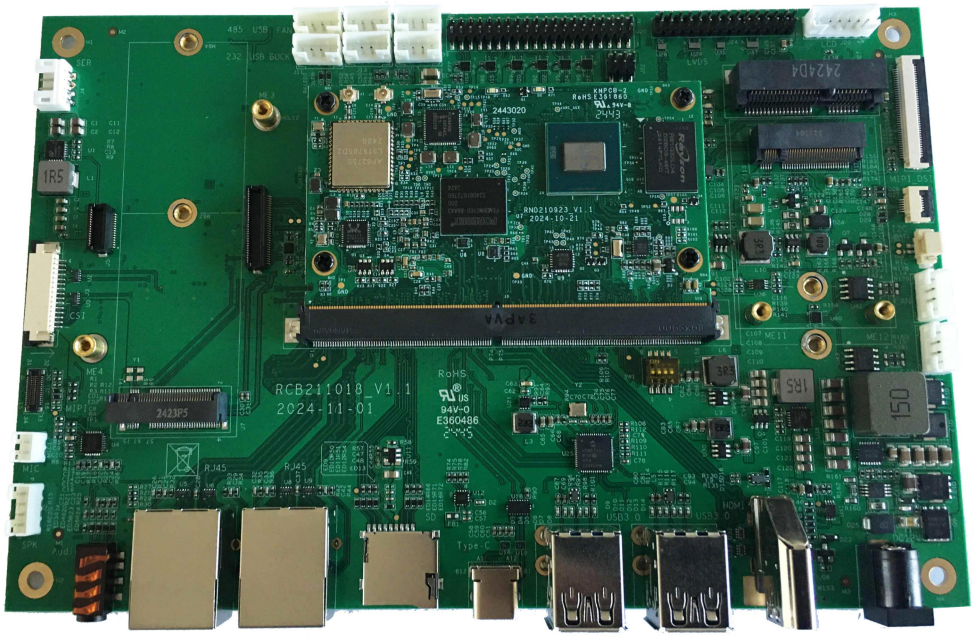
i.MX 8M Plus SMARC Development Board

SPECIFICATION

MODEL: DB820P



Room 02-04, 10/F, Block A, Building 8, Shenzhen International Innovation Valley, Dashi Road, Nanshan District, Shenzhen, Guangdong, China
Emai: support@geniatech.com Tel: (+ 86) 755 86028588

Revision History

VERSION	DATE	BOARD ID	PAGE	DESCRIPTION	AUTHOR
V1.0	22/7/16	RCB211018	14		
V1.1	2024/11/23	RCB211018_V1.1	20		

APPROVED BY GENIATECH		
PREPARED BY 编写	**CHECKED BY 审核**	**APPROVED BY 批准**

Please return the original copy after approved by your company with seal and signature.
请在贵公司盖章并签字后寄回正本一份。

APPROVED BY CUSTOMER		
COMMENTS 确认意见	**APPROVED BY 批准签字**	**COMPANY SEAL 盖章**

CONTENT

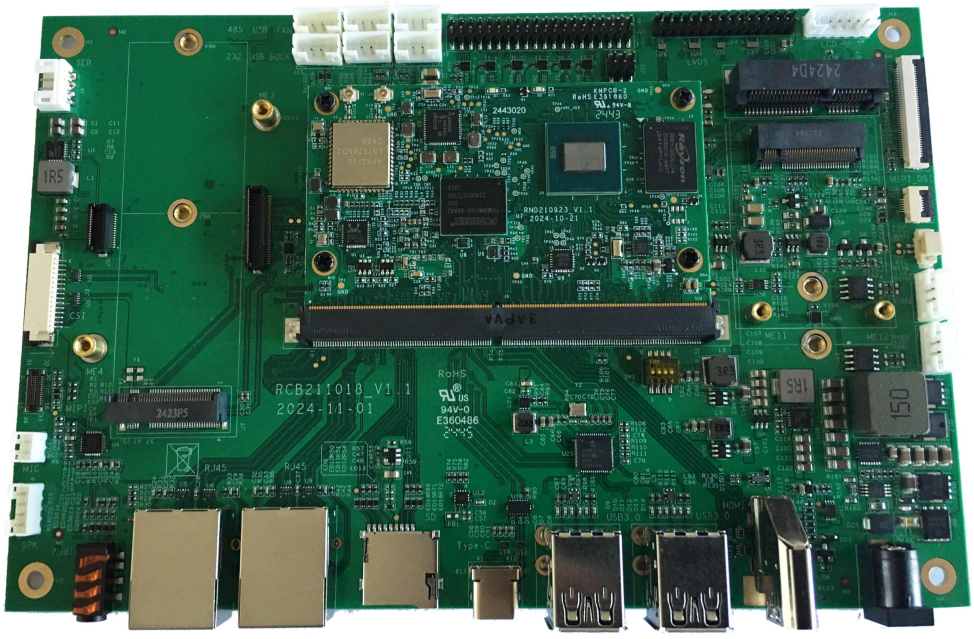
1. General Description

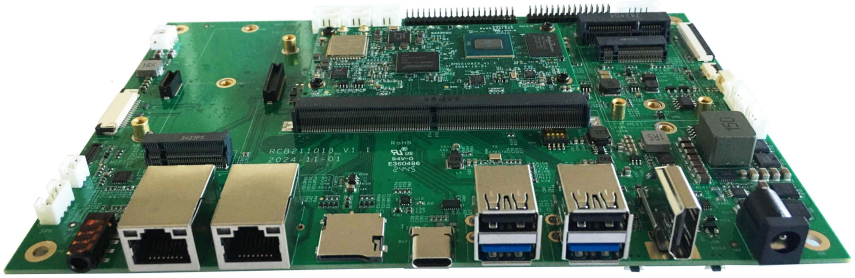
The i.MX 8M Plus SMARC development board DB820P includes the SOM-iMX8MP-SMARC core board and the CBD-iMX8MP-SMARC carrier board, The SOM-iMX8MP-SMARC core board is based on the high-performance i.MX 8M Plus SoC, Is the NXP first integrated transmission nerve processing unit (NPU) product, Operating rate of up to 2.3 TOPS, Focus on machine learning and vision, multimedia, and industrial automation with high reliability, The CBD-iMX8MP-SMARC carrier plate can be used to fully validate the functionality and performance of the i.MX 8M Plus chip. At the same time, it can also build a rapid prototype of application scenarios, which can be widely used in machine learning and artificial intelligence, NPU vision system, advanced multimedia and industrial automation, etc.

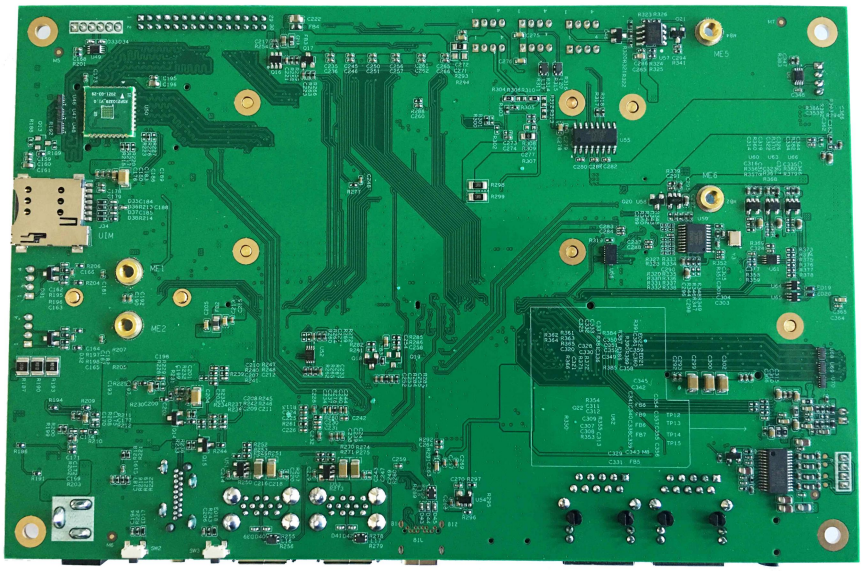
- i.MX 8M Plus SoC, using a 14-nm FET process technique.
- Quad-core 64-bit ARM Cortex A53 processor + Cortex-M7.
- Integrated neural network processing unit (NPU) with a performance of 2.3 TOPS.
- Efficient H.265/H.264/VP9 video decoding capability, with support for up to 4K resolution.
- Support MIPI-DSI, MIPI-CSI, HDMI, LVDS and other display and camera interfaces.
- 2 x Gigabit network / scalable 4G & 5G / multiple M.2 interface, etc.

2. Product Overview

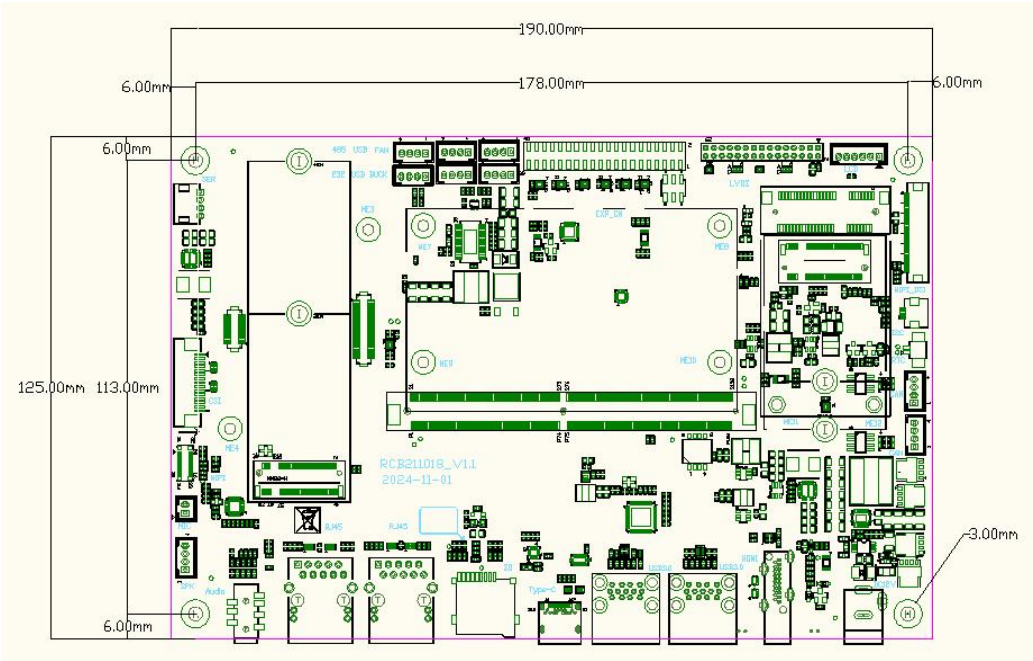
Below picture is for reference only, please prevails in kind.







Dimension drawing

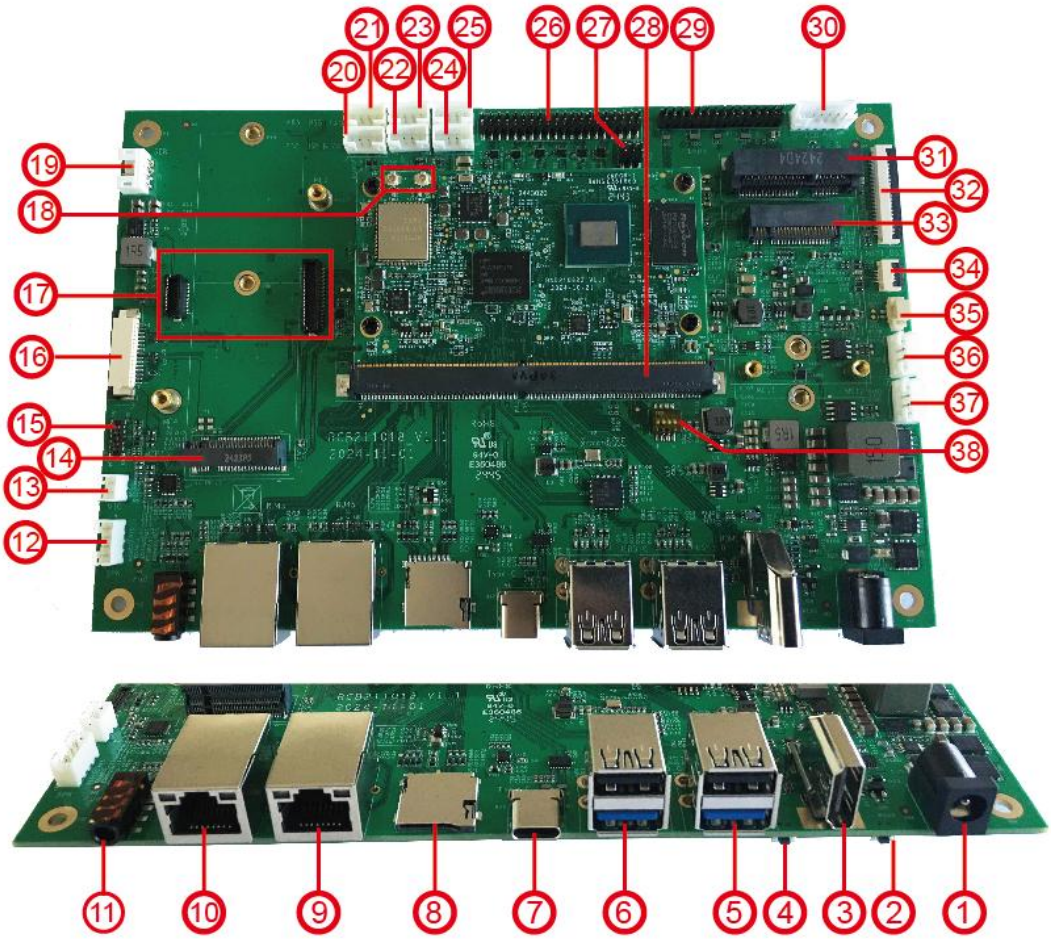


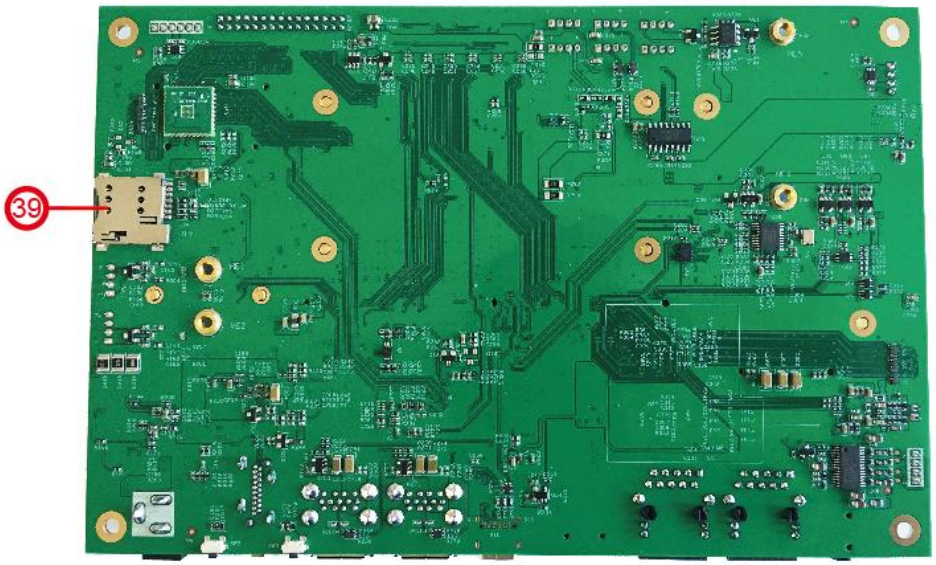
3. Features

CHIPSET	NXP iMX8M Plus	
MARKET AREA	Global	
SMARC-Module	**OS**	Yocto(Linux)/Android 10
	SOC	4 x Cortex-A53, up to 1.8GHz&1 x Cortex-M7, up to 800MHz
	GPU	GC7000UL with OpenCL and Vulkan support Supports OpenGL ES 1.1, 2.0, 3.0, OpenCL 1.2, Vulkan
	NPU	2.3 TOP/s Neural Network performance
	LPDDR4	4GB（1G-8G optional）
	EMMC	16GB eMMC5.1(8-128GB Optional)
	Wi-Fi/BT	Wifi2.4G+5G +BT 5.0
Development board Interfaces	**SMARC**	SMARC V2.1 Compatible with SMARC modules CPU Modules. (82 x 50mm)
	External I/O Connector	1 x Power Key (SW2) 1 x Reset Key (SW3) 1 x DC Jack (J29) 2 x USB 2.0 Type A (J21 J23) 2 x USB 3.0 Type A (J21 J23) 1 x USB Type C (J18) 2 x Giga Ethernet (J10 & J8) 1 x Headphone (J6) 1 x Micro SD Socket(J15) 1 x Micro SIM Socket (J34) 1 x HDMI Out (J25)
	Internal I/O Connector	1 x RS232 4P Header (J11) 1 x RS485 4P Header (J12) 1 x SW1 for System boot mode switch 1 x Expended Connector 2x20 P Header (J20) 1 x B2B Connector for AI module 60Pin (J9) 1 x B2B Connector for AI module power supply 30Pin (J5) 1 x Speaker (Left/Right Channel) 4P Header (J2) 2 x USB2.0 4P Header (J13 J14) 1 x Mic 2P Header (MIC1) 1 x RTC-Battery（JBAT1） 1 x FAN 4P Header with FAN PWM (J16) 1 x LCD Backlight 6P Header (J28) 1 x LVDS Panel Power Switch (j22) 1 x LVDS Screen Connector 2x15P (J24) 1 x M.2 Key B for 4G/5G (J26) 1 x Mini PCIe for 4G (J27) 1 x M.2 Key M for Storage (J7) 1 x A53 Core Debug connector (UART) (J4) 1 x I2C Touch Screen connector (J30)

		1 x MIPI DSI connector for MIPI Panel (J33) 1 x MIPI CSI connector for MIPI Camera 2 lanes (J3) 1 x MIPI CSI connector for MIPI Camera 4 lanes (J1) 2 x CAN 4P Header (J31 & J32)
	DC-IN	12V2A
Dimensions	190*125mm	

4. Connectors list



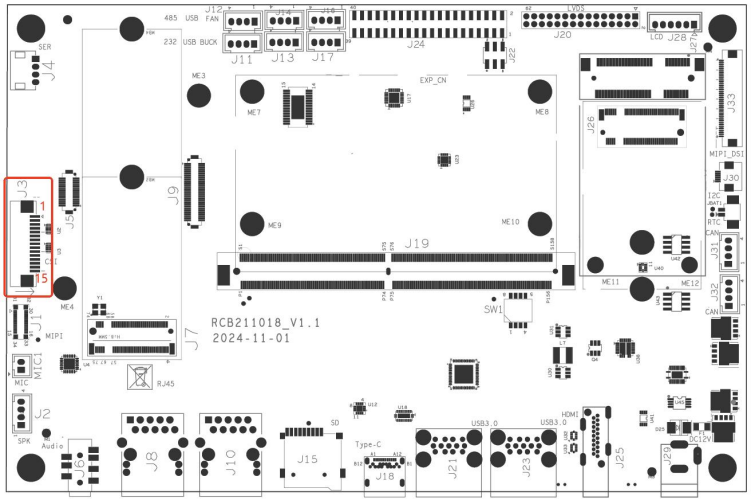


No.	Label	Function	Note
1	J29	DC Jack connector	
2	SW2	Power Key	
3	J25	HDMI Out	HDMI 2.0a Type-A
4	SW3	Reset Key	
5	J23	USB 3.0 Type A USB 2.0 Type A	
6	J21	USB 3.0 Type A USB 2.0 Type A	
7	J18	USB Type C	
8	J15	Micro SD Socket	
9	J10	Giga Ethernet	
10	J8	Giga Ethernet	
11	J6	Headphone Jack connector	
12	J2	Speaker out 4P Header	1 x 4P Header , pitch 2.0mm
13	MIC1	Microphone input	1 x 2P Header , pitch 2.0mm
14	J7	M.2 Key M for Storage or AI module	
15	J1	MIPI CSI connector for MIPI Camera 4 lanes	
16	J3	MIPI CSI connector for MIPI Camera 2 lanes	
17	J5+J9	B2B Connector for AI module 60Pin (J9) B2B Connector for AI module power supply 30Pin (J5)	
18	IPEX	WiFi antenna	
19	J4	A53 Core Debug connector (UART)	1 x 4P Header , pitch 2.0mm
20	J11	RS232 4P Header	1 x 4P Header , pitch 2.0mm
21	J12	RS485 4P Header	1 x 4P Header , pitch 2.0mm

22	**J13**	USB2.0 4P Header	1 x 4P Header , pitch 2.0mm
23	**J14**	USB2.0 4P Header	1 x 4P Header , pitch 2.0mm
24	**J17**	BUCK 4P Header	1 x 4P Header , pitch 2.0mm
25	**J16**	FAN 4P Header with FAN PWM	1 x 4P Header , pitch 2.0mm
26	**J20**	Expended Connector 2x15P Header	2 x 15P header, pitch 2.0mm
27	**J22**	LCD Backlight power supply select	2 x 3P header, pitch 2.0mm
28	**J19**	SMARC connector	
29	**J24**	LVDS Screen Connector 2x15P	2 x 15P header, pitch 2.0mm
30	**J28**	LCD Backlight 6P Header	1 x 6P Header , pitch 2.0mm
31	**J27**	Mini PCIe for 4G/5G	
32	**J33**	MIPI DSI connector for MIPI Panel	1 x 30 wafer, pitch 0.50mm
33	**J26**	M.2 Key B for 4G/5G	
34	**J30**	I2C Touch Screen connector	1 x 6P wafer, pitch 0.50mm
35	**JBAT1**	RTC battery	
36	**J31**	CAN 4P Header	1 x 4P Header , pitch 2.0mm
37	**J32**	CAN 4P Header	1 x 4P Header , pitch 2.0mm
38	**SW1**	System boot mode switch	
39	**J34**	Micro SIM Socket	

5. Connectors Pin Outs

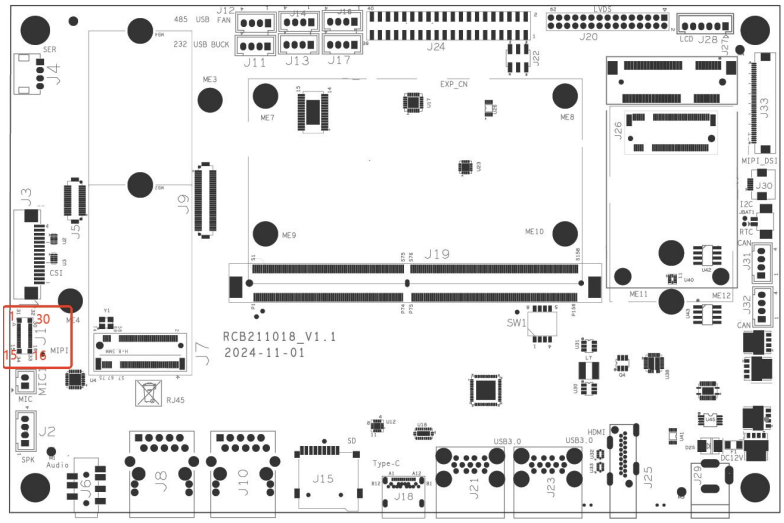
5.1 J3: MIPI CSI connector for MIPI Camera 2 lanes



J3（FPC_15Pin_1.0mm）

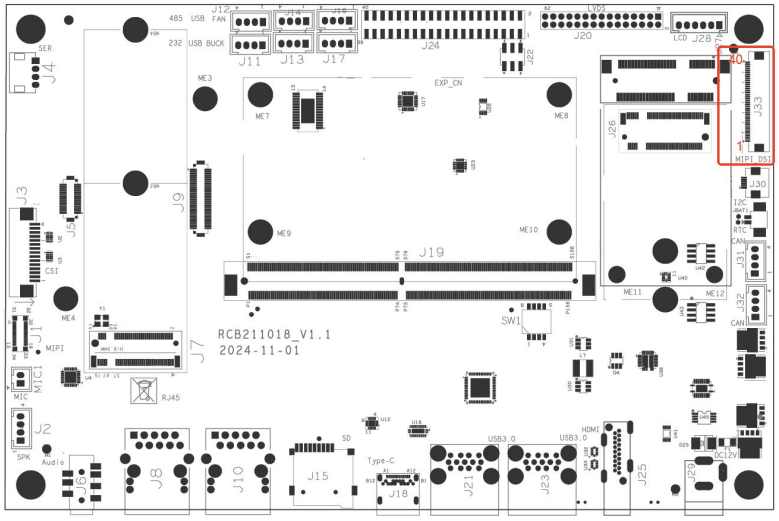
Pin	Function	Pin	Function
1	GND	2	MIPI_CSI0_RX0-
3	MIPI_CSI0_RX0+	4	GND
5	MIPI_CSI0_RX1-	6	MIPI_CSI0_RX1+
7	GND	8	MIPI_CSI0_CK-
9	MIPI_CSI0_CK+	10	GND
11	MIPI_CSI0_PWR	12	MIPI_CSI0_MCLK
13	MIPI_CSI0_SCL	14	MIPI_CSI0_SDA
15	VDD_3V3		

5.2 J1: MIPI CSI connector for MIPI Camera 4 lanes



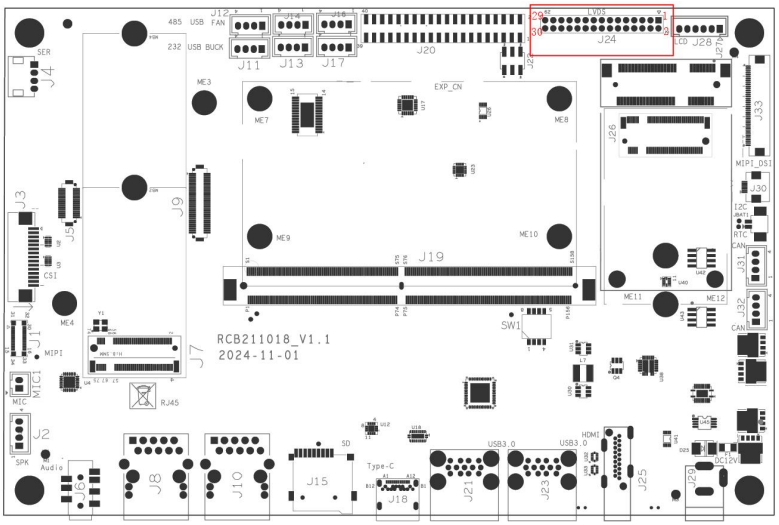
J1(OK-23GM030-04)			
Pin	Function	Pin	Function
1	MIPI_CSI1_RX3-	30	VCC12_DVP
2	MIPI_CSI1_RX3+	29	VCC18_DVP
3	GND	28	GND
4	MIPI_CSI1_RX1-	27	MIPI_CSI1_SDA
5	MIPI_CSI1_RX1+	26	MIPI_CSI1_SCL
6	GND	25	GND
7	MIPI_CSI1_CK-	24	MIPI_CSI1_MCLK
8	MIPI_CSI1_CK+	23	GND
9	GND	22	VCC12_DVP
10	MIPI_CSI1_RX0-	21	GND
11	MIPI_CSI1_RX0+	20	MIPI_CSI1_RST
12	GND	19	NC(TP1)
13	MIPI_CSI1_RX2-	18	GND
14	MIPI_CSI1_RX2+	17	AVDD28_DVP
15	GND	16	GND

5.3 J33: MIPI DSI connector for MIPI Panel



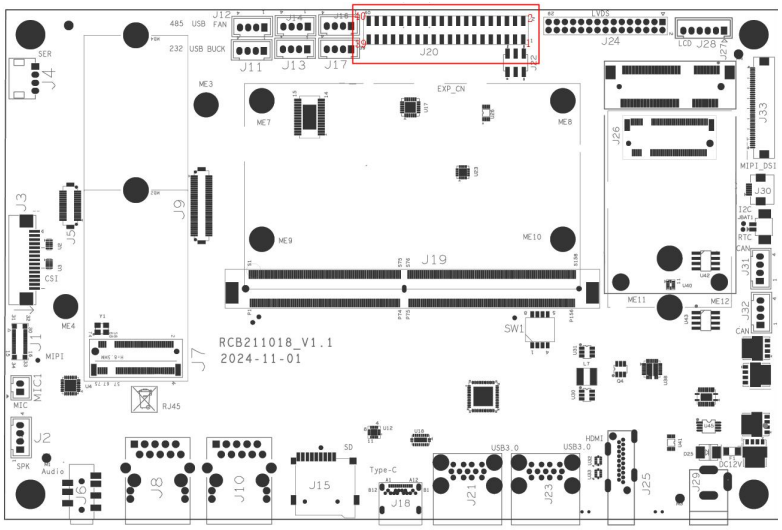
J33(FPC_40Pin_0.5mm)			
Pin	Function	Pin	Function
1	NC1	21	DSI_DATA3_P
2	VCC_LCD0	22	GND
3	VDD_1V8/3V3	23	NC
4	GND	24	NC
5	MIPI_DSI_nRST	25	GND
6	NC	26	NC
7	GND	27	PWM_OUT
8	DSI_DATA0_N	28	NC
9	DSI_DATA0_P	29	NC
10	GND	30	GND
11	DSI_DATA1_N	31	VCC1_LED-
12	DSI_DATA1_P	32	VCC1_LED-
13	GND	33	NC
14	DSI_CLOCK_N	34	NC
15	DSI_CLOCK_P	35	NC
16	GND	36	NC
17	DSI_DATA2_N	37	NC
18	DSI_DATA2_P	38	NC
19	GND	39	VCC1_LED+
20	DSI_DATA3_N	40	VCC1_LED+

5.4 J24: LVDS Screen Connector 2x15P



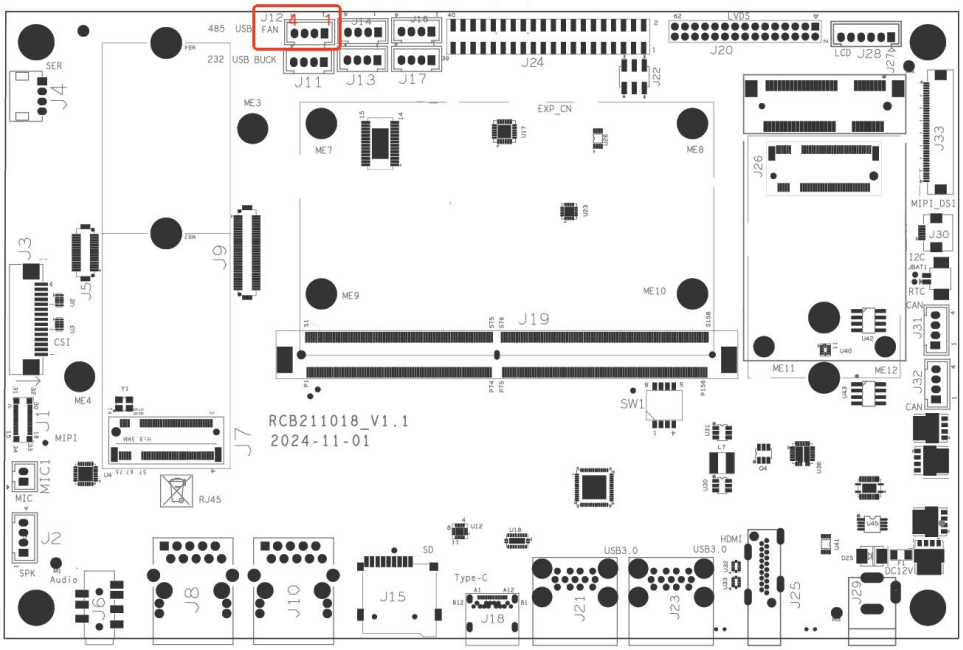
J24(2*15Pin 2.0mm)			
Pin	Function	Pin	Function
1	PANELVCC	2	PANELVCC
3	PANELVCC	4	GND
5	GND	6	GND
7	LVDS0_TX0_N	8	LVDS0_TX0_P
9	LVDS0_TX1_N	10	LVDS0_TX1_P
11	LVDS0_TX2_N	12	LVDS0_TX2_P
13	GND	14	GND
15	LVDS0_CLK_N	16	LVDS0_CLK_P
17	LVDS0_TX3_N	18	LVDS0_TX3_P
19	LVDS1_TX0_N	20	LVDS1_TX0_P
21	LVDS1_TX1_N	22	LVDS1_TX1_P
23	LVDS1_TX2_N	24	LVDS1_TX2_P
25	GND	26	GND
27	LVDS1_CLK_N	28	LVDS1_CLK_P
29	LVDS1_TX3_N	30	LVDS1_TX3_P

5.5 J20: Expended Connector 2x20 P Header



J20(2*20Pin 2.0mm)			
Pin	Function	Pin	Function
1	VEXP_3V3	2	VEXP_5V
3	I2C3_SDA_3V3	4	VEXP_5V
5	I2C3_SCL_3V3	6	GND
7	UART0_CTS_3V3	8	UART0_TXD_3V3
9	GND	10	UART0_RXD_3V3
11	UART0_RTS_3V3	12	UART3_TXD_3V3
13	ESPI_IO_0_3V3	14	GND
15	ESPI_IO_1_3V3	16	UART3_RXD_3V3
17	VEXP_3V3	18	ESPI_ALERT0_3V3
19	ECSPI2_MOSI_3V3	20	GND
21	ECSPI2_MISO_3V3	22	ECSPI_CS0_3V3
23	ECSPI2_SCLK_3V3	24	ECSPI2_SS0_3V3
25	GND	26	ECSPI_CS1_3V3
27	I2C5_SDA_3V3	28	I2C5_SCL_3V3
29	ESPI_IO_2_3V3	30	GND
31	ESPI_IO_3_3V3	32	GPIO9/PWM2_3V3
33	ESPI_CK_3V3	34	GND
35	PDM_STREAM_3	36	PDM_STREAM_2
37	PDM_STREAM_1	38	PDM_STREAM_0
39	GND	40	PDM_CLK

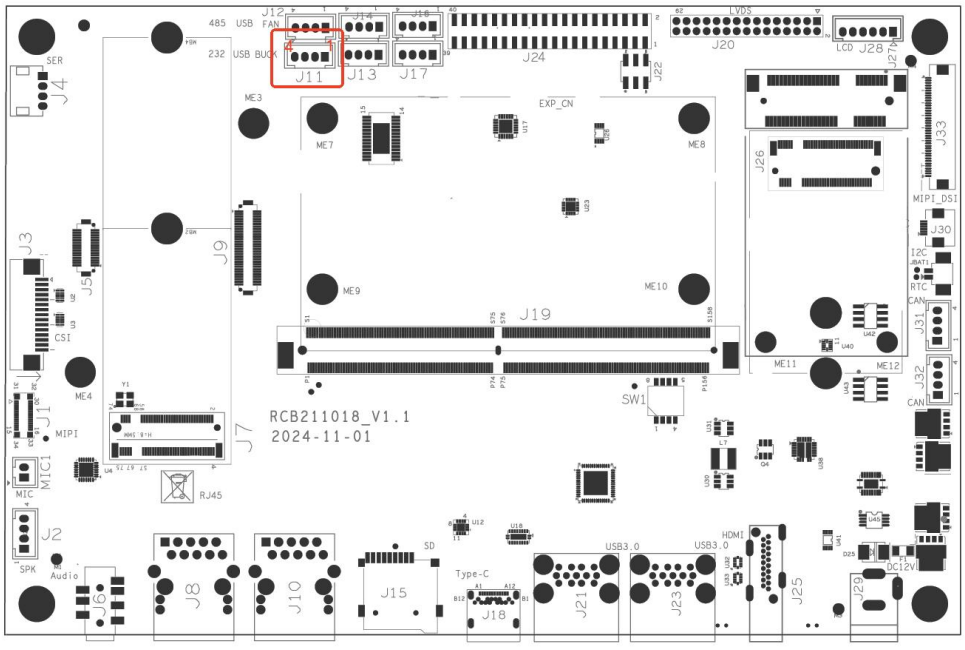
5.6 J12: RS485 4P Header



J12

Pin	Function
1	RS485_1_B
2	GND
3	RS485_1_A
4	NC

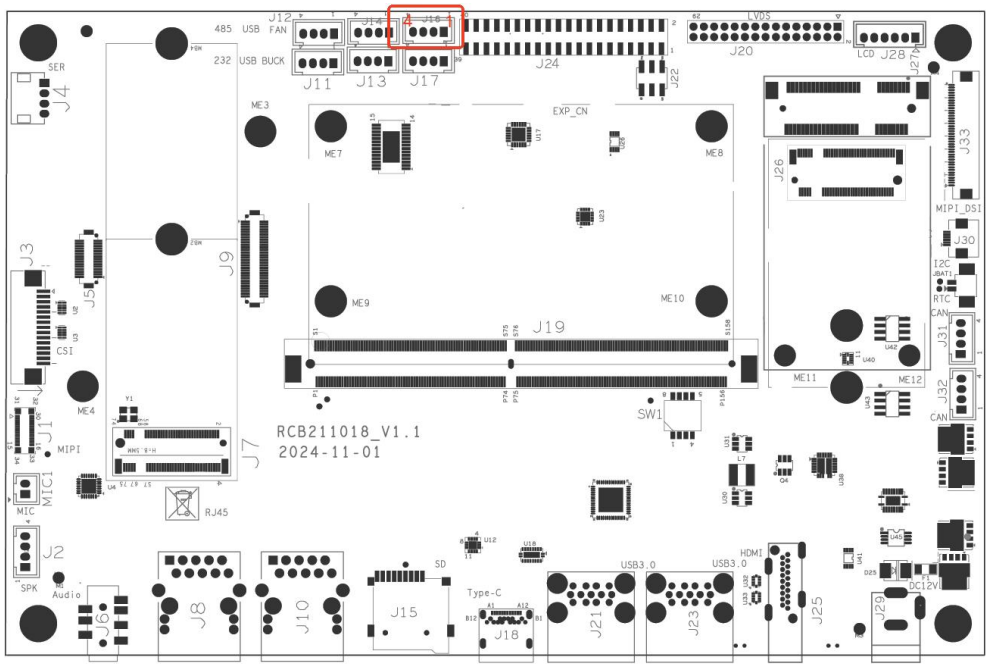
5.7 J11: RS232 4P Header



J11

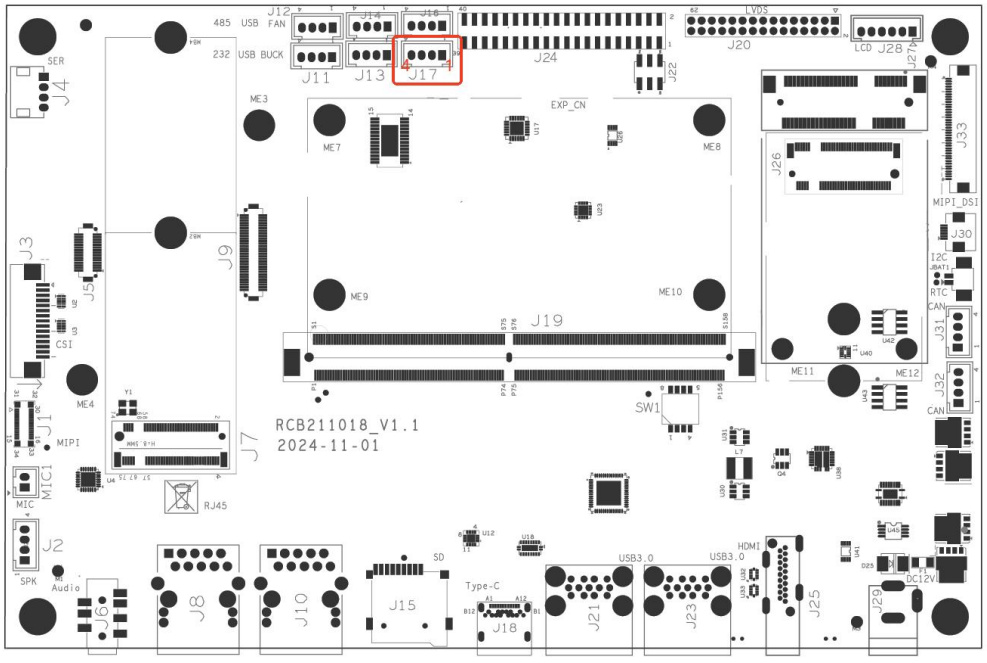
Pin	Function
1	RS232_RX
2	GND
3	RS232_TX
4	NC

5.8 J16: FAN 4P Header



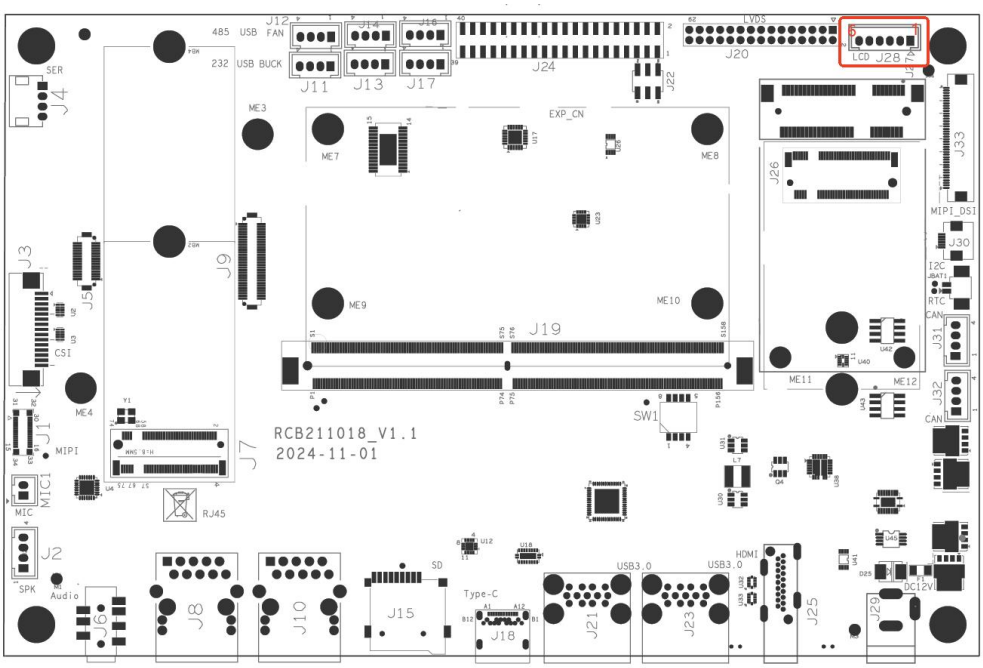
J16	
Pin	**Function**
1	GND
2	VDD_5V
3	FAN_TACH
4	FAN_PWM

5.9 J17:BUCK



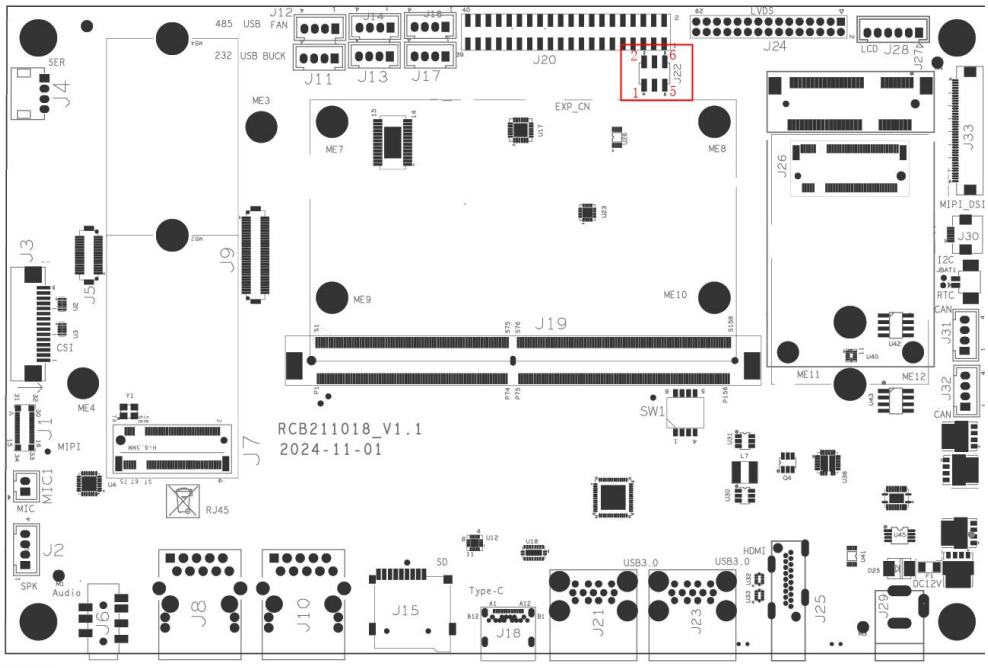
J17	
Pin	**Function**
1	VCC BUCK
2	VCC BUCK
3	CA1/LED1
4	CA3/LED3

5.10 J28: LCD Backlight 6P Header



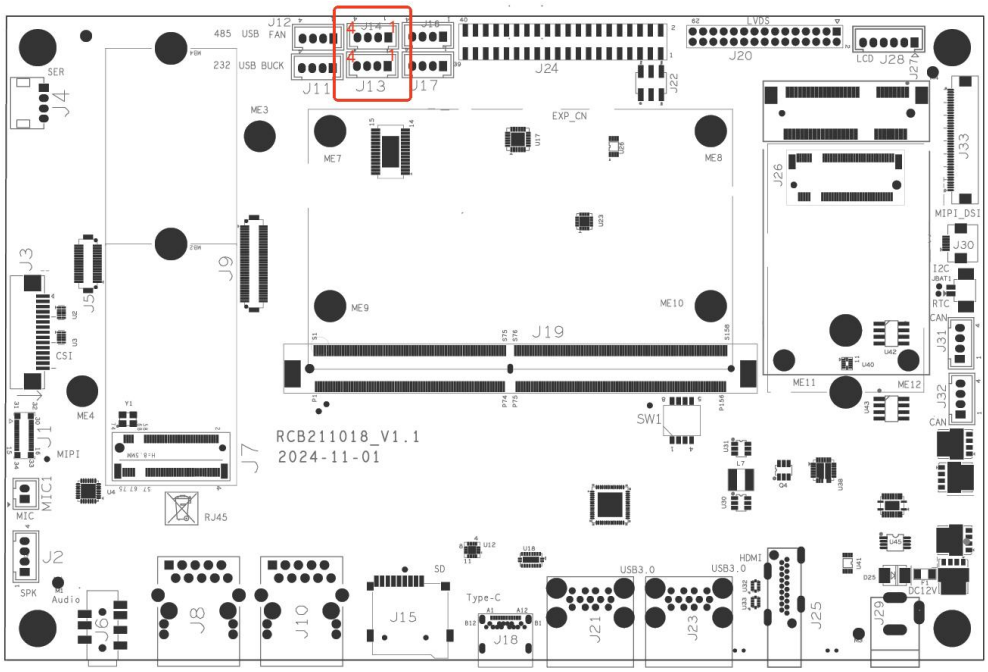
J28	
Pin	**Function**
1	GND
2	GND
3	LVDS_BL_PWM_3V3
4	LVDS_BL_EN_3V3
5	VCC_BUCK
6	VCC_BUCK

5.11 J22:LVDS Backlight Power Supply Select



J28	
Pin	**Function**
1-2	VCC_BUCK(12V)
3-4	VDD_5V
5-6	VDD_3V3

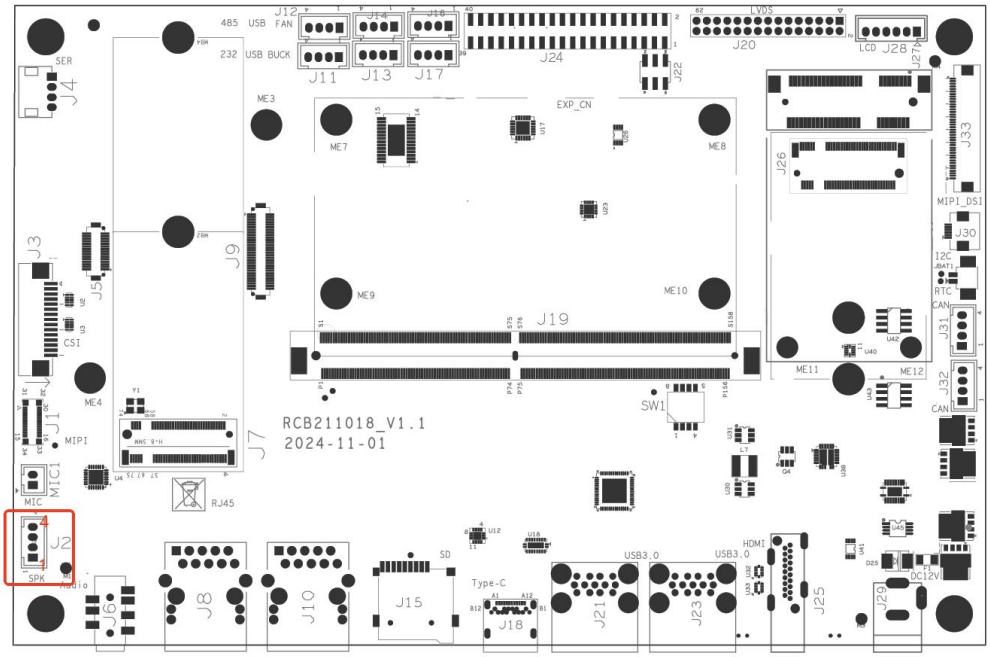
5.12 J13&J14: USB 4P Header



J13	
Pin	**Function**
1	VCC_5V
2	USB4_HUB_DM
3	USB4_HUB_DP
4	GND

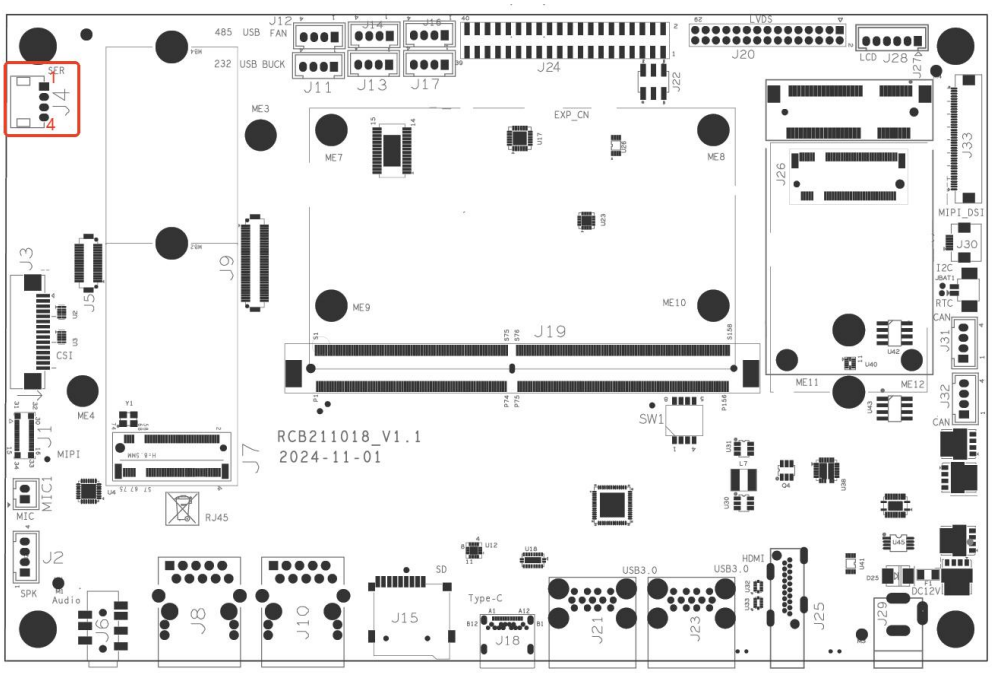
J14	
Pin	**Function**
1	VCC_5V
2	USB3_HUB_DM
3	USB3_HUB_DP
4	GND

5.13 J2: Speaker (Left/Right Channel) 4P Header



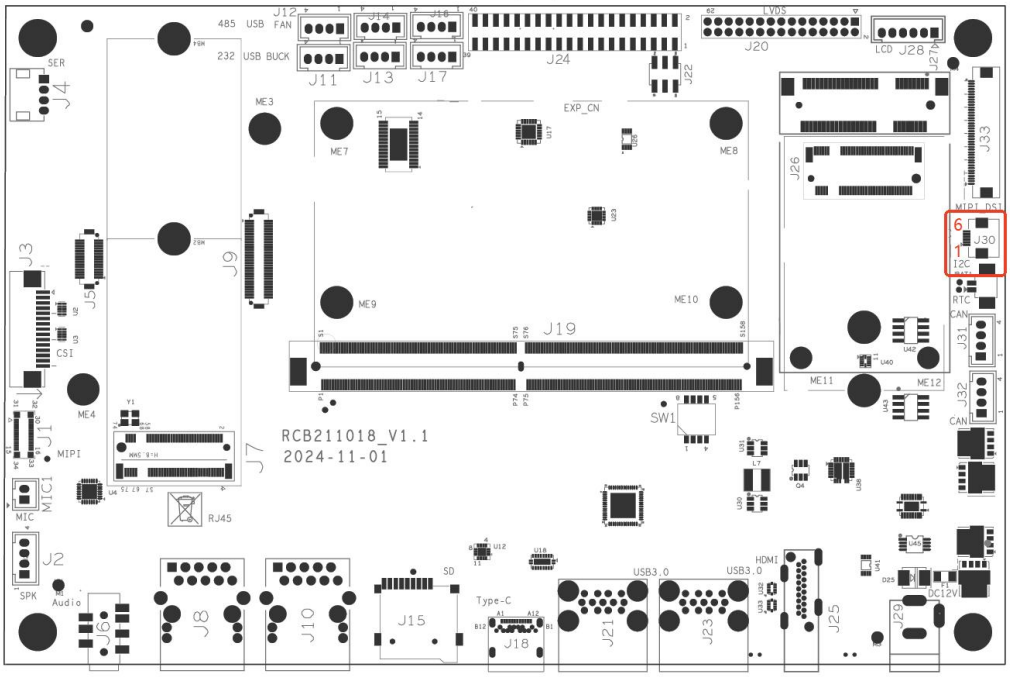
J2	
Pin	**Function**
1	L_SPK-
2	L_SPK+
3	R_SPK-
4	R_SPK+

5.14 J4: A53 Core Debug connector



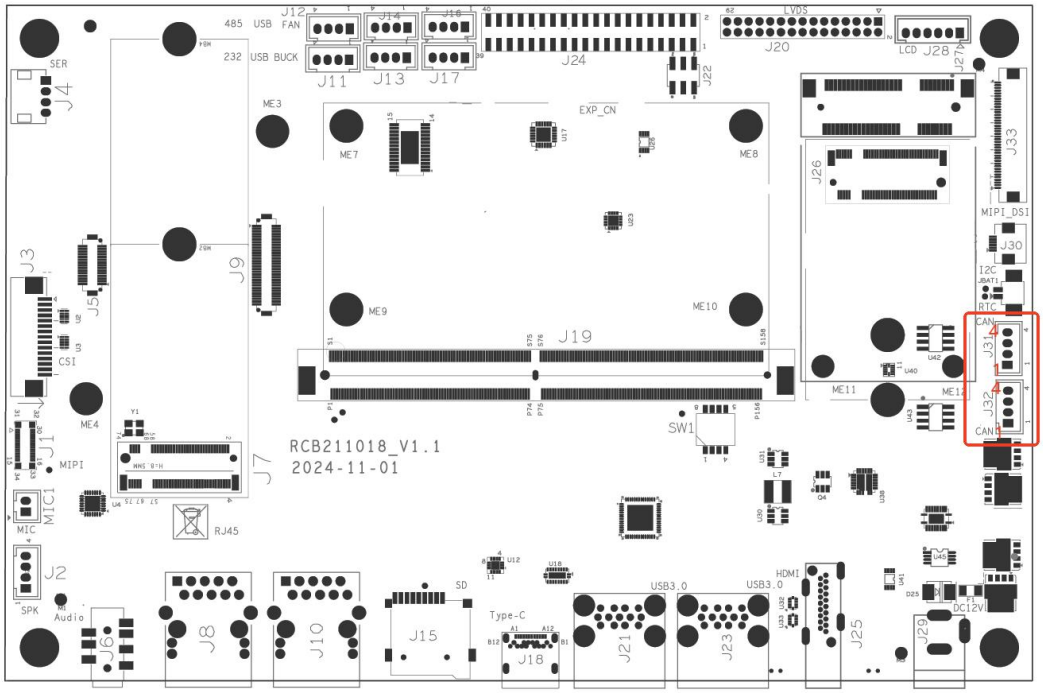
J4	
Pin	**Function**
1	UART2_RXD_3V3
2	GND
3	UART2_TXD_3V3
4	NC

5.15 J30: I2C Touch Screen connector



J30(FPC 6Pin 0.5mm)	
Pin	**Function**
1	TP_I2C_SCK
2	TP_I2C_SDA
3	TP_VCC_3V3
4	TP_nRST_3V3
5	TP_INT_3V3
6	GND

5.16 J31 & J32: CAN 4P Header



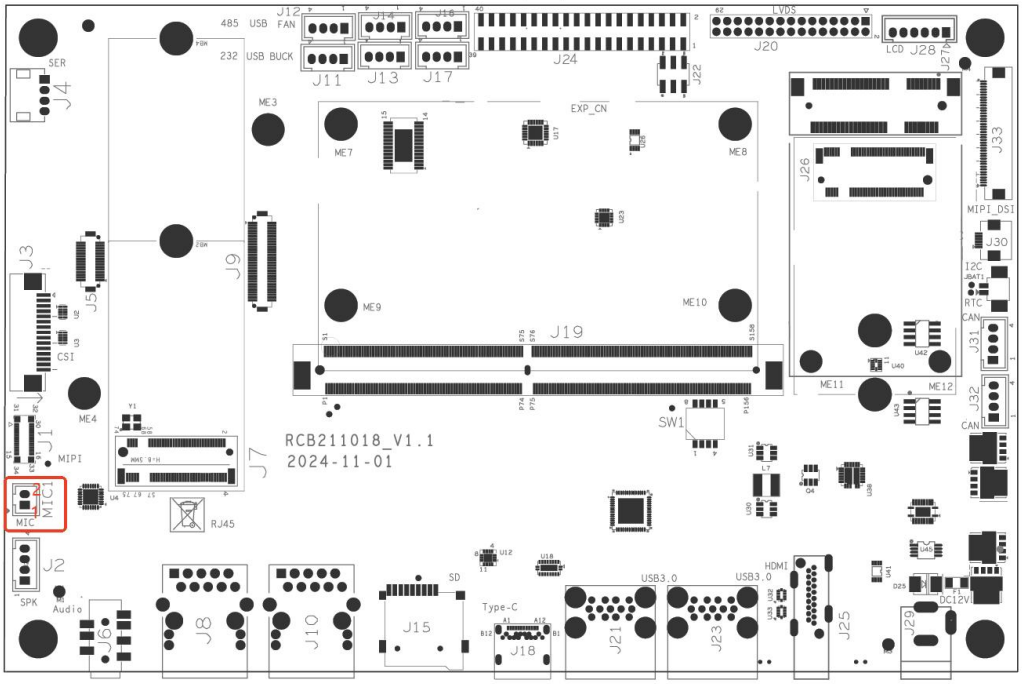
J31

Pin	Function
1	CAN1_L
2	GND
3	CAN1_H
4	NC

J32

Pin	Function
1	CAN0_L
2	GND
3	CAN0_H
4	NC

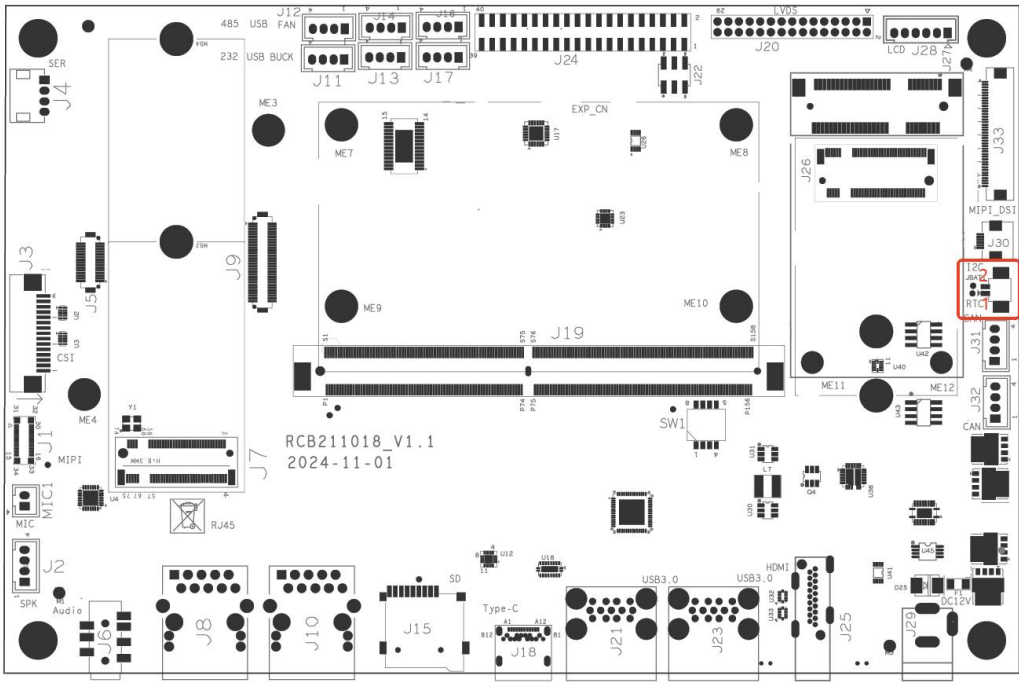
5.17 MIC1:Microphone Input Header



MIC1

Pin	Function
1	MIC2P
2	MIC2N

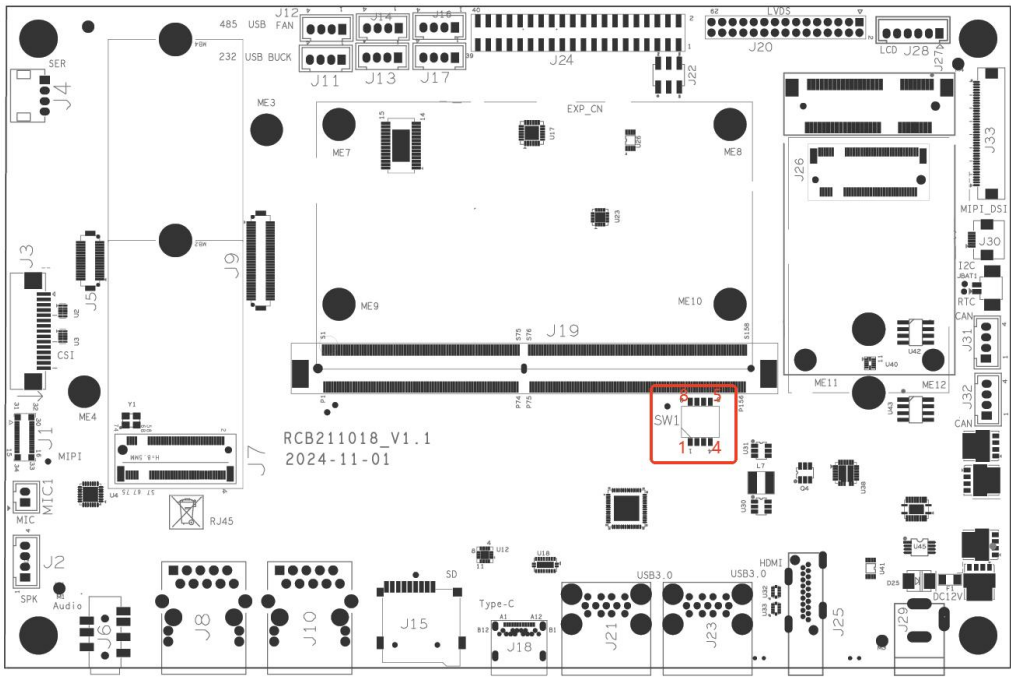
5.18 JBAT1:RTC Battery Header



JBAT1

Pin	Function
1	VDD_RTC
2	GND

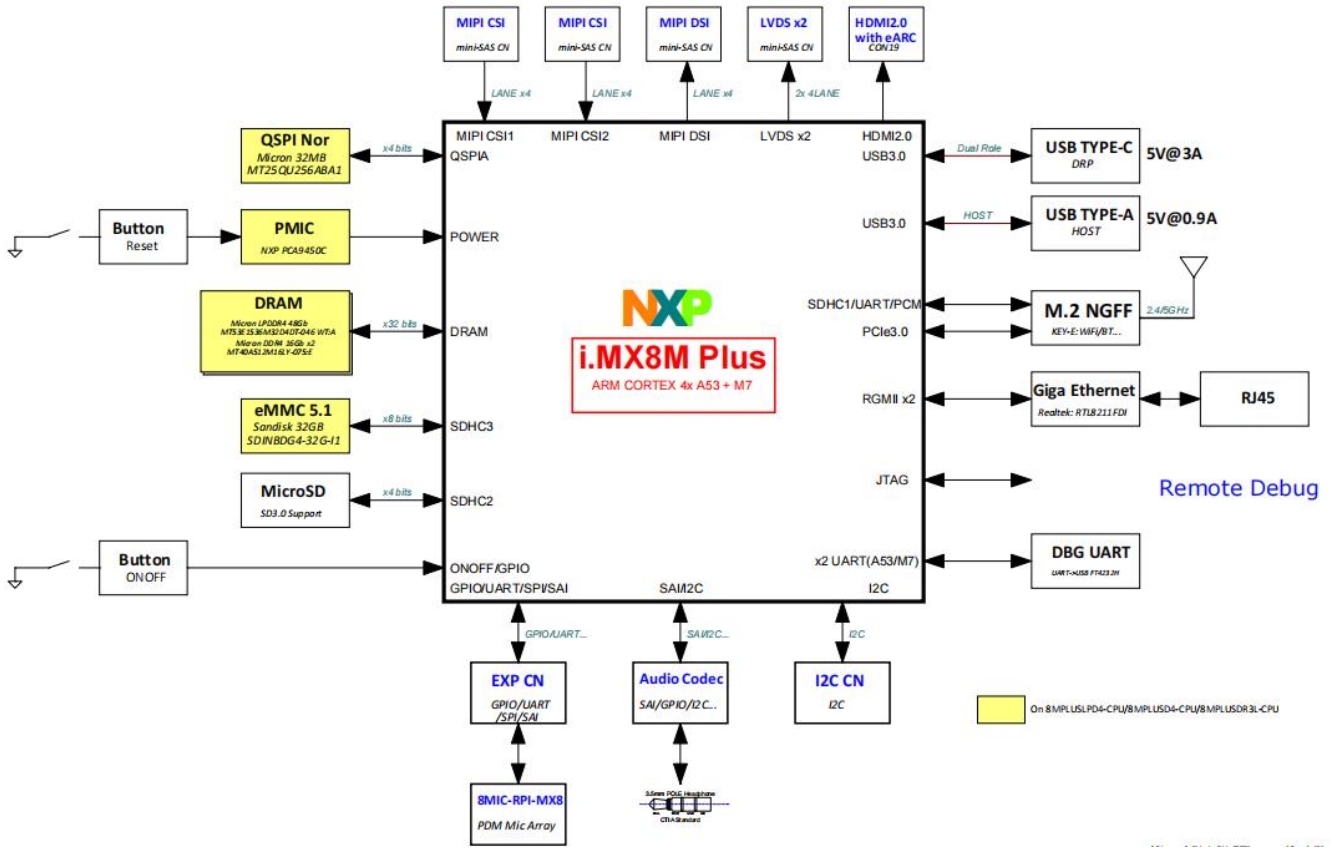
5.19 SW1: System boot mode switch



SW1	
Pin	Function
1	BOOT_SEL0
2	BOOT_SEL1
3	BOOT_SEL2
4	BOOT_SEL3
5	GND
6	GND
7	GND
8	GND

BOOT_SEL3	BOOT_SEL2	BOOT_SEL1	BOOT_SEL0	Boot Modes
OFF	OFF	ON	OFF	USDHC3 (eMMC boot only, SD3 8-bit)
OFF	OFF	OFF	OFF	USB Serial Download

6. System Block Diagram



7. Support Formats

Video Decode

- 1080p60 HEVC/H.265 Main, Main 10 (up to level 5.1)
- 1080p60 VP9 Profile 0, 2
- 1080p60 VP8
- 1080p60 AVC/H.264 Baseline, Main, High decoder

Video Encode

- 1080p60 AVC/H.264 encoder
- 1080p60 HEVC/H.265 encoder

Image Sensor Processor (ISP)

375 Mpixel/s HDR ISP supporting configurations, such as 12MP@30fps, 4kp45, or 2x 1080p80

8. Precautions For Use

Relative humidity: ≤80% .

Operation temperature: Commercial field：0~ 85℃； Industrial field: -40~85℃.

Keep the Board away from static electricity.

Keep the Board away from water and other liquid.

Don’t use long connect wires which may affect performance and image quality.

More Help

Sales E-mail：sales@geniatech.com
Technical E-mail：support@geniatech.com
Technical Hotline：(+86)0755-8602-8588
Official Website：www.geniatech.com
Official Mall：https://shop.geniatech.com