

SMA-3568

Rockchip RK3568J , SMARC V2.1 RISC Module

User's Manual

1st Ed – 24 March 2025

FCC Statement



THIS DEVICE COMPLIES WITH PART 15 FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:

- (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE.
- (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRE OPERATION.

THIS EQUIPMENT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR A CLASS "A" DIGITAL DEVICE, PURSUANT TO PART 15 OF THE FCC RULES.

THESE LIMITS ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST HARMFUL INTERFERENCE WHEN THE EQUIPMENT IS OPERATED IN A COMMERCIAL ENVIRONMENT. THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY AND, IF NOT INSTALLED AND USED IN ACCORDANCE WITH THE INSTRUCTION MANUAL, MAY CAUSE HARMFUL INTERFERENCE TO RADIO COMMUNICATIONS.

OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE HARMFUL INTERFERENCE IN WHICH CASE THE USER WILL BE REQUIRED TO CORRECT THE INTERFERENCE AT HIS OWN EXPENSE.

A Message to the Customer

Avalue Customer Services

Each and every Avalue's product is built to the most exacting specifications to ensure reliable performance in the harsh and demanding conditions typical of industrial environments. Whether your new Avalue device is destined for the laboratory or the factory floor, you can be assured that your product will provide the reliability and ease of operation for which the name Avalue has come to be known.

Your satisfaction is our primary concern. Here is a guide to Avalue's customer services. To ensure you get the full benefit of our services, please follow the instructions below carefully.

Technical Support

We want you to get the maximum performance from your products. So if you run into technical difficulties, we are here to help. For the most frequently asked questions, you can easily find answers in your product documentation. These answers are normally a lot more detailed than the ones we can give over the phone. So please consult the user's manual first.

To receive the latest version of the user's manual; please visit our Web site at:

<http://www.avalue.com>

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1. Getting Started

1.1 Safety Precautions

Warning!



Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges. Only experienced electronics personnel should open the PC chassis.

Caution!



Always ground yourself to remove any static charge before touching the CPU card. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components in a static-dissipative surface or static-shielded bag when they are not in the chassis.

Always note that improper disassembling action could cause damage to the motherboard. We suggest not removing the heatsink without correct instructions in any circumstance. If you really have to do this, please contact us for further support.

1.2 Packing List

Before you begin installing your single board, please make sure that the following materials have been shipped:

- 1 x SMA-3568 Risc Module + SMA-3568 Carrier board Evaluation Kit



If any of the above items is damaged or missing, contact your retailer.

1.3 Document Amendment History

Revision	Date	By	Comment
1st	March 2025	Avalue	Initial Release

1.4 Manual Objectives

This manual describes in details Avalue Technology SMA-3568.

We have tried to include as much information as possible but we have not duplicated information that is provided in the standard IBM Technical References, unless it proved to be necessary to aid in the understanding of this board.

We strongly recommend that you study this manual carefully before attempting to set up SMA-3568 series or change the standard configurations. Whilst all the necessary information is available in this manual we would recommend that unless you are confident, you contact your supplier for guidance.

If you have any suggestions or find any errors regarding this manual and want to inform us of these, please contact our Customer Service department with the relevant details.

1.5 System Specifications

SMA-3568	
System	
CPU	Quad-core 64-bit Cortex-A55, 22nm lithography process, frequency up to 2.0GHz
GPU	ARM G52 2EE Supports OpenGL ES 1.1/2.0/3.2, OpenCL 2.0, Vulkan 1.1 Embedded high-performance 2D acceleration hardware
VPU	Supports 4K 60fps H.265/H.264/VP9 video decoding Supports 1080P 60fps H.265/H.264 video encoding Supports 8M ISP, supports HDR
System Chipset	Rockchip RK3568J
System Memory	2GB (standard on board)/ 4GB & 8GB LPDDR4 (by option)
Expansion Slot	
mPCIe	1 x (for 4G LTE Module use)
Storage	
SATA	1 x SATA Data Slot
eMMC	16GB(standard) / 32GB & 64GB & 128GB(by option) on board eMMC
SD / Micro Card	1 x TF Card Slot
Edge I/O	
LAN	2 x RJ45 (Giga ethernet)
WiFi	1 x Wifi2.4G/5G +BT 4.1 from UART1/PCM2 (Optional) x2 WiFi/BT Antenna interface (Optional)
USB	1 x USB2.0 Type-A 1 x USB3.0 HOST Type-A (OTG)
HDMI	1 x HDMI 2.0
DC Input	1 x DC Jack
SD / Micro Card	1 x TF Card Slot
Onboard I/O	
USB	2 x USB2.0 4P Header, pitch 2.0mm
RTC Battery	1 x RTC-Battery (CR1220)
LVDS	1 x (multiplex with DSI1)
LCD Backlight	eDP BACKLIGHT : 1 x (6P Header, pitch 2.0mm)
Brightness	LVDS BACKLIGHT : 1 x (6P Header, pitch 2.0mm)
Touch	I2C for TOUCH X1 (6P Header, pitch 2.0mm) J22
DC-Input	1 X 4P Header, pitch 2.0mm (for POE IN or DC IN)
Other	1 x Speaker(4P Header, pitch 2.0mm(Up to 2*5W)) 1 x Mic in Phone (4P Header, pitch 2.0mm (for Analog Mic)) 1 x SIM Socket (MXM 314P 0.5mm H7.8 SMD)

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	1 x IR IN 1 x Power Key 1 x Reset Key 1 x Recovery Key NOTE : SMARC3568J motherboard design defaults to 5.2V, and will be changed if there is a subsequent customer demand.
I/O Interface (SOM)	
I2S	1x
PCI Express	PCIe 2.1 *1(1 lane) PCIe 3.0 *1(2 lanes)
GPIO	x14 (CBD-Board 6P Header, pitch 2.0mm)
CAN	x1 (CBD-Board 4P Header, pitch 2.0mm)
UART	x6 (CBD-Board 4P Header, pitch 2.0mm)
USB	X 2 USB2.0 x1 USB3.0 HOST / OTG
System Memory	2GB (standard)/ 4GB & 8GB (by option) on board LPDDR4
eMMC	16GB(standard) / 32GB & 64GB & 128GB(by option) on board eMMC
DIO	X1 SDIO
I2C Bus	X4
SPI	x2
Others	X1 POE OUT (CBD-Board : 4P Header, pitch 2.0mm)
Display(refer to Edge I/O)	
Digital Display Interface (SOM)	X1 HDMI 2.0 X1 LVDS (multiplex with DSI1) X1 MIPI DSI (DSI0 &DSI1) (CBD-Board 40P FPC, pitch 0.5mm)
Other	X1 MIPI CSI (4 lanes)
Mechanical & Environmental Specification	
Power Mode	12V/2A
Operating Temp.	-40℃ ~ +85℃
Storage Temp.	0℃ ~ +70℃
Operating Humidity	40℃ 90%RH, non-condensing
Size (L x W)	SMARC V2.1 standard / Module-board

	SMARC/ SOM Size : 50mm*82mm CBD-Board : 170*138mm
Vibration Test	Package Vibration Test Reference IEC60068-2-64 Testing procedures Test Fh: Vibration broadband random Test 1. PSD: 0.026G²/Hz, 2.16 Grms 2. Non-operation mode 3. Test Frequency: 5-500Hz 4. Test Axis: X,Y and Z axis 5. 30 min. per each axis 6. IEC 60068-2-64 Test:Fh Random Vibration Operation Reference IEC60068-2-64 Testing procedures Test Fh : Vibration broadband random Test 1. PSD: 0.00454G²/Hz, 1.5 Grms 2. Operation mode 3. Test Frequency : 5-500Hz 4. Test Axis : X,Y and Z axis 5. 30 minutes per each axis 6. IEC 60068-2-64 Test:Fh Random Vibration Non Operation Reference IEC60068-2-64 Testing procedures Test Fh : Vibration broadband random Test 1. PSD: 0.01818G²/Hz, 3.0 Grms 2. Non Operation mode 3. Test Frequency : 5-500Hz 4. Test Axis : X,Y and Z axis 5. 30 minutes per each axis 6. IEC 60068-2-64 Test:Fh
Drop Test	Reference ISTA 2A, Method : IEC-60068-2-32 Test: Ed Drop Test 1 One corner , three edges, six faces 2 ISTA 2A, IEC-60068-2-32 Test:Ed
OS Information	Debian 11 (Standard)/ Android 11(by demand)

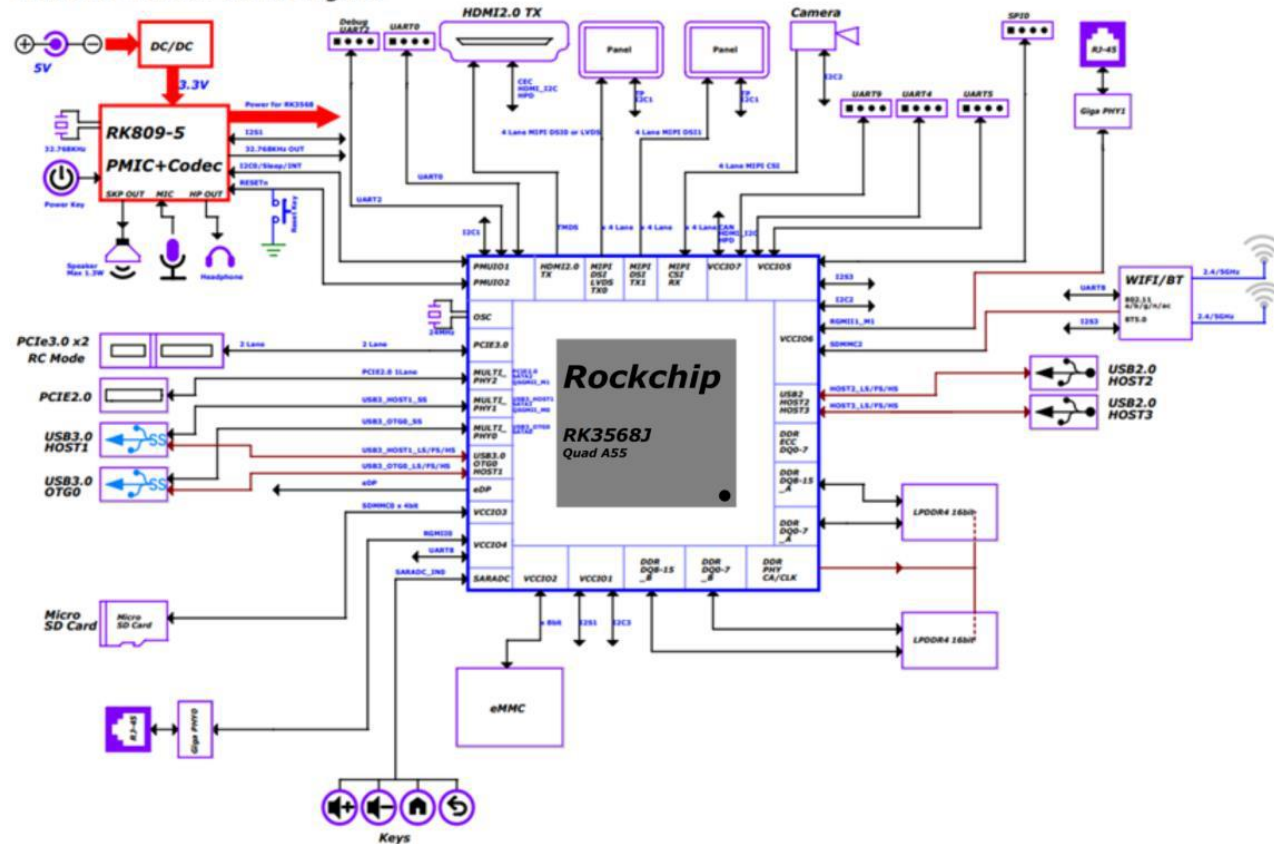


Note: Specifications are subject to change without notice.

1.6 Architecture Overview—Block Diagram

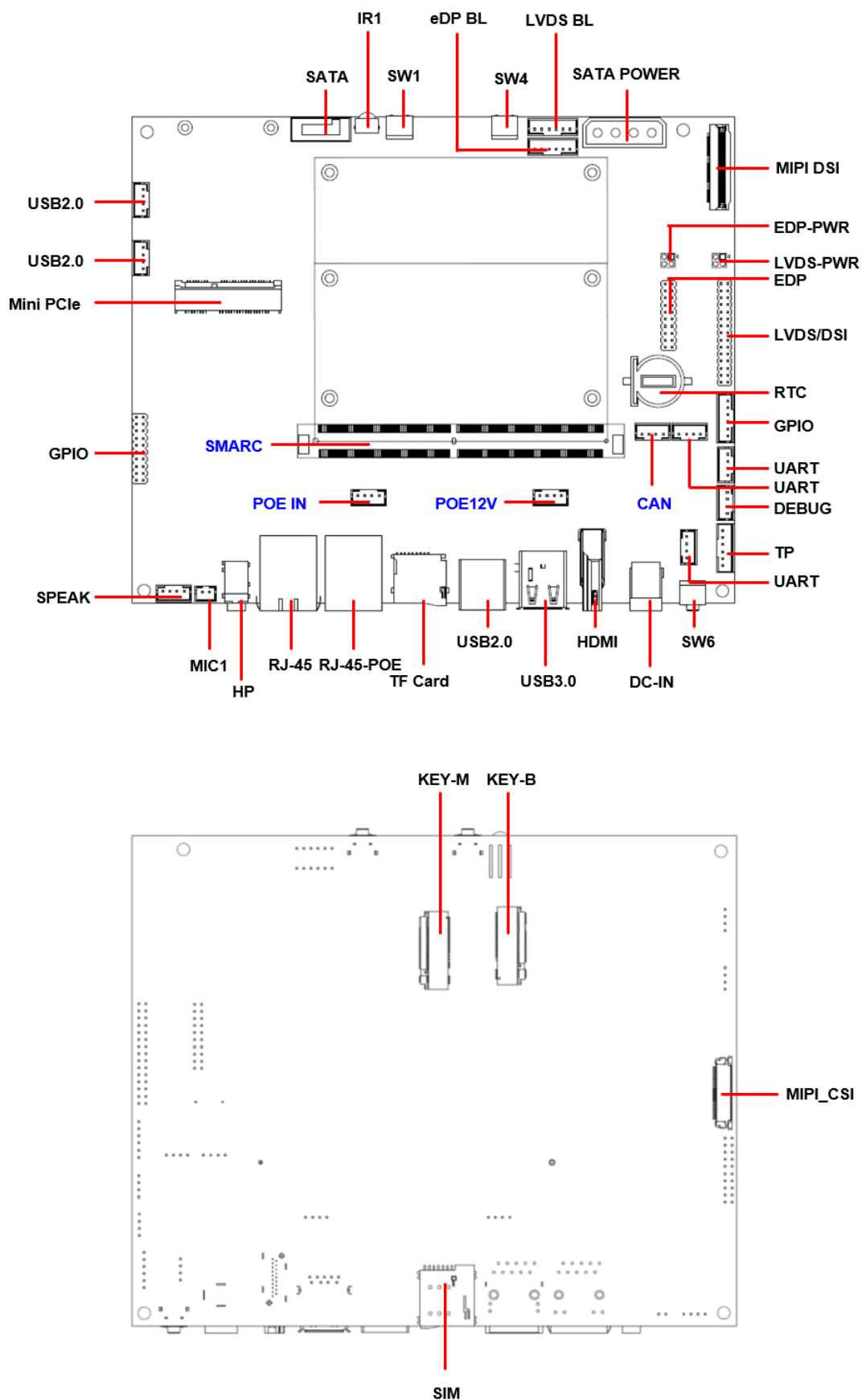
The following block diagram shows the architecture and main components of SMA-3568.

SOM-3568-SMARC Block Diagram



2. Hardware Configuration

2.1 SMA-3568 Product Overview



2.2 SMA-3568 Connector List

The following tables list the function of each of the board's connectors.

Connectors

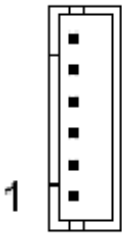
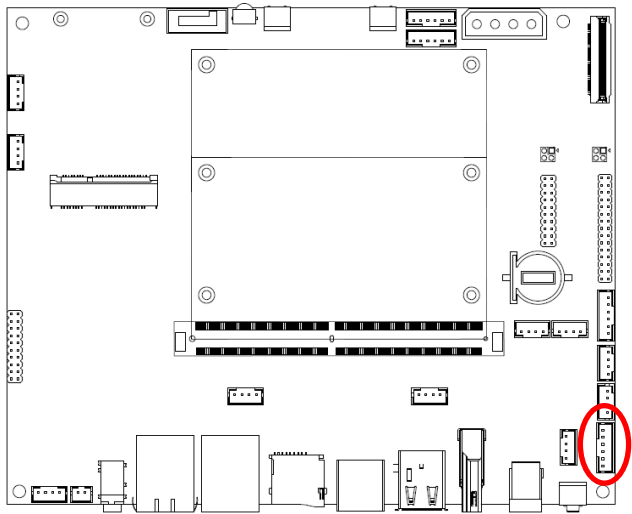
Label	Function	Note
SPEAK	Speaker connector	4 x 1 header, pitch 2.00mm
HP	Headphone connector	
MIC1	MIC Connector	2 x 1 header, pitch 2.00mm
RJ-45	RJ-45 Ethernet	
RJ-45-POE	RJ-45 Ethernet (An external POE module(802.3af) is required for power over ethernet.)	
TF_CARD	Micro SD slot	
SIM	SIM Card slot	
POE-IN	POE-OUT connector	4 x 1 header, pitch 2.00mm
POE12V	POE-12V connector	4 x 1 header, pitch 2.00mm (for POE IN or DC IN)
USB2.0	USB2.0-Type A connector	
USB3.0	USB3.0-Type A connector	OTG
HDMI	HDMI connector	
DC-IN	DC-OUT Jack	
SW6	Reset key	
RTC	RTC Battery connector	
TP	Touch Panel connector	6 x 1 header, pitch 2.00mm
DEBUG	DEBUG UART Connector	4 x 1 header, pitch 2.00mm
LVDS-PWR	LVDS_PANEL Vcc switch connector	3 x 2 header, pitch 2.00mm
LVDS/DSI	LVDS/DSI Connector	15 x 2 header, pitch 2.00mm
GPIO	GPIO connector	6 x 1 header, pitch 2.00mm
EDP	eDP Connector	10 x 2 header, pitch 2.00mm
EDP-PWR	eDP_PANEL Vcc switch connector	3 x 2 header, pitch 2.00mm
MIPI DSI	Single- MIPI1 LCM connector	FPC 34 Pin, pitch 0.5mm
SATA POWER	SATA Power connector	SATA_IDE_DIP_4Pin
LVDS BL	LVDS backlight connector	6 x 1 header, pitch 2.00mm
eDP BL	eDP backlight connector	6 x 1 header, pitch 2.00mm
SW1	Recovery/Update key	
SW4	PWR_ON/OFF key	

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IR1	IR Receiver	
SATA	SATA3.0 connector	
KEY-M	PCIe M.2 KEY M for Storage	
Mini PCIe	mini PCIe connector (for 4G LTE Module)	
KEY-B	PCIe M.2 KEY B connector	
USB2.0	USB2.0 slot	4 x 1 header, pitch 2.00mm
USB2.0	USB2.0 slot	4 x 1 header, pitch 2.00mm
GPIO	GPIO connector	10 x 2 header, pitch 2.00mm
SMARC	SMARC connector	

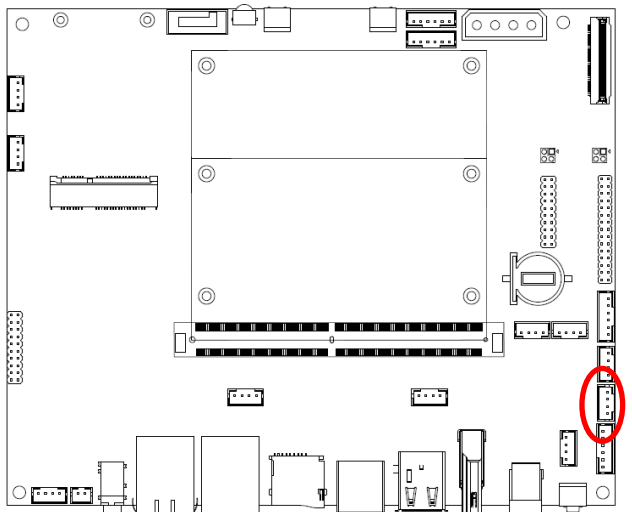
2.3 SMA-3568 Setting Connectors

2.3.1 Touch Panel Connector (TP)



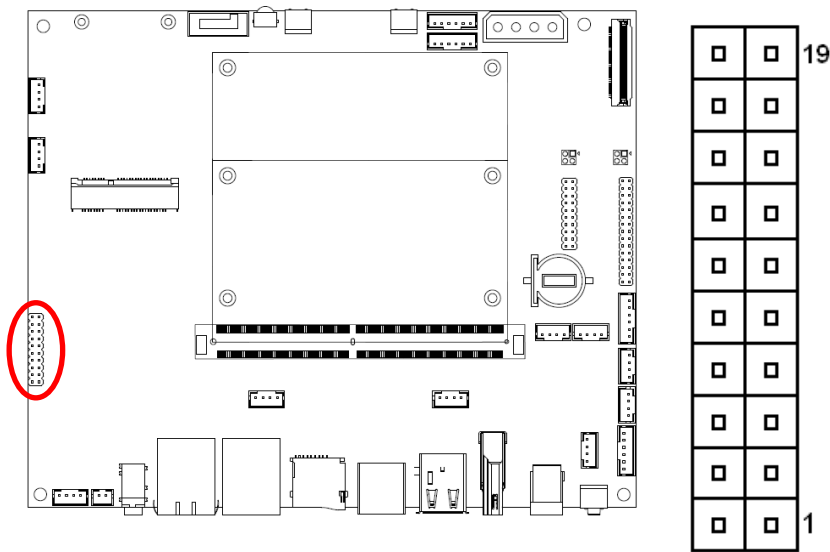
Signal	PIN
GND	6
I2C_SCL	5
I2C_SDA	4
INT	3
RST	2
+3.3V	1

2.3.2 DEBUG UART Connector (DEBUG)



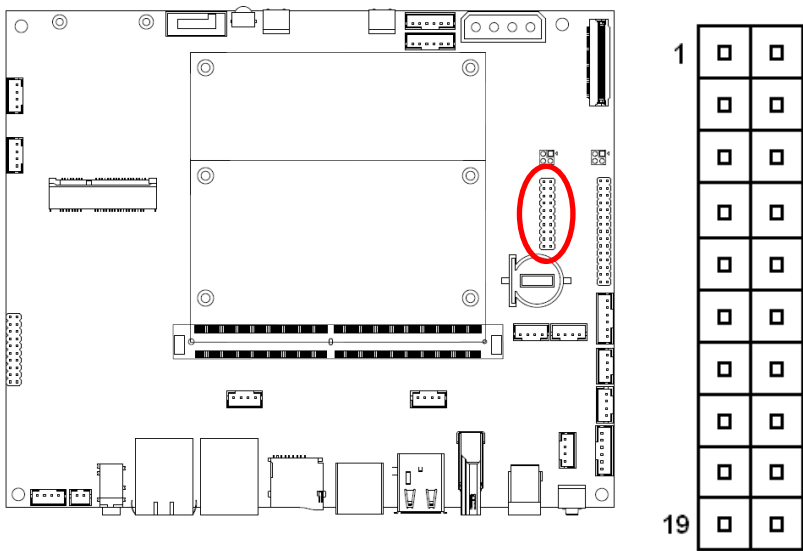
Signal	PIN
NC	4
TX_+3.3V	3
GND	2
RX_+3.3V	1

2.3.3 General purpose I/O connector (GPIO)



Signal	PIN	PIN	Signal
GND	20	19	GND
GND	18	17	GND
NA	16	15	NA
NA	14	13	GPIO3_B1
NA	12	11	GPIO3_B2
GPIO4_C6	10	9	UART7_RX_ M1_3V3
GPIO4_C5	8	7	UART7_TX_ M1_3V3
GND	6	5	GND
+3.3V	4	3	+5V
+3.3V	2	1	+5V

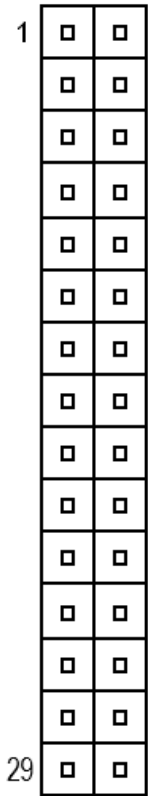
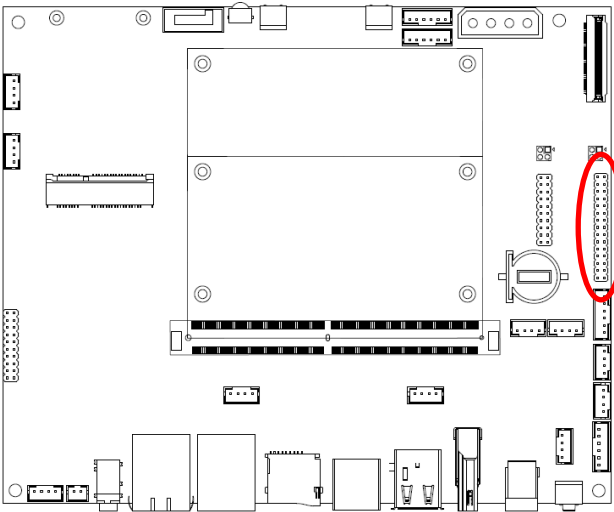
2.3.4 eDP Connector (EDP)



Signal	PIN	PIN	Signal
EDP_PANELVCC	1	2	EDP_PANELVCC
GND	3	4	GND
EDP_TX_D0N	5	6	EDP_TX_D0P
EDP_TX_D1N	7	8	EDP_TX_D1P
EDP_TX_D2N	9	10	EDP_TX_D2P
EDP_TX_D3N	11	12	EDP_TX_D3P
GND	13	14	GND
EDPTX_AUXN	15	16	EDPTX_AUXP
GND	17	18	GND
EDP_HPD	19	20	+3.3V

Note: EPD_PANELVCC can be selected +3.3V or +5V by Jumper

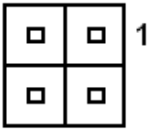
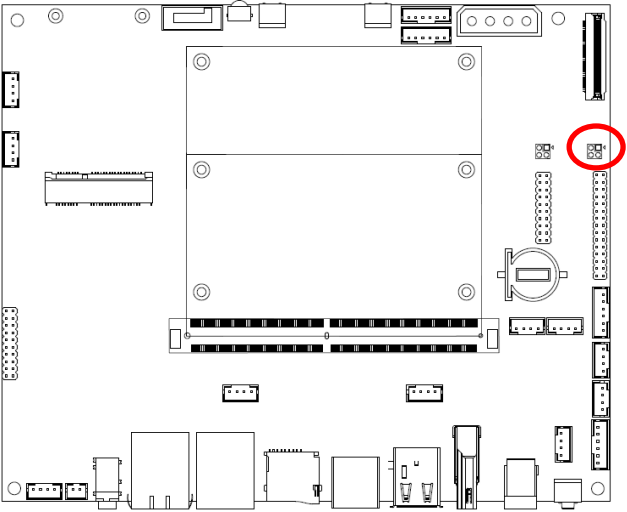
2.3.5 LVDS/DSI Connector (LVDS/DSI)



Signal	PIN	PIN	Signal
LVDS_PANELVCC	1	2	LVDS_PANELVCC
LVDS_PANELVCC	3	4	GND
GND	5	6	GND
MIPI_DSI_TX0_D0N/ LVDS_TX0_D0N	7	8	MIPI_DSI_TX0_D0P/ LVDS_TX0_D0P
MIPI_DSI_TX0_D1N/ LVDS_TX0_D1N	9	10	MIPI_DSI_TX0_D1P/ LVDS_TX0_D1P
MIPI_DSI_TX0_D2N/ LVDS_TX0_D2N	11	12	MIPI_DSI_TX0_D2P/ LVDS_TX0_D2P
GND	13	14	GND
MIPI_DSI_TX0_CLKN/ LVDS_TX0_CLKN	15	16	MIPI_DSI_TX0_CLKP/ LVDS_TX0_CLKP
MIPI_DSI_TX0_D3N/ LVDS_TX0_D3N	17	18	MIPI_DSI_TX0_D3P/ LVDS_TX0_D3P
NC	19	20	NC
NC	21	22	NC
NC	23	24	NC
GND	25	26	GND
NC	27	28	NC
NC	29	30	NC

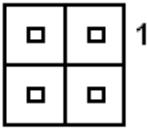
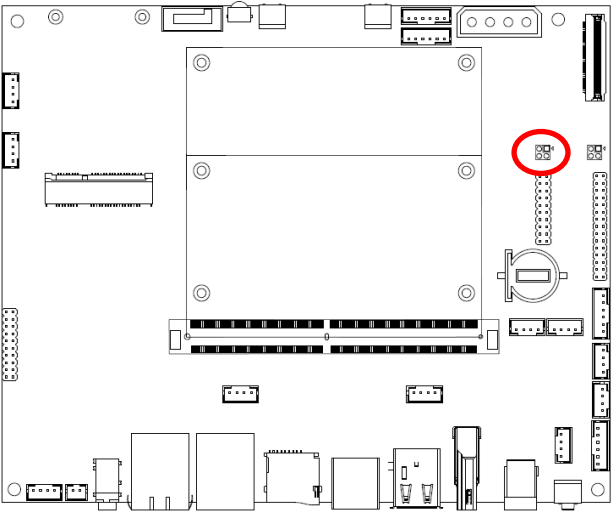
Note: LVDS_PANELVCC can be selected +3.3V or +5V by Jumper

2.3.6 LVDS_PANEL Vcc switch connector (LVDS-PWR)



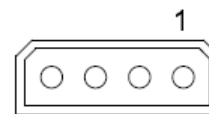
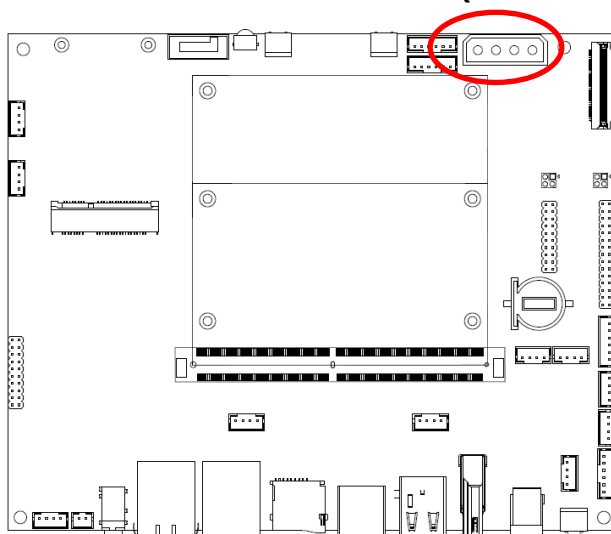
Function	Signal	PIN	PIN	Signal	Function
LVDS_ PANELVCC =3.3V	+3.3V	2	1	+5V	LVDS_ PANELVCC =5V
	LVDS_ PANELVCC	4	3	LVDS_ PANELVCC	

2.3.7 eDP_PANEL Vcc switch connector (EDP-PWR)



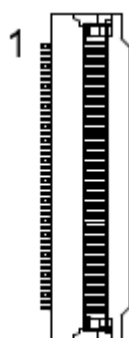
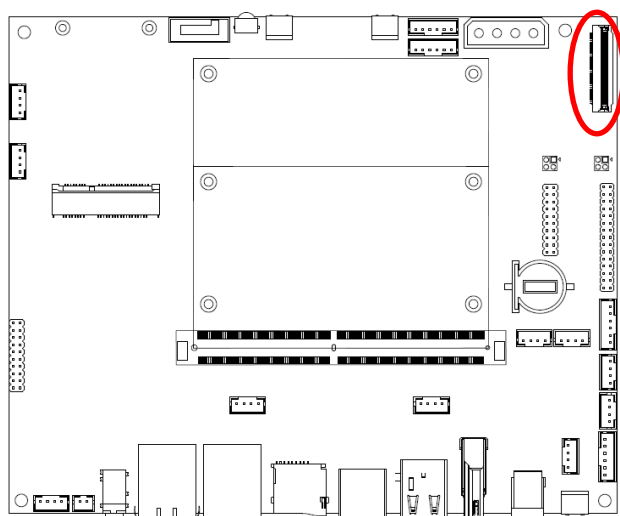
Function	Signal	PIN	PIN	Signal	Function
eDP_ PANELVCC =3.3V	+3.3V	2	1	+5V	eDP_ PANELVCC =5V
	eDP_ PANELVCC	4	3	eDP_ PANELVCC	

2.3.8 SATA Power Connector (SATA POWER)



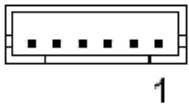
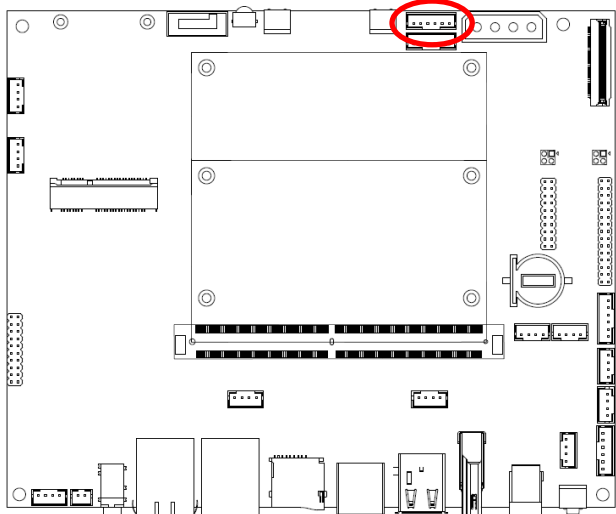
Signal	PIN
+5V	1
GND	2
GND	3
+12V	4

2.3.9 Single- MIPI1 LCM connector (MIPI DSI)



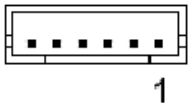
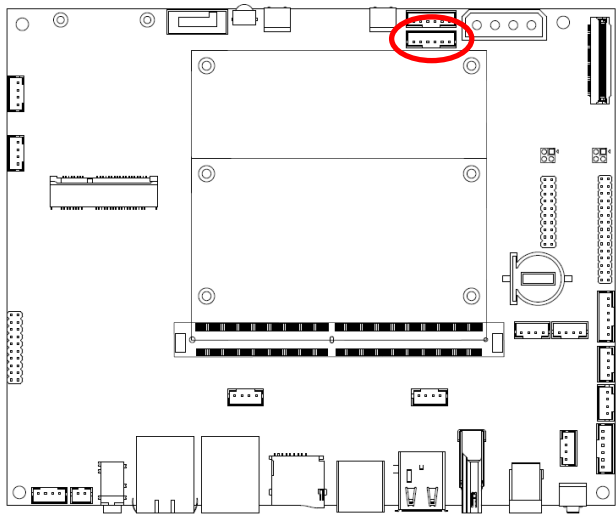
Signal	PIN	PIN	Signal
NC	1	21	MIPI_DSI_TX1_D3P_SOC
+3.3V	2	22	GND
+3.3V	3	23	NC
GND	4	24	NC
RST	5	25	GND
NC	6	26	NC
GND	7	27	TP1
MIPI_DSI_TX1_D0N_SOC	8	28	NC
MIPI_DSI_TX1_D0P_SOC	9	29	NC
GND	10	30	GND
MIPI_DSI_TX1_D1N_SOC	11	31	VCC_MIPI_LED-
MIPI_DSI_TX1_D1P_SOC	12	32	VCC_MIPI_LED-
GND	13	33	NC
MIPI_DSI_TX1_CLKN_SOC	14	34	NC
MIPI_DSI_TX1_CLKP_SOC	15	35	NC
GND	16	36	NC
MIPI_DSI_TX1_D2N_SOC	17	37	NC
MIPI_DSI_TX1_D2P_SOC	18	38	NC
GND	19	39	VCC_MIPI_LED+
MIPI_DSI_TX1_D3N_SOC	20	40	VCC_MIPI_LED+

2.3.10 LCD backlight connector (LVDS BL)



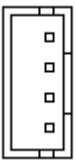
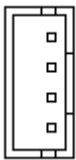
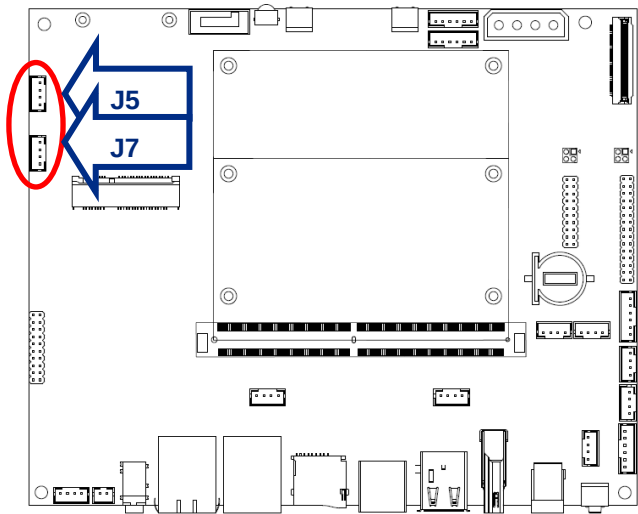
Signal	PIN
+12V	1
+12V	2
LVDS_BL_ON	3
LCD0_BL_PWM_4	4
GND	5
GND	6

2.3.11 eDP backlight connector (eDP BL)



Signal	PIN
+12V	1
+12V	2
EDP_BL_ON	3
LCD1_BL_PWM_5	4
GND	5
GND	6

2.3.12 USB2.0 Slot (USB2.0)

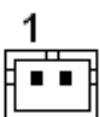
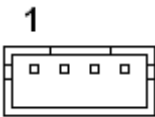
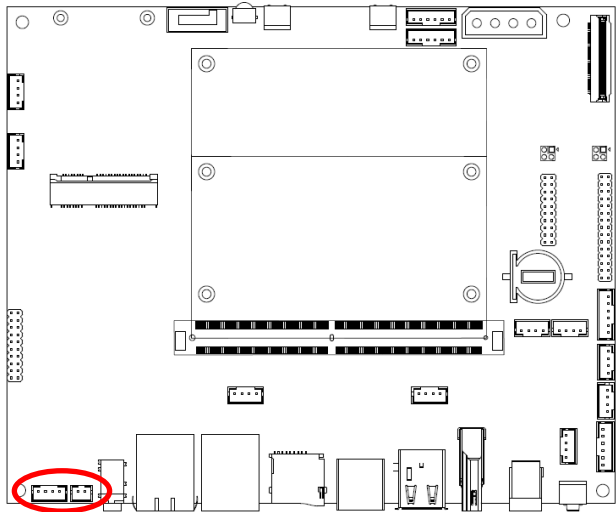


J5

J7

PIN	Signal	PIN	Signal
1	+5V	1	+5V
2	DATA-	2	DATA-
3	DATA+	3	DATA+
4	GND	4	GND

2.3.13 Speaker & MIC Connector (SPEAK & MIC1)

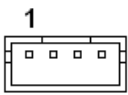
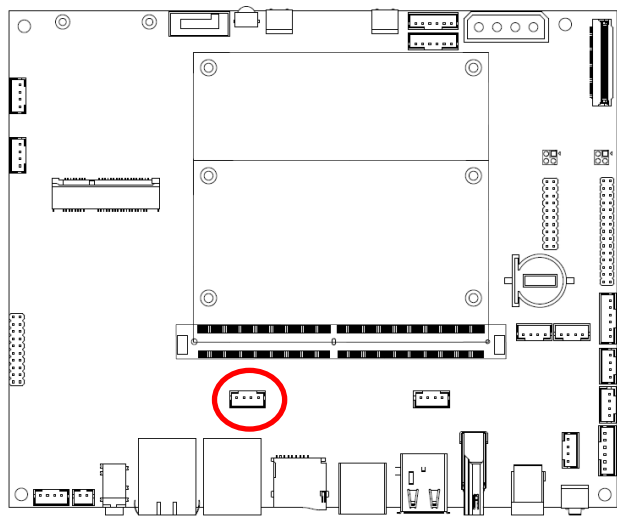


SPEAK

MIC1

PIN	Signal	PIN	Signal
1	SPKR_LN	1	LIN2
2	SPKR_LP	2	RIN2
3	SPKR_RN		
4	SPKR_RP		

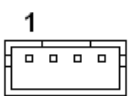
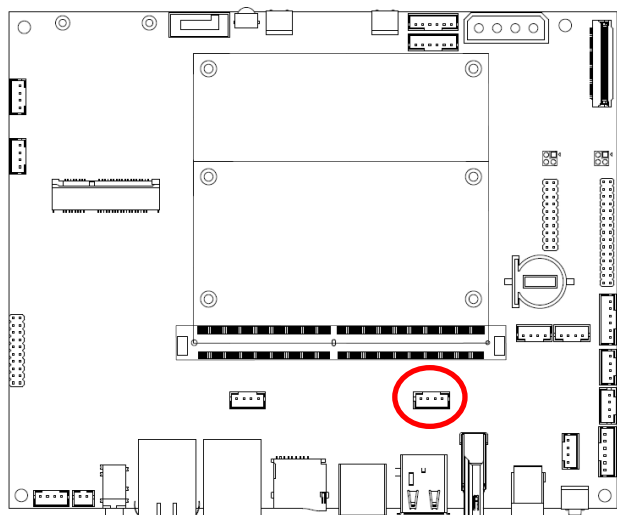
2.3.14 POE OUT Connector (POE-IN)



Signal	PIN
TR0_TAP	1
TR1_TAP	2
TR2_TAP	3
TR3_TAP	4

Note: An external POE module(802.3af) is required for power over ethernet.

2.3.15 POE-12V Connector (POE12V)



Signal	PIN
VCC12V_POE	1
VCC12V_POE	2
GND	3
GND	4

Note: In addition to supporting VCC12V_POE, it also supports DC-IN +12V

3. Mechanical Drawing

