ISR215F

Ruggedized Edge Computer

with NXP i.MX 8M Plus - ARM Cortex-A53 Quad Processor

User's Manual

Version 1.0
(September 2024)

iBASE

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Compliance

CE

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

FC

This product has been tested and found to comply with the limits for a Class B device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to radio communications.

WEEE

This product must not be disposed of as normal household waste, in accordance with the EU directive of for waste electrical and electronic equipment (WEEE - 2012/19/EU). Instead, it should be disposed of by returning it to a municipal recycling collection point. Check local regulations for disposal of electronic products.

Green IBASE

This product complies with RoHS 2 restrictions, which prohibit the use of certain hazardous substances in electrical and electronic equipment. The following substances must not exceed the specified concentrations:

- Hexavalent chromium: 1,000 ppm
- Poly-brominated biphenyls (PBBs): 1,000 ppm
- Poly-brominated diphenyl ethers (PBDEs): 1,000 ppm
- Cadmium: 100 ppm
- Mercury: 1,000 ppm
- Lead: 1,000 ppm
- Bis(2-ethylhexyl) phthalate (DEHP): 1,000 ppm
- Butyl benzyl phthalate (BBP): 1,000 ppm
- Dibutyl phthalate (DBP): 1,000 ppm
- Diisobutyl phthalate (DIBP): 1,000 ppm

Important Safety Information

Carefully read the following safety information before using this device.

Setting up your system:

- Put the device horizontally on a stable and solid surface.
- Do not use this product near water.
- Do not use this product near any heated source.
- Leave plenty of space around the device and do not block the ventilation openings. Never drop or insert any objects of any kind into the openings.

Care during use:

- Do not place heavy objects on the top of the device.
- Make sure to connect the correct voltage to the device. Failure to supply the correct voltage could damage the unit.
- Do not place or allow objects to rest on the power cord, and do not walk on it.
- Ensure that the total ampere rating of all devices plugged into the extension cord does not exceed the cord's ampere rating.
- Do not spill water or any other liquids on your device.
- Always unplug the device and use only neutral cleaning agents when cleaning.
- Use a computer vacuum cleaner to remove dust and particles from the vents.

Product Disassembly

Do not try to repair, disassemble, or make modifications to the device. Doing so will void the warranty and may result in damage to the product or personal injury.

CAUTION

Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries by observing local regulations.

Warranty Policy

- **IBASE standard products:**

  24-month (2-year) warranty from the date of shipment. If the date of shipment cannot be ascertained, the product serial numbers can be used to determine the approximate shipping date.

- **3rd-party parts:**

  12-month (1-year) warranty from delivery for 3rd-party parts that are not manufactured by IBASE, such as CPU, CPU cooler, memory, storage devices, power adaptor, display panel and touch screen.

* However, products that fail due to misuse, accident, improper installation or unauthorized repair shall be treated as out of warranty and customers shall be billed for repair and shipping charges.

Technical Support & Services

1. Visit the IBASE website at www.ibase.com.tw to find the latest information about the product.
2. If you encounter any technical problems and require assistance from your distributor or sales representative, please prepare and send the following information:

   - Product model name
   - Product serial number
   - Detailed description of the problem
   - Error messages in text or screenshots if any
   - The arrangement of the peripherals
   - Software used (such as OS and application software)

3. If repair service is required, please apply for an RMA number from the IBASE's website or contact your distributor or sales representative for assistance.

Table of Contents

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Chapter 1
General Information

The information provided in this chapter includes:

- Features
- Packing List
- Specifications
- Product View
- Dimensions

1.1 Introduction

The ISR215F is a rugged edge computer powered by the NXP i.MX 8M Plus ARM Cortex-A53 quad processor, designed for demanding industrial applications. It features 3GB LPDDR4, 16GB eMMC with an SD expansion slot, and multiple connectivity options including COM, USB, HDMI, Ethernet, 5G via an M.2 B-Key (3052), LTE via a Mini-PCIe, and Wi-Fi/BT via an M.2 E-Key (2232). The device is characterized by its ruggedized and fanless design, making it ideal for reliable operation in harsh environments.

1.2 Features

- NXP Cortex™-A53, i.MX 8M Plus Quad 1.6GHz processor
- 3GB LPDDR4, 16GB eMMC & SD socket for expansion
- Embedded I/O for COM, USB, HDMI, Ethernet
- Supports M.2 Key-B (3052), M.2 E-Key (2232) and mPCIe for WiFi/BT, 4G/LTE or 5G add-on module
- Ruggedized and fanless design

1.3 Packing List

Your product package should include the items listed below.

- ISR215F-Q316I

The user's manual can be downloaded from the IBASE website.

1.4 Specifications

Product Name	ISR215F-Q316I
Description	ARM-based IOT Gateway, NXP i.MX 8M Plus - ARM ISR215F-Q316I Cortex-A53 Quad 1.6GHz processor, 3GB LPDDR4, 16GB eMMC and Expansion IO board
System Motherboard	IBR215-Q316I 2.5” SBC
System	
Operating System	• Android 13 • Yocto 4.0 • Other OS (by request)
CPU Type	NXP IMX 8M Plus - ARM Cortex-A53 Quad processor
Memory	3GB LPDDR4 on board (optional 1GB/2GB/4GB)
Storage	16GB eMMC on board (up to 128GB)
Construction	SGCC
Color	Black
Display	HDMI 2.0a Edge connector
LAN	2x RJ45 GbE LAN
Watchdog	256 levels, 0~128 seconds
Front I/O	• 1x HDMI 2.0a • 2x USB 3.0 (Type-A) • 2x RJ45 GbE • 1x Mini-USB OTG • 1x RS232/422/485 (IO board)
Rear I/O	4x Antenna holes (reserved)
Side I/O	• 1x On/Off button Yes • 1x 12V~24V DC-in jack • 1x SD socket (UHS-I SDR-104, 104MB/s max) • 1x Boot select switches (boot from eMMC or SD)

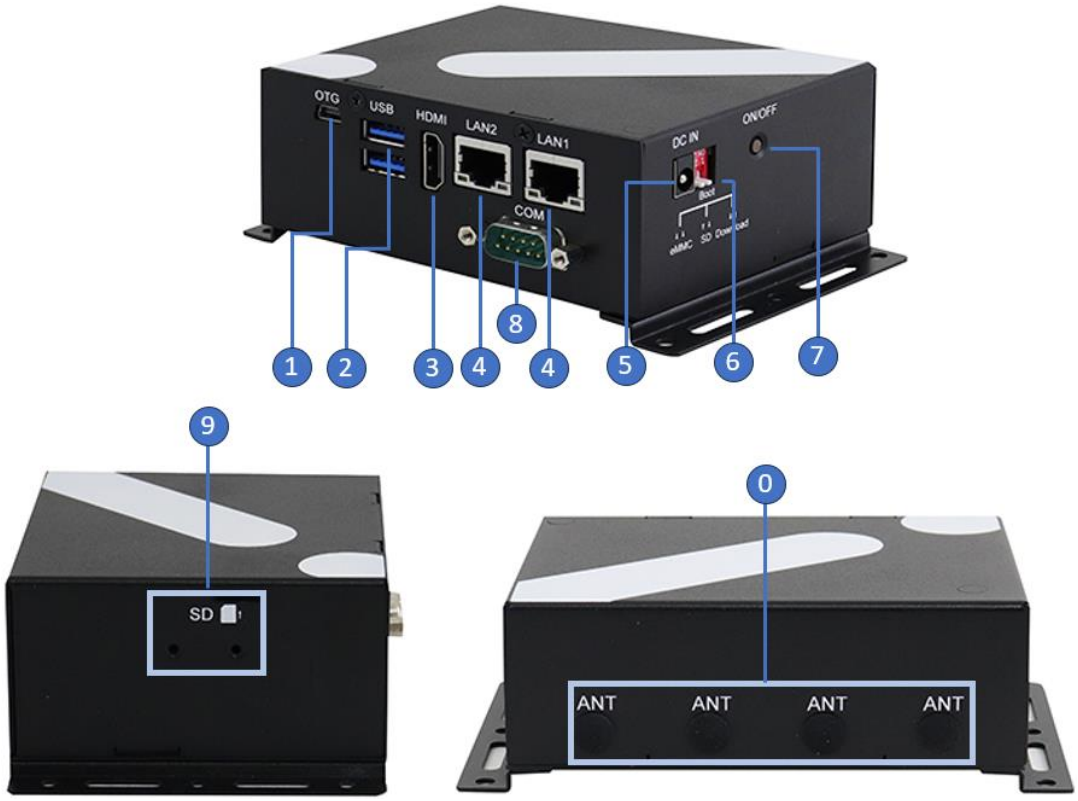
Expansion Slots	• 1x M.2 3052 Key-B with SIM socket (for 5G module)
	• 2x I2C / 4x GPIO 6-pin header
	• 1x Audio Line-in and Line-out 6-pin header
	• 1x DC power in 4-pin header
	• 1x mPCI-E (IO board, for 4G/LTE USB module)
	• 1x M.2 2232 E-key (IO board, UART and SDIO for WiFi/BT modules)
	• The features below are on IO board but not externally:
	  ■ 2x USB 3.0 in 2x 10-pin header
	  ■ 1x LVDS 2ch with Backlight control
	  ■ 1x Cap touch IF
	  ■ 2x MIPI-CSI for cameras
	  ■ 2x CAN-FD

Fanless	Yes
Mounting	Wall mount and DIN rail
Certification	CE/ FCC Class-B

Environment	
Operating Temperature	-40 ~ +70 °C (-40 ~ 158 °F)
Relative Humidity	0 ~ 90 %, non-condensing

All specifications are subject to change without prior notice.

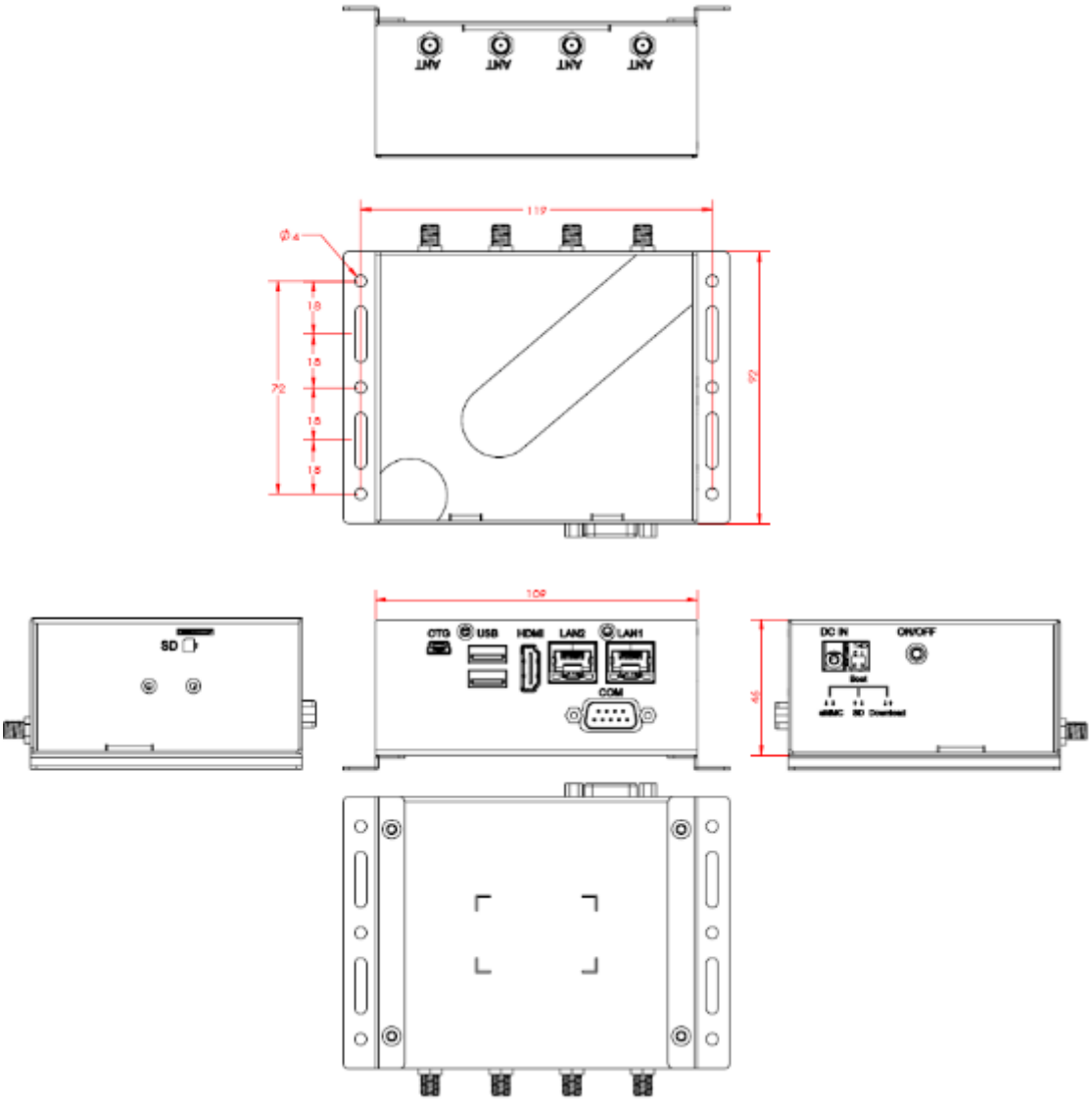
1.5 Product View

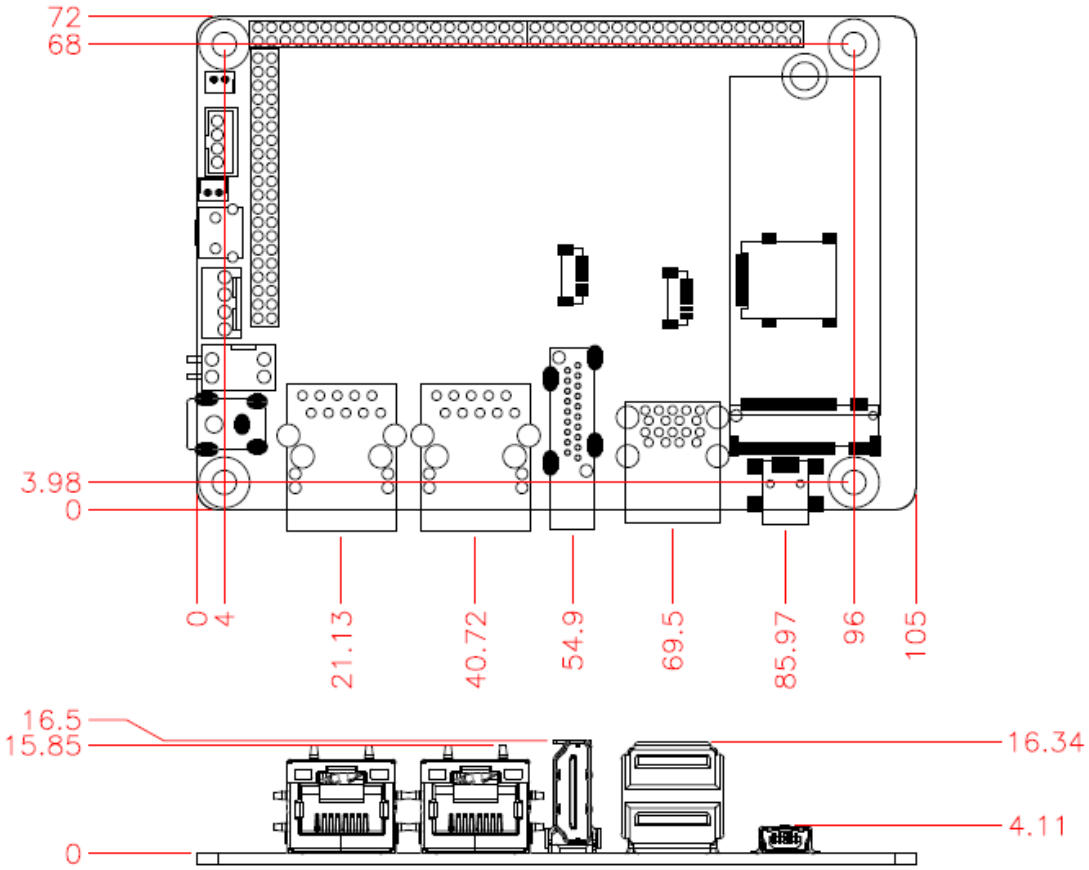


No.	Name	No.	Name
1	OTG Port	6	Boot Setting
2	USB Ports	7	Power On/Off
3	HDMI Port	8	COM Port
4	GbE LAN Port	9	SD card socket and two screw holes for DIN rail mounting
5	DC-in Power input		
		0	Antenna holes (reserved)

1.6 Dimensions

Unit: mm




72
68
3.98
0
0
4
21.13
40.72
54.9
69.5
85.97
96
105
16.5
15.85
0
16.34
4.11

Chapter 2
Hardware Configuration

This section contains general information about:

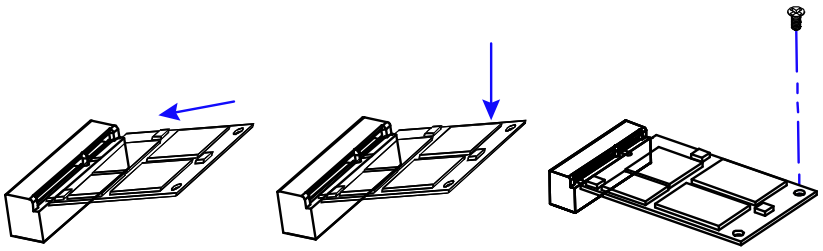
- Installations
- Connectors

2.1 Installations

There are several connectors, sockets and switches on the motherboard in the system. To be able to access them, remove the screws on top of the system and the two screws on the same side as with the USB and LAN connectors.

2.1.1 M.2 Cards Installation

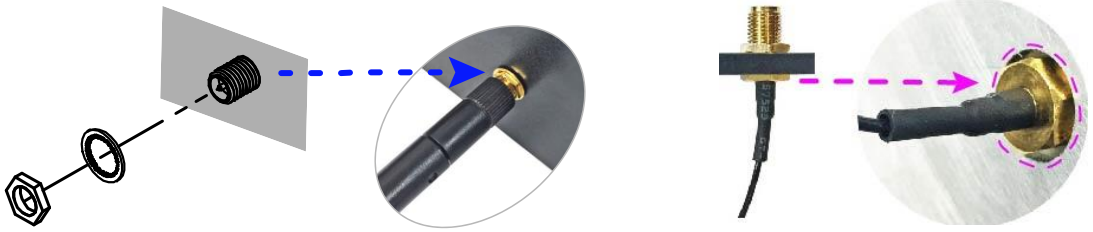
1. To install the M.2 cards, remove the device cover, locate the slot and align the keys of the card with those of the interface in a way similar to the images below and fix the card onto the brass standoff with a screw.



2.1.2 WiFi / LTE Antenna Installation

Insert the WiFi / LTE antenna extension cable through the antenna hole of the front I/O cover and fasten the antenna as shown below. Then apply adhesive around the hex nut behind the front I/O cover to prevent the extension cable from falling off, should the cable becomes loose.

1. Fasten the hex nut and the washer. Then install the antenna.
2. Apply adhesive around here.



Info: The diameter of the nut is around 6.35 mm (0.25”-36UNC).

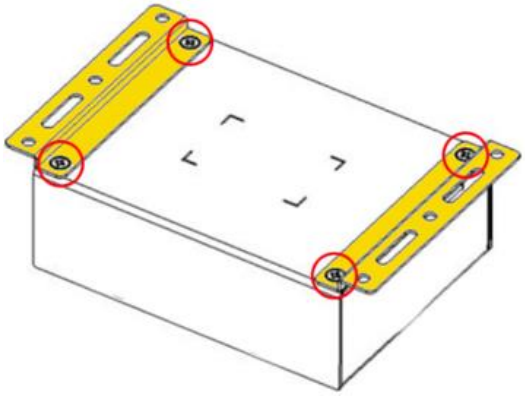
2.1.3 Mounting Installation

Requirements

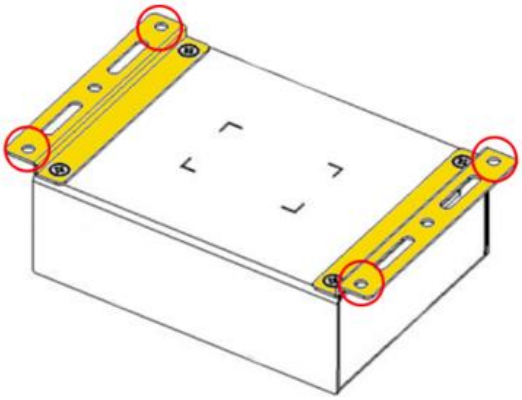
Before mounting the system, ensure that you have enough room for the power adaptor and signal cable routing, and have good ventilation for the power adaptor. The method of mounting must be able to support the weight of the device plus the weight of the suspending cables attached to the system. Use the following methods for mounting the device:

Wall Mounting Installation

1. Turn the device upside down. Attach the wall-mount kit to the device using 4 screws.



2. Prepare at least 4 screws (M3) to install the device on the wall.

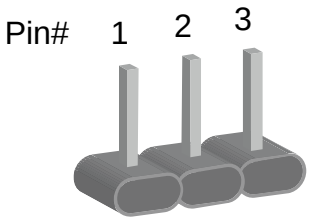


2.2 Setting the Jumpers

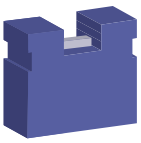
Configure your device by using jumpers to enable the features that you need based on your applications. Contact your supplier if you have doubts about the best configuration for your use.

2.2.1 How to Set Jumpers

Jumpers are short-length conductors consisting of several metal pins with a base mounted on the circuit board. Jumper caps are placed (or removed) on the pins to enable or disable functions or features. If a jumper has 3 pins, you can connect Pin 1 with Pin 2 or Pin 2 with Pin 3 by shorting the jumper.

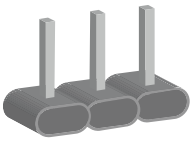
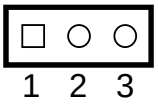
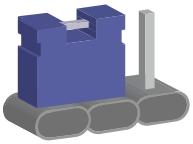
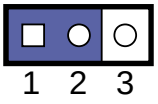
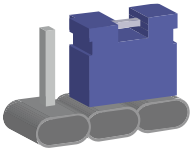
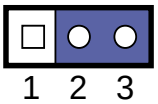


A 3-pin jumper



A jumper cap

Refer to the illustration below to set jumpers.

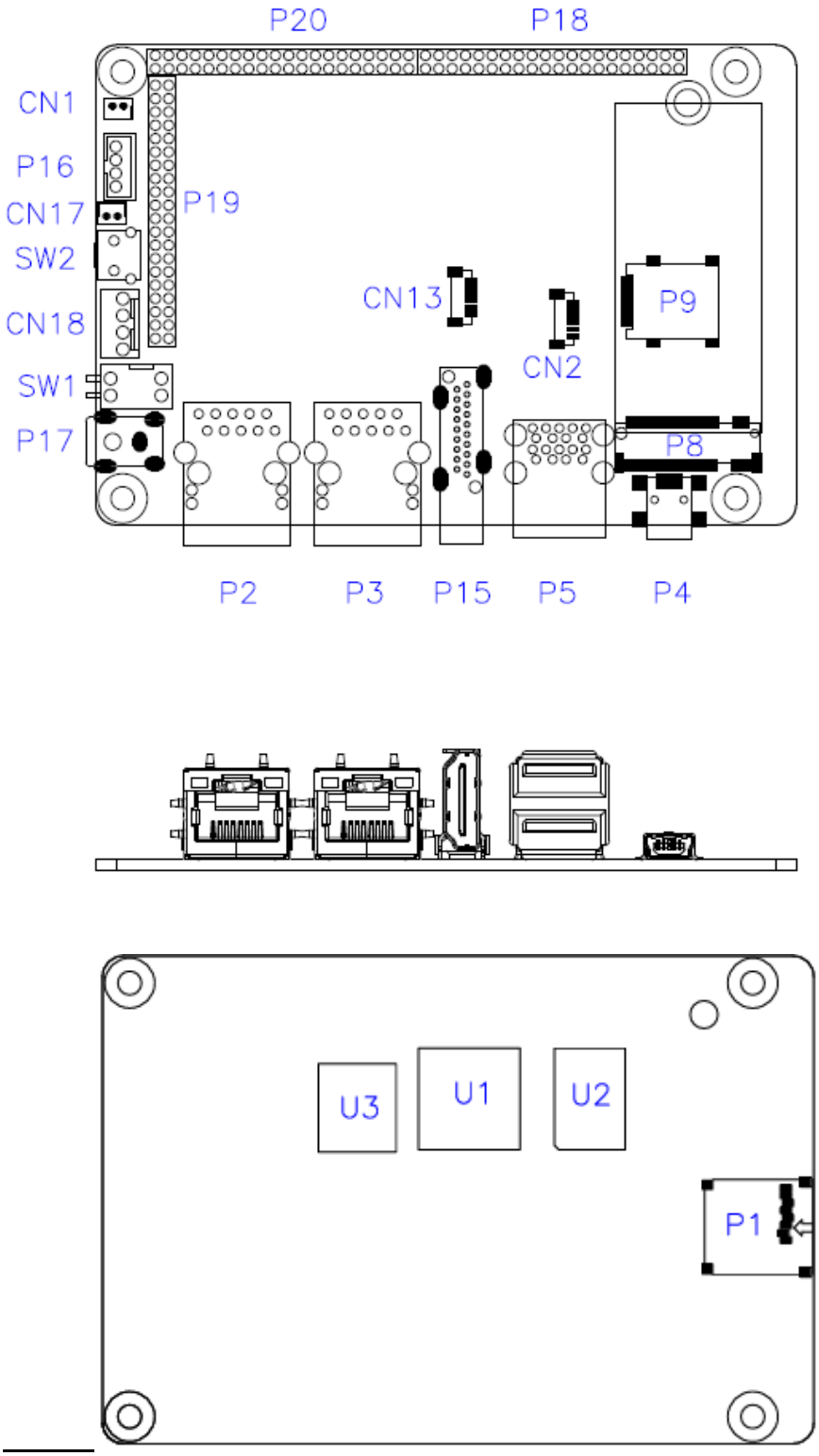
Pin closed	Oblique view	Setting
Open		
1-2		
2-3		

When two pins of a jumper are encased in a jumper cap, this jumper is **closed**, i.e. turned **On**.

When a jumper cap is removed from two jumper pins, this jumper is **open**, i.e. turned **Off**.

2.3 Connector Locations on Motherboard

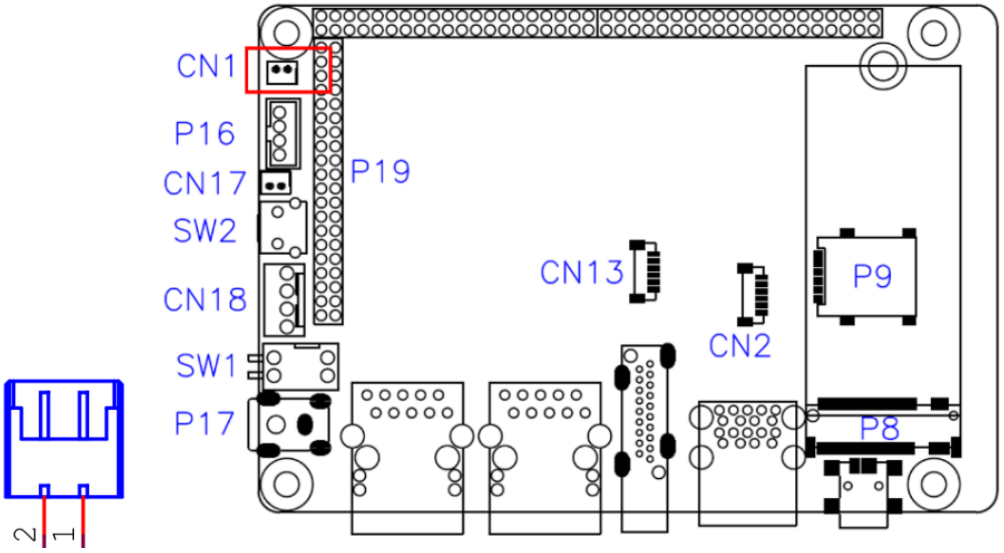
Motherboard: IBR215



2.4 Connectors Quick Reference

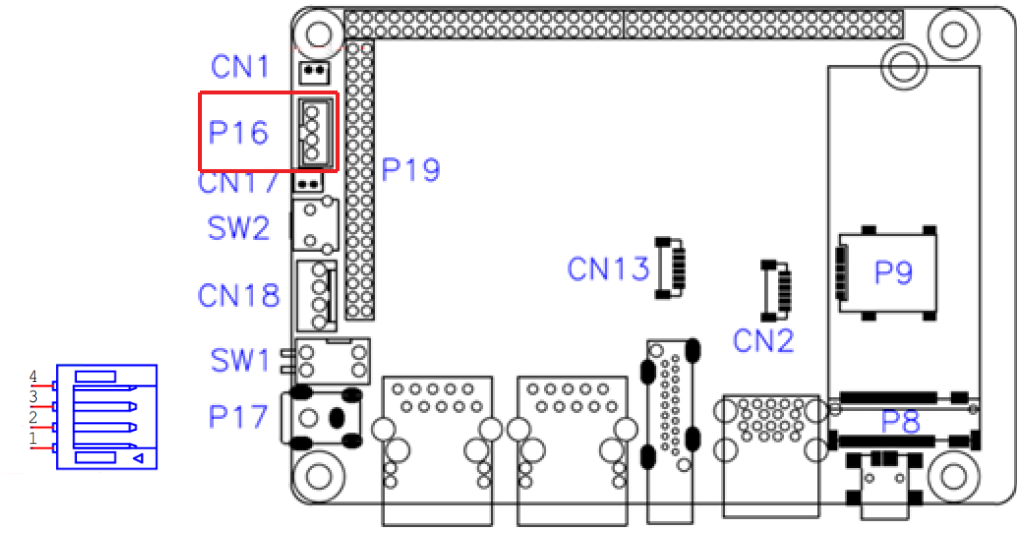
Function	Connector
RTC Lithium Cell Connector	CN1
RS232 Debug Connector	P16
System ON/OFF Button	SW2
System ON/OFF Connector	CN17
Running Mode	SW1
DC Power Input	P17, CN18
Audio Line-In & Line-Out Connector	CN2
I^2C Connector	CN13
Micro SD Card Slot	P1
HDMI Port	P15
GbE LAN Port	P2,P3
Dual USB 3.0 Type-A Port	P5
Mini-USB OTG Port	P4
NGFF M.2 3052 Slot	P8
SIM Card Socket	P9

2.4.1 RTC Lithium Cell Connector (CN1)



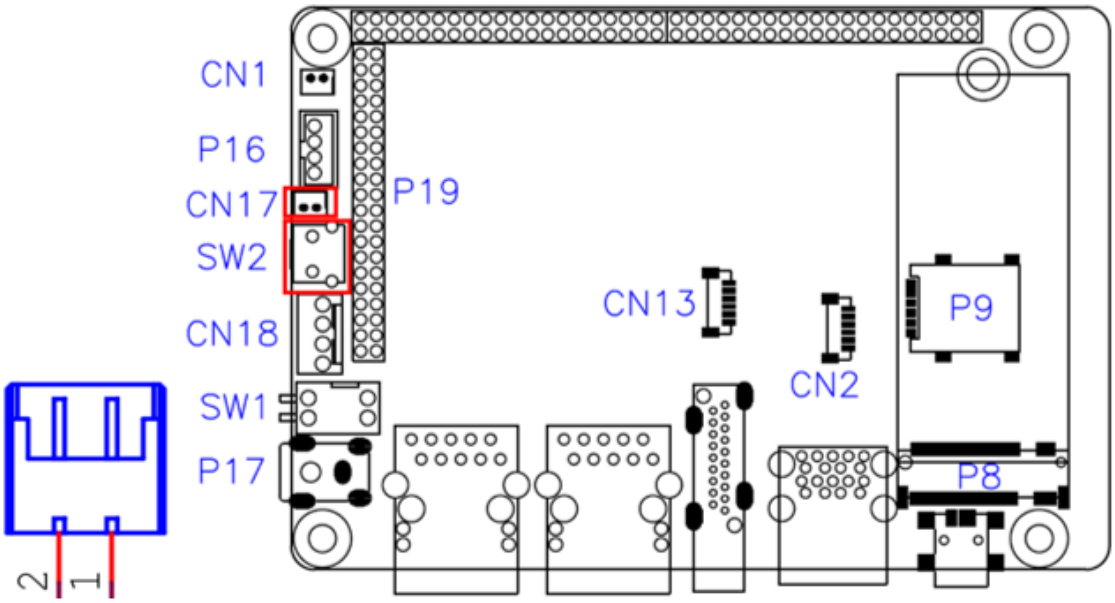
Pin	Signal Name	Pin	Signal Name
1	RTC_VCC	2	Ground

2.4.2 RS232 Debug Connector (P16)



Pin	Assigment
1	DEBUG_RX
2	DEBUG_TX
3	GND
4	NC

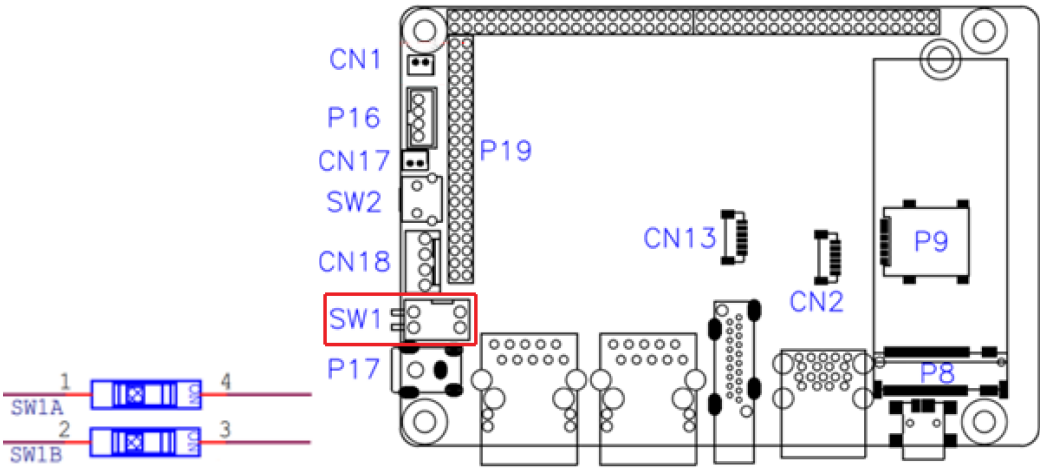
2.4.3 System On/Off Button (SW2, CN17)



SW2: On/Off Switch
CN17: On/Off Signal Header

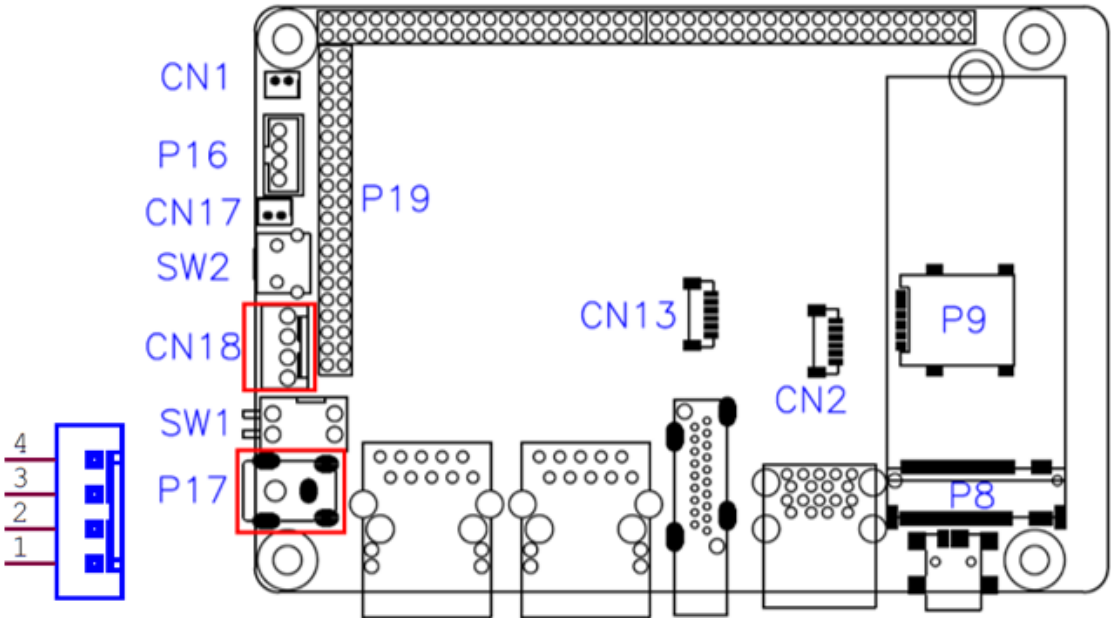
Pin	Assigment	Pin	Assigment
1	Ground	2	ONOFF_B

2.4.4 Running Mode (SW1)



Running Mode	SW1A	SW1B
SDHC3(eMMC)	OFF	OFF
SDHC2(SD)	OFF	ON
USB Download	ON	--

2.4.5 LVDS DC Power Input (P17, CN18)

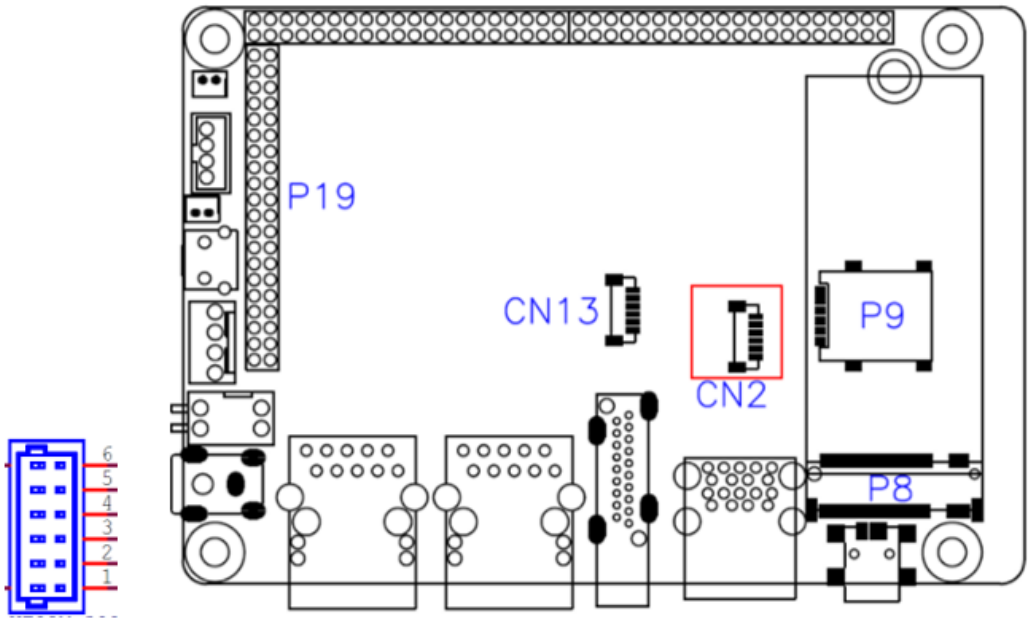


CN18: DC Input/Output Header

Pin	Assigment	Pin	Assigment
1	Ground	2	Ground
3	12V~24V	4	12V~24V

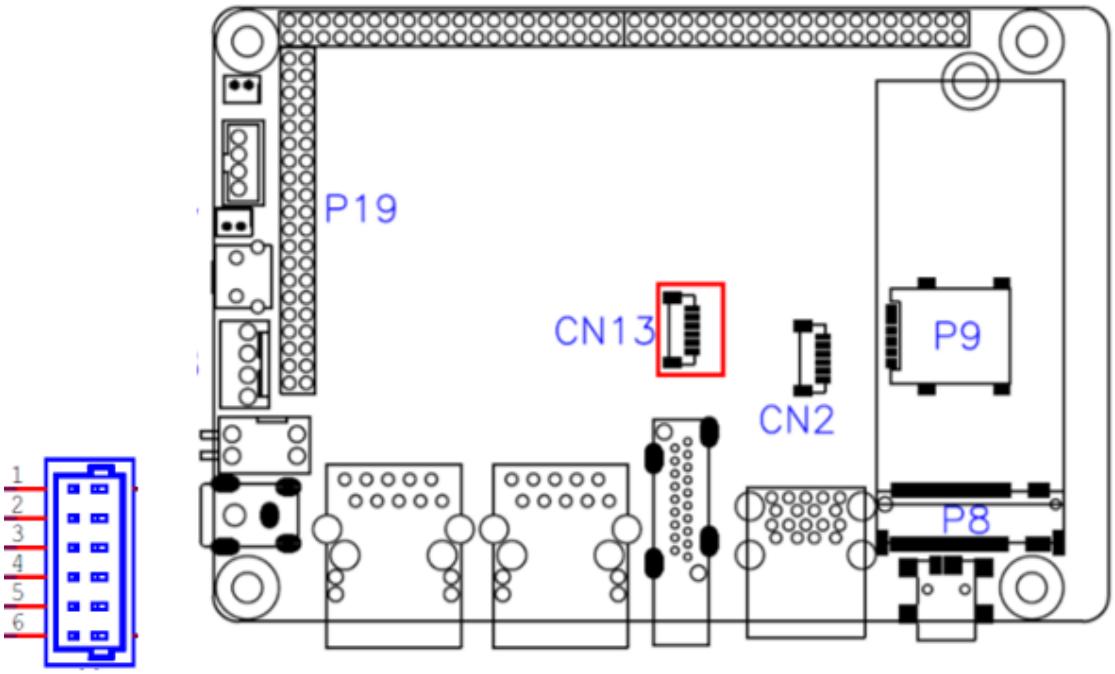
P17: 12V~24V DC input

2.4.6 Audio Line-In & Line-Out Connector (CN2)



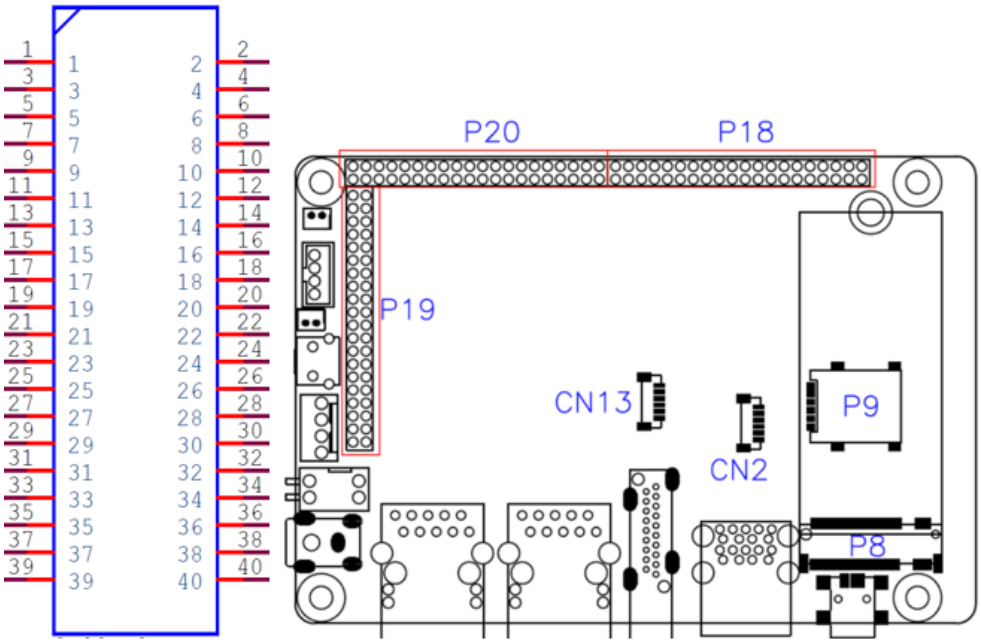
Pin	Signal Name	Pin	Signal Name
1	Ground	2	Line_Out_R
3	Line_Out_L	4	Ground
5	Line_In_R	6	Line_In_L

2.4.7 I²C Connector (CN13)



Pin	Signal Name	Pin	Signal Name
1	I2C3_SCL	2	I2C3_SDA
3	Ground	4	I2C4_SCL
5	I2C4_SDA	6	Ground

2.4.8 IO Board Port (P18, P19, P20)



P18:

Pin	Assigment	Pin	Assigment
1	CSI_P2_DN2	2	CSI_P2_DP2
3	CSI_P2_DN3	4	CSI_P2_DP3
5	SD1_DATA0	6	SD1_DATA1
7	SD1_CMD	8	SD1_CLK
9	SD1_DATA2	10	SD1_DATA3
11	UART1_TXD	12	UART1_RXD
13	UART_TX3/RTS1	14	UART_RX3/CTS1
15	VDCDC3_1V8	16	VDCDC5_3V3
17	CLKO1_CSI1_MCLK	18	CLKO2_CSI2_MCLK
19	LCD_BL_PWM/GPIO1_01/PWMO1	20	GPIO1_00/32K_OUT
21	Ground	22	Ground
23	HUB_DP6	24	HUB_DM6
25	HUB_DP1	26	HUB_DM1
27	HUB_TXDP1	28	HUB_TXDM1
29	HUB_RXDP1	30	HUB_RXDM1
31	Ground	32	Ground
33	HUB_DP2	34	HUB_DM2
35	HUB_TXDP2	36	HUB_TXDM2
37	HUB_RXDP2	38	HUB_RXDM2
39	USB_PWR_OUT1	40	USB_PWR_OUT2

P19:

Pin	Assigment	Pin	Assigment
1	VDCDC6_5V	2	VDCDC6_5V
3	DC_IN	4	DC_IN
5	GPIO2_11/PCIe_PWEN	6	UART4_RTS/CSPI2_SS0
7	UART4_TXD/CSPI2_MOSI	8	UART4_RXD/CSPI2_SCLK
9	UART4_CTS/CSPI2_MISO	10	GPIO4_28/M2_WAKE_B
11	GPIO4_24/PCIe_WAKE_B	12	GPIO4_21/TP_EN_B
13	GPIO4_22/M2_RST_B	14	GPIO4_26/PCIe_DIS_B
15	GPIO5_03/M2_BT_DIS_B	16	GPIO4_27/TP_RST_B
17	GPIO4_25/PCIe_REQ_B	18	GPIO4_23/PCIe_RST_B
19	GPIO4_19/LVDS_BL_PWEN	20	GPIO5_04/M2_WIFI_DIS_B
21	GPIO5_05/M2_I2C_IRQ_B	22	GPIO3_21/CSI2_PWEN_B
23	CAN1_RX	24	CAN1_TX
25	CAN2_RX	26	CAN2_TX
27	GPIO3_20/CSI1_PWEN_B	28	Ground
29	GPIO3_19/CSI1_RST_B	30	GPIO4_01/LVDS_EN
31	GPIO4_18/TP_INT_B	32	GPIO4_03/CSI2_RST_B
33	I2C2_SCL	34	I2C2_SDA
35	I2C1_SCL	36	I2C1_SDA
37	1V8_PCM_DO	38	1V8_PCM_DIN
39	1V8_PCM_CLK	40	1V8_PCM_SYNC

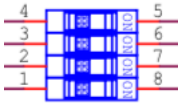
P20:

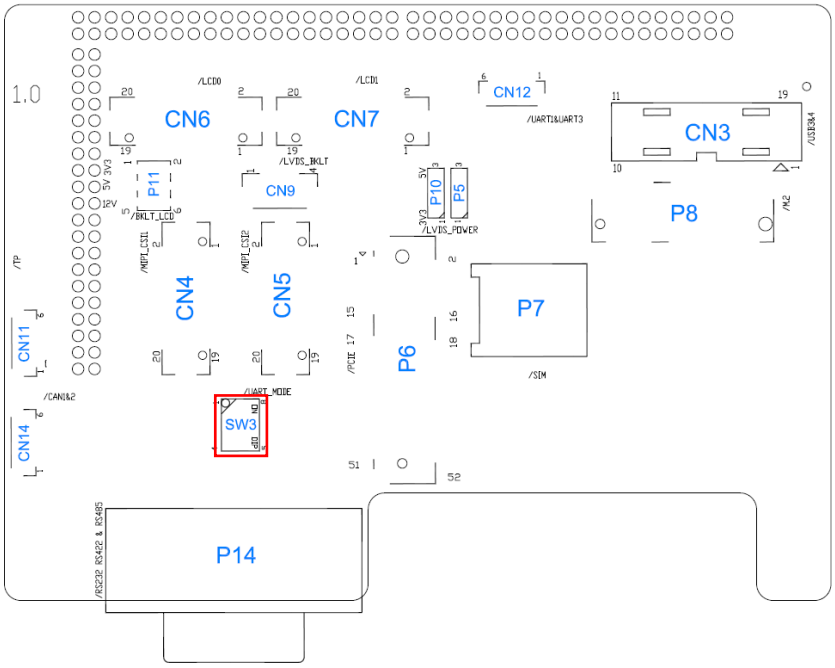
Pin	Assigment	Pin	Assigment
1	Ground	2	Ground
3	Ground	4	Ground
5	LVDS0_TX3_N	6	LVDS0_TX3_P
7	LVDS0_TX2_N	8	LVDS0_TX2_P
9	LVDS0_CLK_N	10	LVDS0_CLK_P
11	LVDS0_TX1_N	12	LVDS0_TX1_P
13	LVDS0_TX0_N	14	LVDS0_TX0_P
15	CSI_P1_DN3	16	CSI_P1_DP3
17	CSI_P1_DN2	18	CSI_P1_DP2
19	CSI_P1_CKN	20	CSI_P1_CKP
21	CSI_P1_DN1	22	CSI_P1_DP1
23	CSI_P1_DN0	24	CSI_P1_DP0
25	LVDS1_TX3_N	26	LVDS1_TX3_P
27	LVDS1_TX2_N	28	LVDS1_TX2_P
29	LVDS1_CLK_N	30	LVDS1_CLK_P
31	LVDS1_TX1_N	32	LVDS1_TX1_P
33	LVDS1_TX0_N	34	LVDS1_TX0_P
35	CSI_P2_DN0	36	CSI_P2_DP0
37	CSI_P2_DN1	38	CSI_P2_DP1
39	CSI_P2_CKN	40	CSI_P2_CKP

2.5 IO Board Jumper & Connectors Quick Reference

Function	Connector
COM RS-232/422/485 Selection	SW3
COM RS-232/422/485 Port	P14
UART1 & UART3 Connector	CN12
LVDS Display Connector	CN6, CN7
LCD Backlight Control Connector	CN9
LVDS Power Jumper	P10
LCD Backlight Power Jumper	P11
Internal USB3.0 Connector	CN3
MIPI-CSI Connector	CN4,CN5
NGFF M.2 2230 Slot	P8
Mini-PCIe Slot	P6
Mini-PCIe / NGFF M.2 2230 Jumper	P5
SIM Card Socket	P7
CAN2.0b CAN1 & CAN2 Connector	CN14
Capacitive Touch Screen Interface	CN11
IO Expansion Input	P20,P21,P22

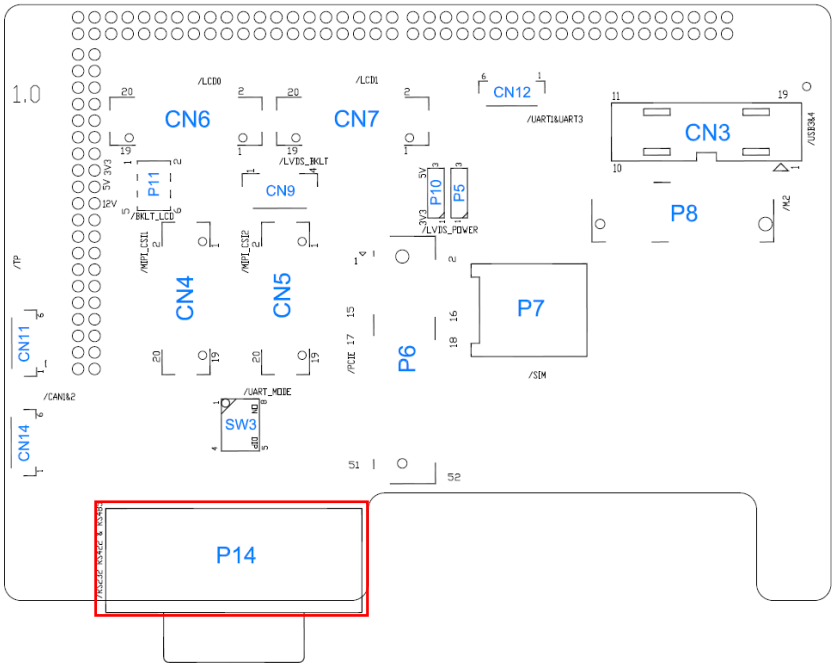
2.5.1 RS-232/422/485 Selection (SW3)





Panel Type	1-8	2-7	3-6	4-5
RS-422 Full Duplex	Off	On	On	On
RS-232 (Default)	Off	Off	On	On
RS-485 Half Duplex (TX Low-Active)	Off	On	Off	On
RS-485 Half Duplex (TX High-Active)	Off	Off	Off	On
RS-422 Full Duplex	Off	On	On	Off
RS-485 Half Duplex	Off	On	Off	Off
Shutdown	Off	Off	Off	Off

2.5.2 COM RS-232/422/485 Port (P14)

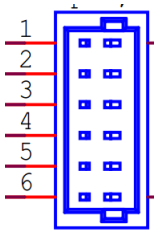


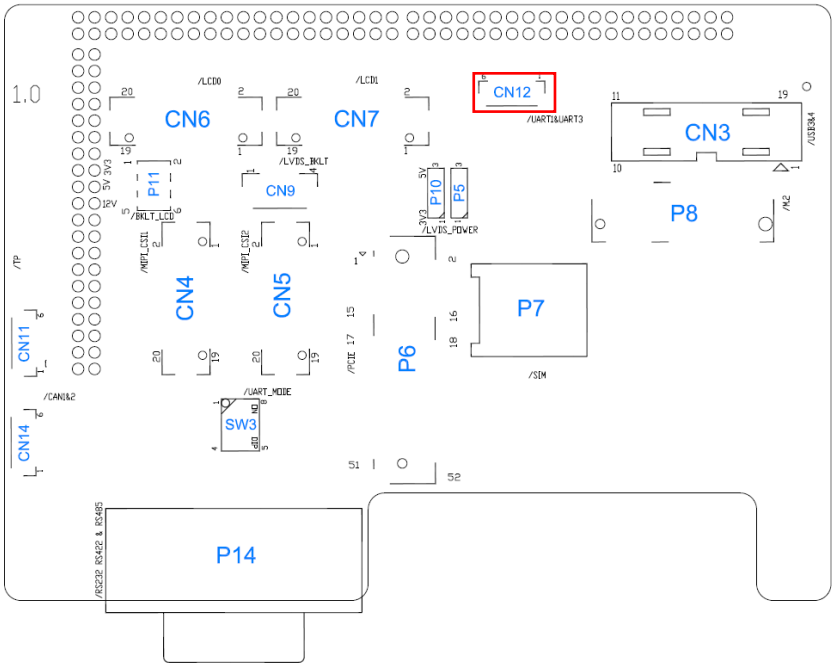
Pin	Signal Name	Pin	Signal Name
1	DCD, Data carrier detect	6	DSR, Data set ready
2	RXD, Receive data	7	RTS, Request to send
3	TXD, Transmit data	8	CTS, Clear to send
4	DTR, Data terminal ready	9	NC
5	GND		

Refer to the SW3 setting for RS-232/422/485 mode selection.

Pin	Assignment		
	RS-232	RS-422	RS-485
1	NC	TX-	DATA-
2	RX	TX+	DATA+
3	TX	RX+	NC
4	NC	RX-	NC
5	GND	GND	GND
6	NC	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	NC	NC	NC

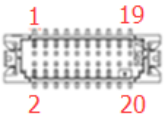
2.5.3 UART1 & UART3 Connector (CN12)

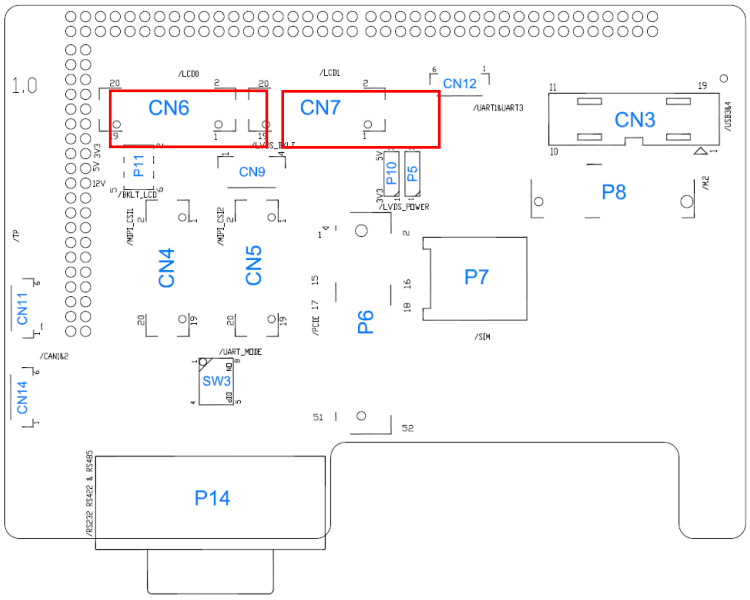




Pin	Assigment	Pin	Assigment
1	UART3_TXD	2	UART3_RXD
3	GND	4	UART1_TXD
5	UART1_RXD	6	GND

2.5.4 LVDS Display Connector (CN6, CN7)





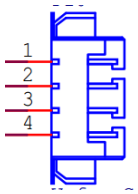
CN6：

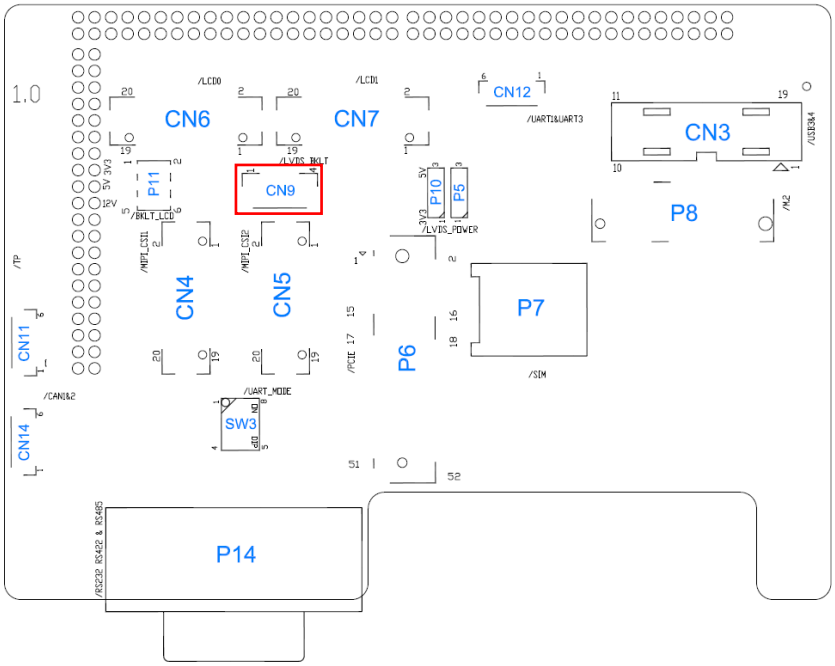
Pin	Assigment	Pin	Assigment
1	LCD0_TX0_P	2	LCD0_TX0_N
3	GND	4	GND
5	LCD0_TX1_P	6	LCD0_TX1_N
7	GND	8	LCD_VDD
9	LCD0_TX3_P	10	LCD0_TX3_N
11	LCD0_TX2_P	12	LCD0_TX2_N
13	GND	14	GND
15	LCD0_CLK_P	16	LCD0_CLK_N
17	BTL_PWM	18	LCD_VDD
19	BKLT_VCC	20	BKLT_VCC

CN7：

Pin	Assigment	Pin	Assigment
1	LCD1_TX0_P	2	LCD1_TX0_N
3	GND	4	GND
5	LCD1_TX1_P	6	LCD1_TX1_N
7	GND	8	LCD_VDD
9	LCD1_TX3_P	10	LCD1_TX3_N
11	LCD1_TX2_P	12	LCD1_TX2_N
13	GND	14	GND
15	LCD1_CLK_P	16	LCD1_CLK_N
17	BTL_PWM	18	LCD_VDD
19	BKLT_VCC	20	BKLT_VCC

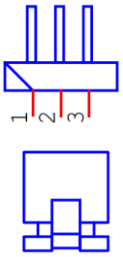
2.5.5 LCD Backlight Control Connector (CN9)

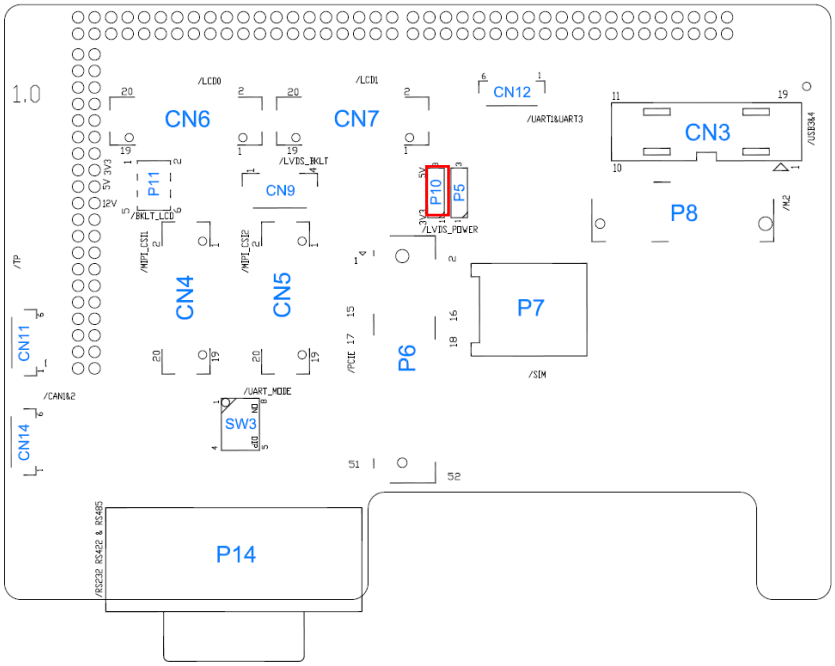




Pin	Assigment	Pin	Assigment
1	BKLT_VCC	3	LCD_BKLT_PWM
2	LCD_BKLT_EN	4	GND

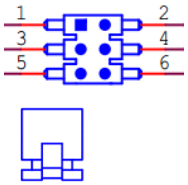
2.5.6 LVDS Power Jumper (P10)

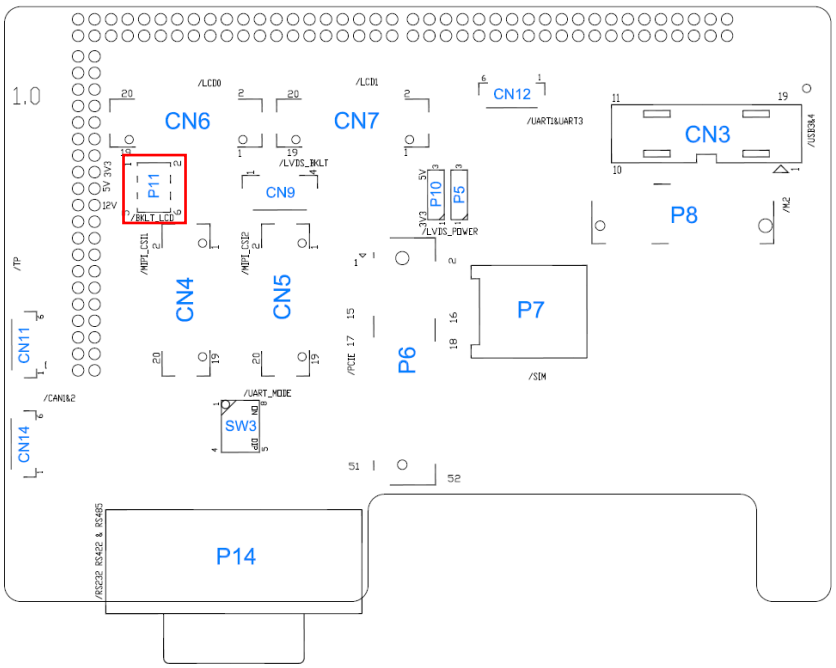




Function	Pin closed
3V3	1-2
5V	2-3

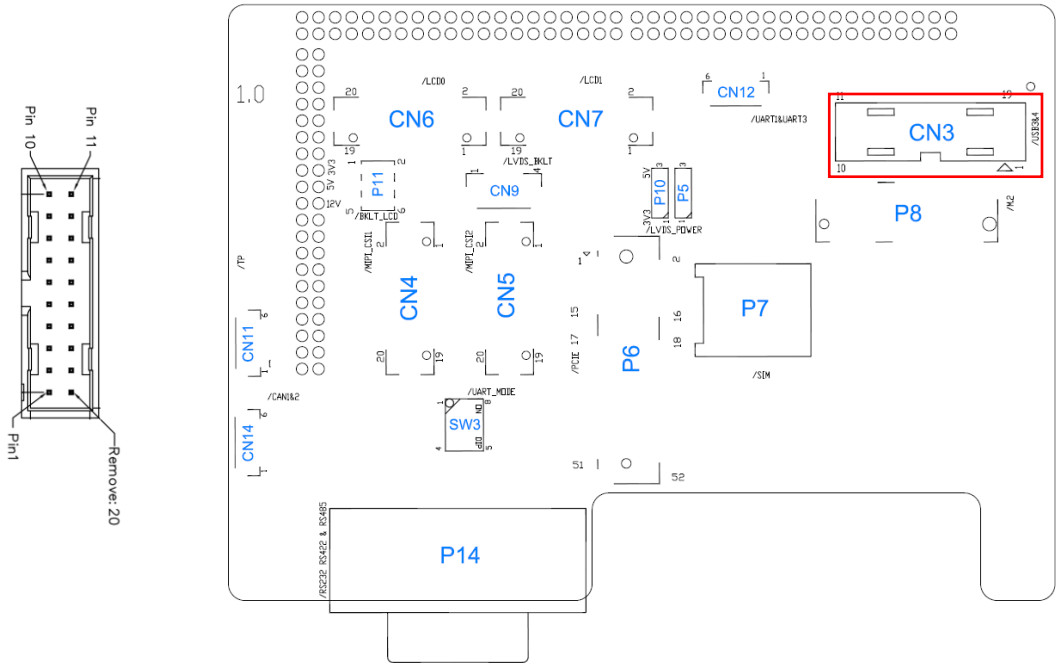
2.5.7 LCD Backlight Power Jumper (P11)





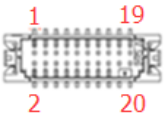
Function	Pin closed
3V3	1-2
5V	3-4
12V	5-6

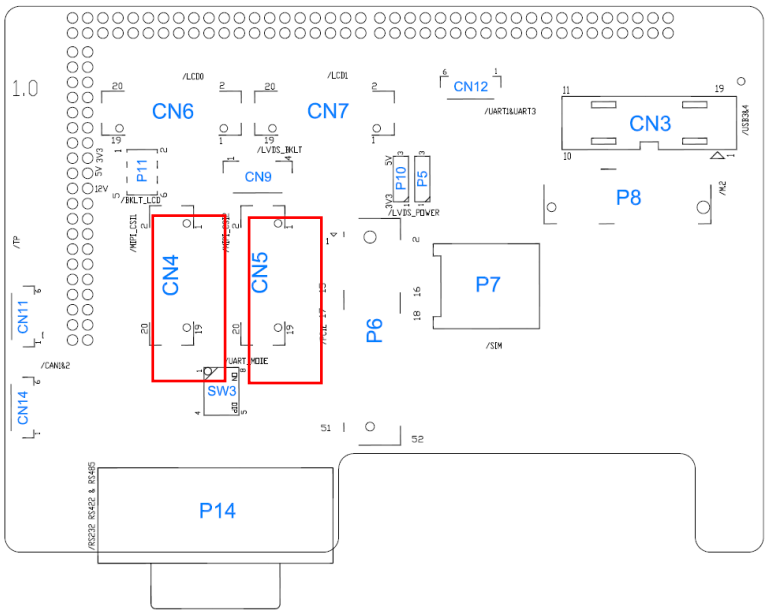
2.5.8 Internal USB3.0 Connector (CN3)



Pin	Assigment	Pin	Assigment
1	+5V	2	RXDM2
3	RXDP2	4	GND
5	TXDM2	6	TXDP2
7	GND	8	DM2
9	DP2	10	NC
11	DP1	12	DM1
13	GND	14	TXDP1
15	TXDM1	16	GND
17	RXDP1	18	RXDM1
19	+5V	X	

2.5.9 MIPI-CSI Connector (CN4,CN5)





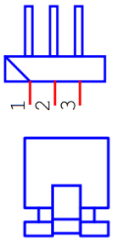
CN4:

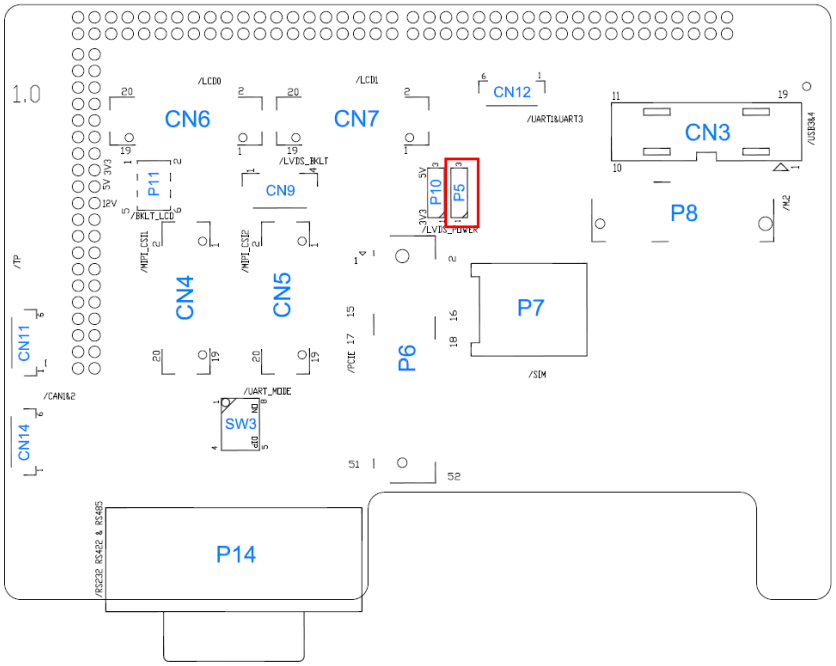
Pin	Assigment	Pin	Assigment
1	MIPI_CSI1_CKP	2	MIPI_CSI1_CKN
3	MIPI_CSI1_DP0	4	MIPI_CSI1_DN0
5	MIPI_CSI1_DP1	6	MIPI_CSI1_DN1
7	MIPI_CSI1_DP2	8	MIPI_CSI1_DN2
9	MIPI_CSI1_DP3	10	MIPI_CSI1_DN3
11	GND	12	GND
13	CSI1_SCL	14	CSI1_SDA
15	CSI1_RST_B	16	VDD_2V8
17	CSI1_PWEN_B	18	VDD_1V8
19	CSI1_MCLK	20	GND

CN5:

Pin	Assigment	Pin	Assigment
1	MIPI_CSI2_CKP	2	MIPI_CSI2_CKN
3	MIPI_CSI2_DP0	4	MIPI_CSI2_DN0
5	MIPI_CSI2_DP1	6	MIPI_CSI2_DN1
7	MIPI_CSI2_DP2	8	MIPI_CSI2_DN2
9	MIPI_CSI2_DP3	10	MIPI_CSI2_DN3
11	GND	12	GND
13	CSI2_SCL	14	CSI2_SDA
15	CSI2_RST_B	16	VDD_2V8
17	CSI2_PWEN_B	18	VDD_1V8
19	CSI2_MCLK	20	GND

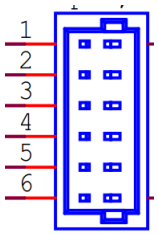
2.5.10 Mini-PCIe / NGFF M.2 2230 Jumper (P5)

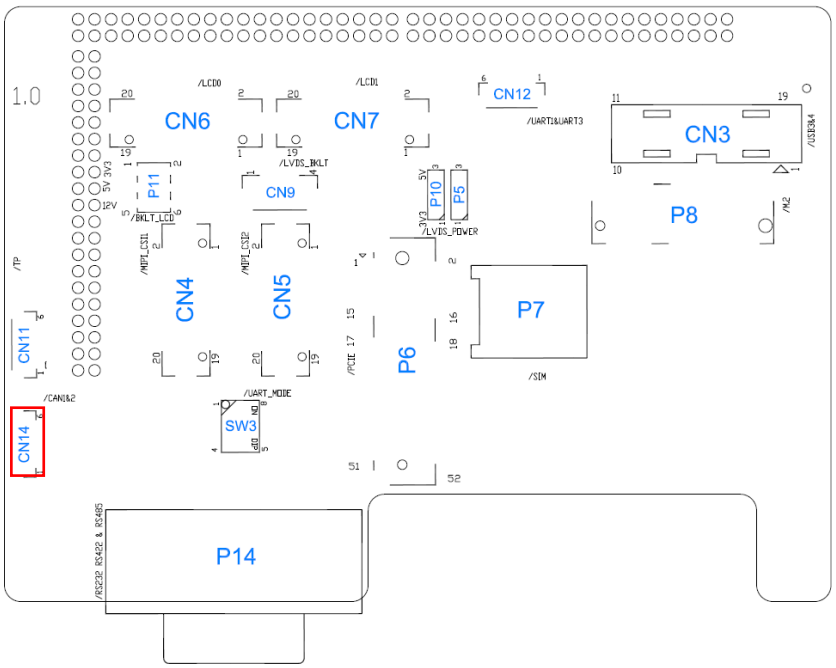




Function	Pin closed
Mini-PCIe	1-2
NGFF M.2 2230	2-3

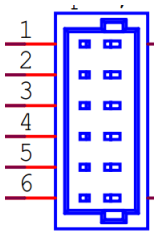
2.5.11 CAN CAN1 & CAN2 Connector(CN14)

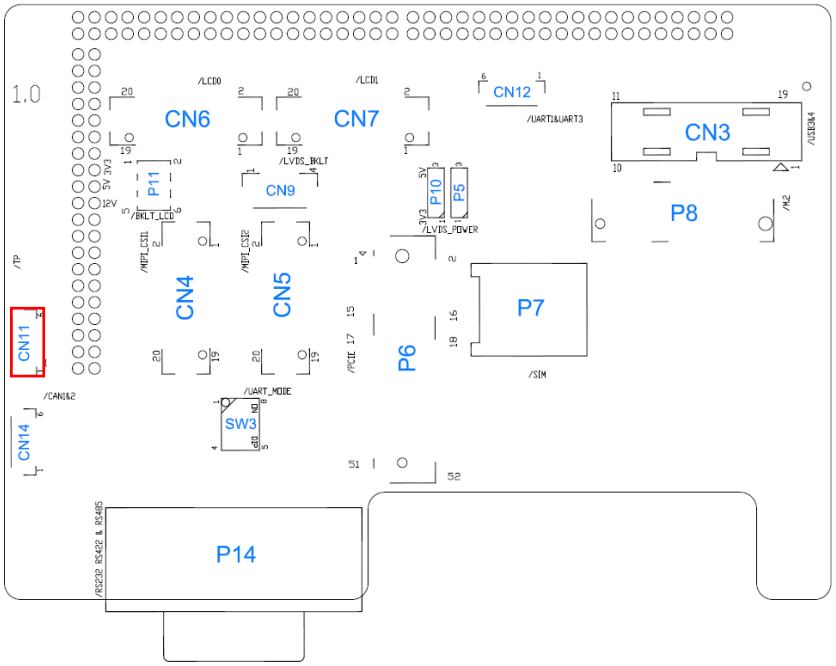




Pin	Assigment	Pin	Assigment
1	CAN1_H	2	CAN1_L
3	GND	4	CAN2_H
5	CAN2_L	6	GND

2.5.12 Capacitive Touch Screen Interface(CN11)





Pin	Assigment	Pin	Assigment
1	3V3	2	TP_INT_B
3	TP_RST_B	4	I2C1_SCL
5	I2C1_SDA	6	GND

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Chapter 3
Software Setup

This chapter introduces the following setup on the device:

(for advanced users only)

- Make a recovery SD card
- Upgrade firmware through the recovery SD card

3.1 Make a Recovery SD Card

Note: This is for advanced users who has IBASE standard image file only.

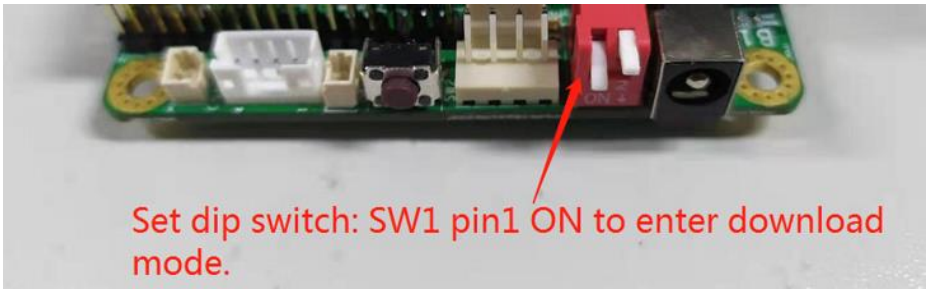
Basically, IBR215 is preloaded with O.S (Android or Yocto) into eMMC by default. Connect the HDMI with IBR215, and 12V-24V power directly.

This chapter guides you to make a recovery boot-up microSD card.

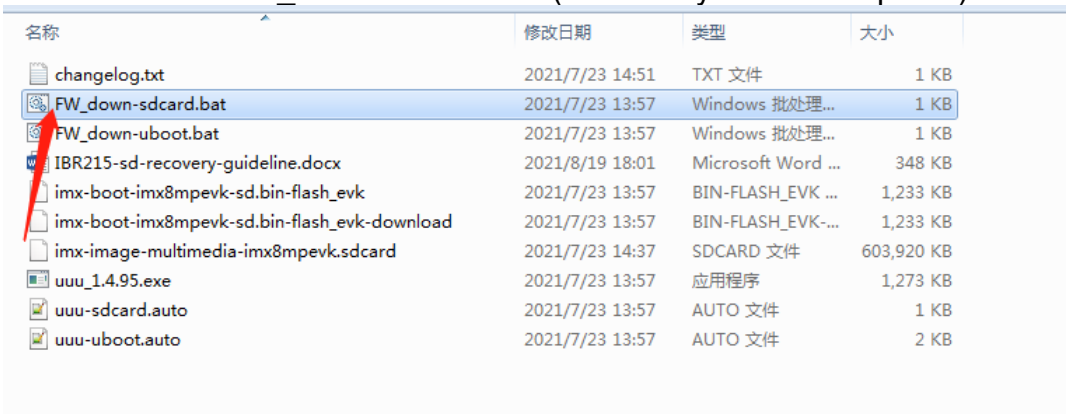
3.1.1 Preparing the Recovery SD card to Install Linux / Android image into eMMC

Note: All data in the eMMC will be erased.

1) System requirements:
   Operating System: Windows 7 or later
   Tool: uuu
   SD card: 4GB or greater in size
2) Insert your SD card to this board (i.e. the P1 connector), connect the board to PC through the mini-USB port (i.e. the P4 connector), and change the boot mode to download mode.



3) Boot IBR215 and flash SD via CMD command “uuu.exe uuu-sdcard.auto” or double click “FW_down-sdcard.bat” (Same way as PCBA update)

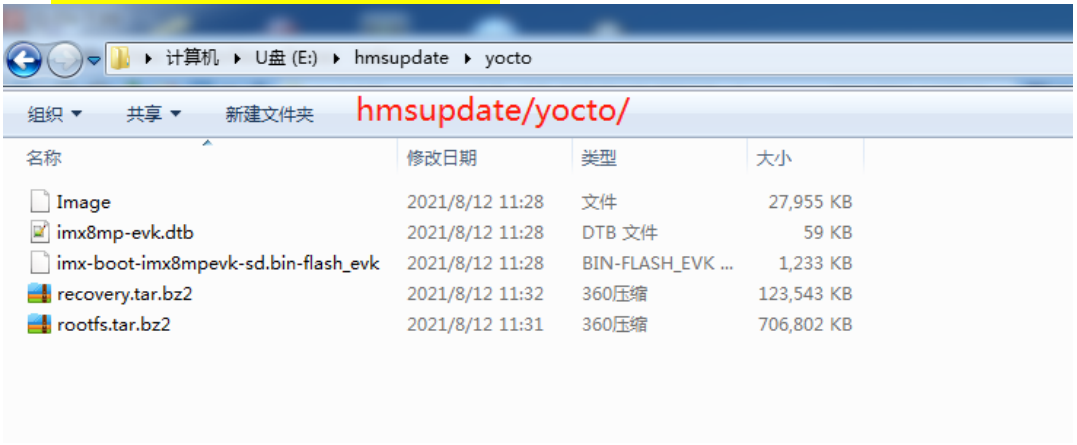


3.1.2 Upgrade Firmware through the Recovery SD Card

1) Put **recovery files into USB flash disk (FAT32)**

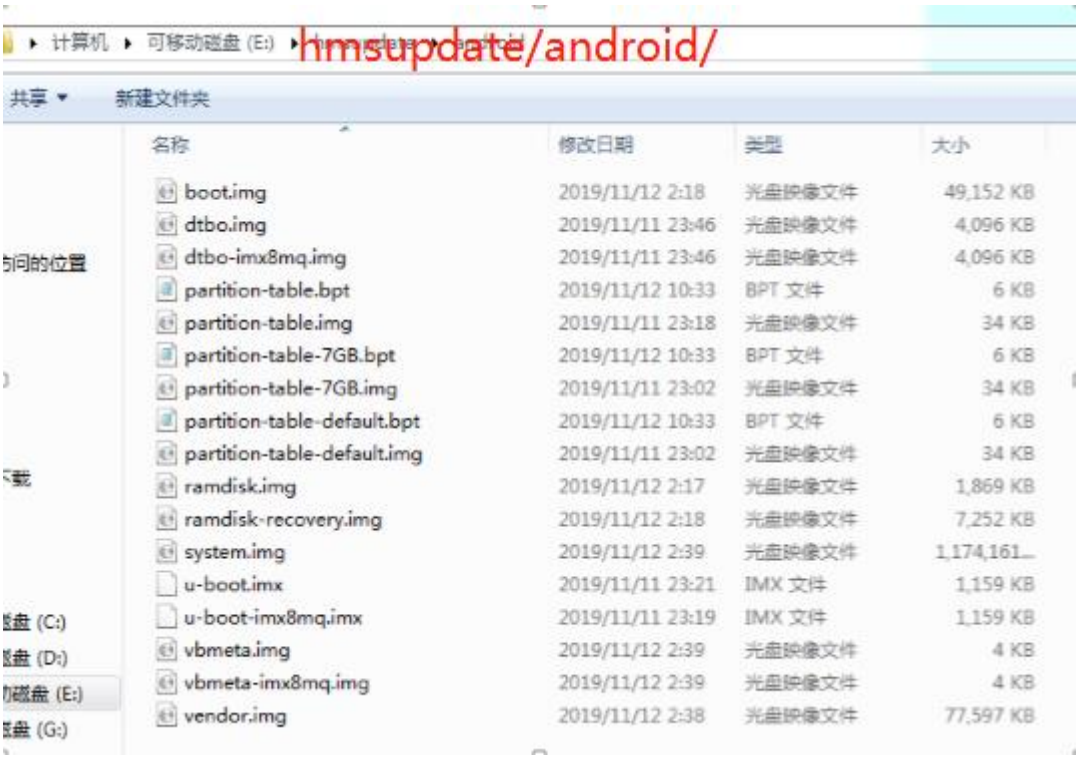
A> Yocto/Ubuntu: Copy all recovery files into PATH:

/USB_flash_disk/hmsupdate/yocto/



B>Android: Copy all recovery files into PATH:

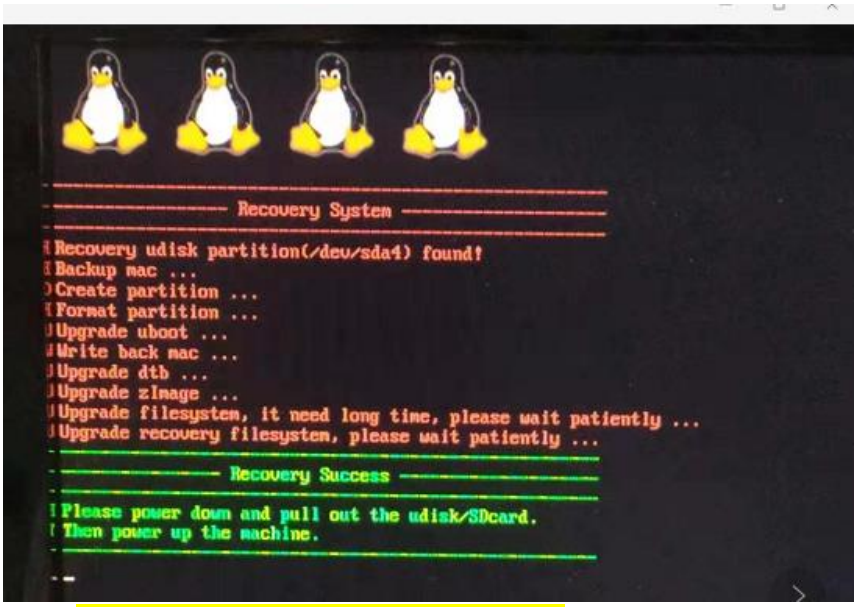
/USB_flash_disk/hmsupdate/android/



2) Plug (step1)SD and (step2)USB flash disk into IBR215

3) Normal boot IBR215 (SW1 Pin1 OFF), start recovery eMMC automatically.

4) The update information will show on HDMI.



Show "Flashing successfully completed", then power off and remove recovery SD and USB flash disk.

Chapter 4
BSP Source Guide

This chapter is intended for advanced software engineers to build BSP source. The topics covered in this chapter are as follows:

- Preparation
- Installing Toolchain
- Building release
- Installing release to board

4.1 Building BSP Source

4.1.1 Preparation

The recommended minimum Ubuntu version is 18.04 or later.

1) Install necessary packages before building:

```
sudo apt-get install gawk wget git-core diffstat unzip texinfo gcc-multilib \
build-essential chrpath socat cpio python python3 python3-pip python3-pexpect \
xz-utils debianutils iputils-ping python3-git python3-jinja2 libegl1-mesa libsdl1.2-dev \
pylint3 xterm
```

2) Download toolchain

The Version of Clang used to compile Linux kernel must be updated. Follow these steps to set Clang for compiling the Linux kernel:

```
sudo git clone
https://android.googlesource.com/platform/prebuilts/clang/host/linux-x86
/opt/prebuilt-android-clang -b master
cd /opt/prebuilt-android-clang
sudo git checkout 007c96f100c5322acc37b84669c032c0121e68d0
export CLANG_PATH=/opt/prebuilt-android-clang
```

The preceding export commands can be added to "/etc/profile". When the host boots up,"AARCH64_GCC_CROSS_COMPILE" and "CLANG_PATH" variables will be set and available for use.

Prepare the build environment for U-Boot and Linux kernel.

This step is mandatory because there is no GCC cross-compile tool chain in the one in AOSP codebase.

a. Download the tool chain for the A-profile architecture on arm Developer GNU-A Downloads page. It is recommended
to use the 8.3 version for this release. You can download the "gcc-arm-8.3-2019.03-x86_64-aarch64-elf.tar.xz"
or "gcc-arm-8.3-2019.03-x86_64-aarch64-linux-gnu.tar.xz". The first one is dedicated for compiling bare-metal
programs, and the second one can also be used to compile the application programs.

b. Decompress the file into a path on local disk, for example, to "/opt/". Export a variable named "AARCH64_GCC_CROSS_COMPILE" to point to the tool as follows:

```
# if "gcc-arm-8.3-2019.03-x86_64-aarch64-elf.tar.xz" is used
sudo tar -xvJf gcc-arm-8.3-2019.03-x86_64-aarch64-elf.tar.xz -C /opt
export AARCH64_GCC_CROSS_COMPILE=/opt/gcc-arm-8.3-2019.03-x86_64-
aarch64-elf/bin/aarch64-elf-
# if "gcc-arm-8.3-2019.03-x86_64-aarch64-linux-gnu.tar.xz" is used
sudo tar -xvJf gcc-arm-8.3-2019.03-x86_64-aarch64-linux-gnu.tar.xz -C /opt
export AARCH64_GCC_CROSS_COMPILE=/opt/gcc-arm-8.3-2019.03-x86_64-
aarch64-linuxgnu/bin/aarch64-linux-gnu
```

3) Decompress the IBR215 source file (example ibr215-bsp.tar.bz2) into "/home/" folder.

4.1.2 Building release

4.1.2.1 For Yocto/Ubuntu/Debian

```
cd /home/bsp-folder
./build-bsp-5.4.sh
```

4.1.2.2 For Android

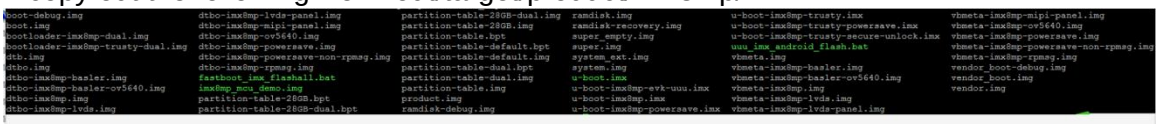
```
cd /home/bsp-folder
source build/envsetup.sh
lunch evk_8mp-userdebug
make    ANDROID_COMPILE_WITH_JACK=false
./imx-make.sh –j4
make –j4
```

4.1.3 Installing release to board

cd /home/bsp-folder
for yocto/Ubuntu/debian

1. cp file in release/ to windows
2. Set board to download mode, and connect otg to usb
3. Run uuu.exe uuu.auto

for android11
1.copy out the following file in out/target/product/imx8mp/



2.set board to download mode, and connect otg to usb
3.download uuu.exe from https://github.com/NXPmicro/mfgtools/releases
run :
uuu_imx_android_flash.bat -f imx8mp -e

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Appendix

This chapter contains the following information:

Onboard Connector Types

A. Onboard Connector Types

Function	Connector	Onboard Type	Compatible Mating Type for Reference
LVDS Display Connector	P13, P14	Hirose DF13E-10DP-1.25V	Hirose DF13E-10DP-1.25C
UART Connector	P19	TechBest WT02M-30002-06132	JST SHR-03V-S-B
LVDS Backlight Control Connector	P18	TechBest 1024041008	Molex 51021-0400
Audio Line-In & Line-Out Connector	P9	E-Call 0110-01-53101100	JCTC 11002H00-1P Well-Lin, 1010H
USB Hub Connector	P7	Hirose DF13E-10DP-1.25V	Hirose DF13E-10DP-1.25C
Digital I/O (GPIO) Connector	P24	E-Call 0110-01-53101100	JCTC 11002H00-1P Well-Lin, 1010H
MIPI-CSI Connector	P10, P26	Hirose DF13E-10DP-1.25V	Hirose DF13E-10DP-1.25C
MIPI-DSI	P12	Hirose DF13E-10DP-1.25V	Hirose DF13E-10DP-1.25C
I^2C Connector	P26	TechBest WT02M-30002-06132	JST SHR-03V-S-B
Internal DC Power Input	P27	TechBest 2542-WS-04-LF	

Connector types may be subject to change without prior notice.