Writing 'mmc0'                                  OKAY [  9.046s]
Sending sparse 'mmc0' 6/10 (262140 KB)          OKAY [  8.782s]
Writing 'mmc0'                                  OKAY [  9.385s]
Sending sparse 'mmc0' 7/10 (251308 KB)          OKAY [  8.854s]
Writing 'mmc0'                                  OKAY [  9.029s]
Sending sparse 'mmc0' 8/10 (233352 KB)          OKAY [  7.260s]
Writing 'mmc0'                                  OKAY [  8.376s]
Sending sparse 'mmc0' 9/10 (262140 KB)          OKAY [  7.234s]
Writing 'mmc0'                                  OKAY [  9.385s]
Sending sparse 'mmc0' 10/10 (92656 KB)          OKAY [  2.404s]
Writing 'mmc0'                                  OKAY [  3.332s]
Finished. Total time: 326.605s
flashing mmc0boot0=/home/okd-build/WORK_AREA1/MTK/ESOM-MT-1200/Yocto/old-v22-bsp/aiot-yocto_img_230725/bl2.img
Sending 'mmc0boot0' (205 KB)                    OKAY [  0.007s]
Writing 'mmc0boot0'                             OKAY [  0.184s]
Finished. Total time: 0.430s
flashing mmc0boot1=/home/okd-build/WORK_AREA1/MTK/ESOM-MT-1200/Yocto/old-v22-bsp/aiot-yocto_img_230725/u-boot-env.bin
Sending 'mmc0boot1' (4 KB)                      OKAY [  0.002s]
Writing 'mmc0boot1'                             OKAY [  0.081s]
Finished. Total time: 0.089s
Rebooting                                       OKAY [  0.002s]
Finished. Total time: 0.253s
```

3.2.3 Reboot

- Unplug type A cable from ESOM-MT-1200
- Plug 12v adapter to the ESOM-MT-1200
- Power on

A

APPENDIX A : POWER CONSUMPTION

Testing Board	ESOM-MT-1200
CPU	MediaTek i1200 Arm 4 Cortex-A78 and 4 Cortex-A55 processor
RAM	8 GB LPDDR4X DRAM
Storage	64 GB eMMC 5.1
USB-1 (USB 3.0)	Kingston 32GB
USB-2 (USB 3.0)	Kingston 32GB
USB-3 (USB 2.0)	USB Micsoft Wired Keyboard 600 USB Mouse HP G1K28AA
LAN1	1.0 Gbps
LAN2	1.0 Gbps
Graphics Output	HDMI
Power Plan	Balances
Power Source	Chroma 62006P-100-25
Test Program	Burn-in Test

A.1 MediaTek i1200 Arm 4 Cortex-A78 and 4 Cortex-A55 processor

Power on and boot to Yocto

CPU	Power Input	Yocto			
		idle status CPU		Stress Test	
		Max Current	Max Consumption	Max Current	Max Consumption
	12V	0.765A	09.18W	1.944A	23.33W

Vecow

For further support information, please visit www.vecow.com