

IBR300

Ruggedized Edge Computer

**with NXP i.MX93 -
ARM Cortex-A55 Dual Processor**

User's Manual

Version 1.0
(November 2024)



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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.

FCC

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.

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Chapter 1

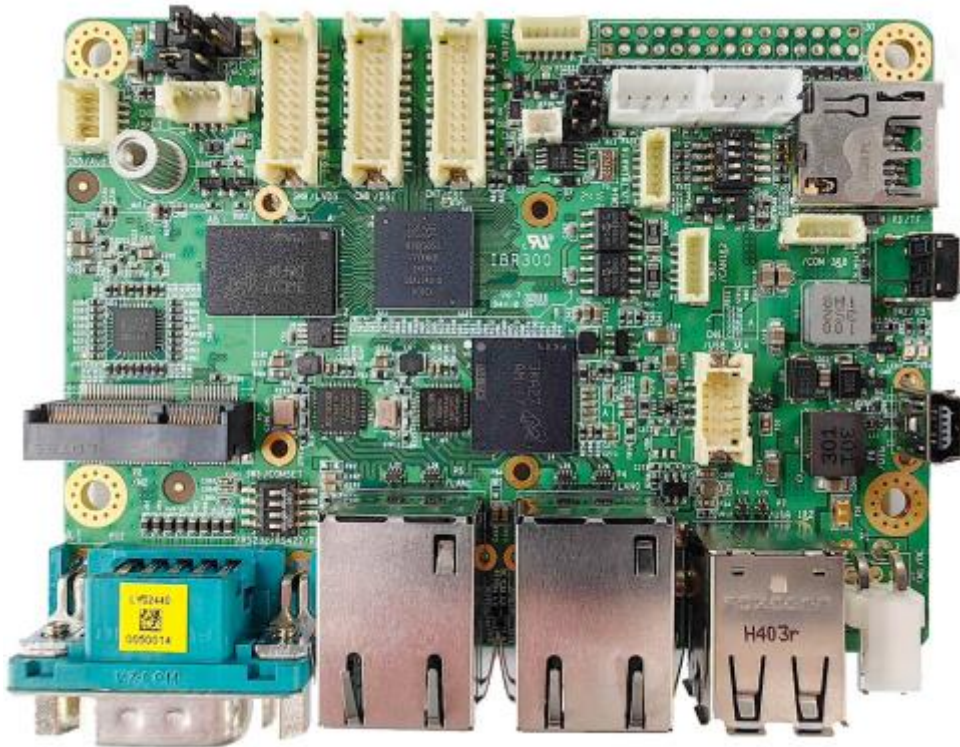
General Information

The information provided in this chapter includes:

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

1.1 Introduction

The IBR300 is a rugged edge computer powered by the NXP i.MX93 ARM Cortex-A55 dual processor, designed for demanding industrial applications. It features 2GB LPDDR4, 32GB eMMC with an SD expansion slot, and multiple connectivity options including COM, USB, LVDS, DSI, Ethernet and Wi-Fi/BT via an M.2 E-Key (2230). The device is characterized by its ruggedized and fanless design, making it ideal for reliable operation in harsh environments.



1.2 Features

- NXP Arm Cortex® -A55 Dual Core cluster and Arm Cortex® -M33 processor
- 2GB LPDDR4, 32GB eMMC & SD socket for expansion
- Embedded I/O for COM, USB, HDMI, Ethernet
- Supports M.2 E-Key (2230) for Wi-Fi /BT add-on module
- Ruggedized and fanless design

1.3 Packing List

Your product package should include the items listed below.

- IBR300 SBC

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

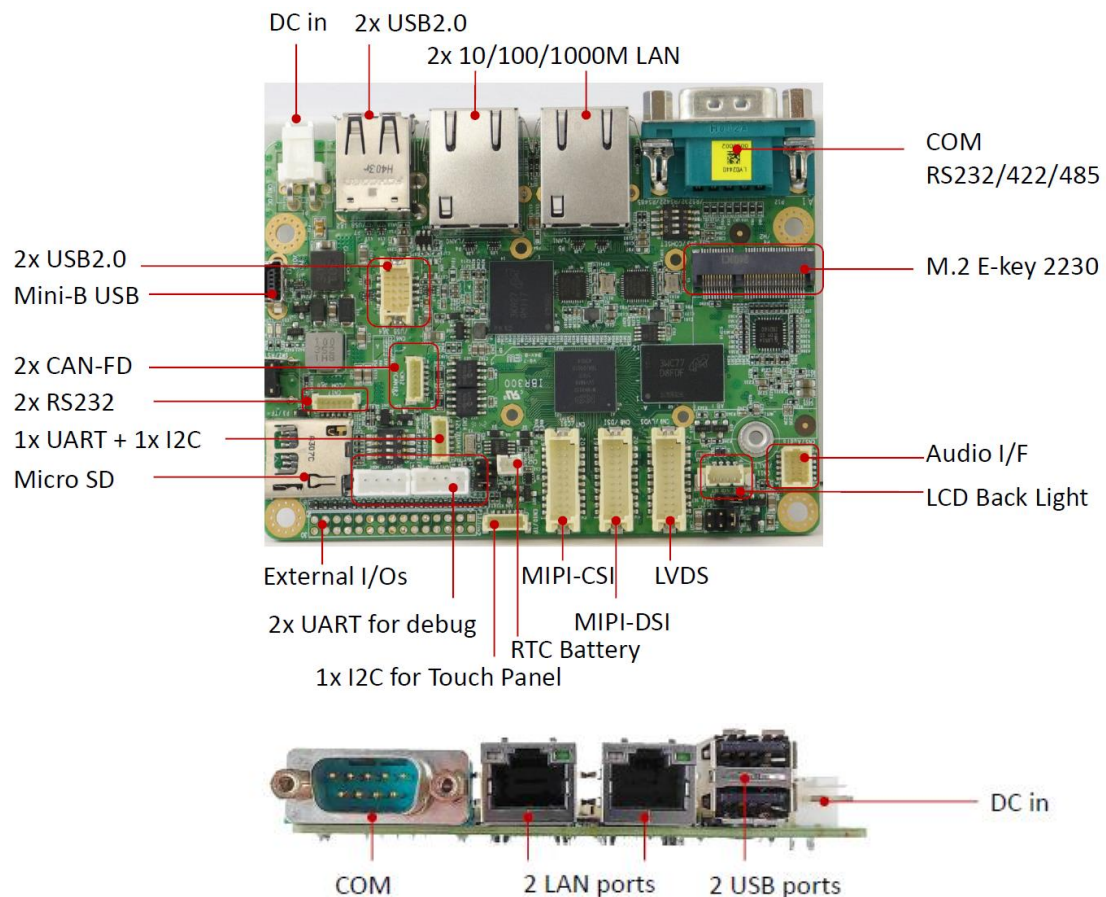
1.4 Specifications

Product Name	IBR300
Form Factor	2.5" SBC
System	
Operating System	- Yocto 4.2 - Other OS (by request)
CPU Type	NXP Cortex®-A55 i.MX93 Dual Core industrial-Grade SoC operating up to 1.7 GHz
MCU Type	Cortex®-M33 CPU operating up to 250 MHz
NPU Type	ARM Ethos®-U65 microNPU (256 MACs operating up to 1.0 GHz and 2 OPS/MAC)
Memory	2GB LPDDR4 on board (optional 1GB/3GB/4GB)
Storage	32GB eMMC on board (up to 128GB)
RTC	IDT 1337AGDVG18
Power Supply	12/24VDC-In Jack and Internal header
Watchdog	256 levels, 0~128 seconds
Dimensions	100mm x 72mm
RoHS	Yes
Certification	CE, FCC Class B
I/O Ports	
DC Jack	DC power in 2-pin header
Display	1 x MIPI DSI (2*10 pin header) 1 x LVDS Tx (2*10 pin header)
Camera	1 x MIPI-CSI (2*10 pin header)
Touch Panel	1 x I2C Cap Touch Panel I/F (6 pin wafer connector)
LAN	2 x RJ45 GbE LAN
USB	2 x USB 2.0 Type A 2 x USB 2.0 (2*5 pin header)
Serial	1 x RS232/422/485 D-Sub connector 1 x 4-wire UART or 2-wire UART + I2C (6 pin wafer connector) 1 x two 2-wire RS232 (6 pin wafer connector) 2 x 2-wire RS232 for Debug (4 pin wafer connector)
CAN	2 x CAN-FD (6 pin wafer connector)
Micro SD	1x SD socket (UHS-I SDR-104, 104MB/s max)
Dip Switch	1x Boot select switches (Boot From eMMC or mSD)
Button	1x Reset Button
Audio	1x Audio Line-in and Line-out (2*5 pin header)
M.2 2230	1x M.2 2230 E-key (I2C, PCM, USB, UART and SDIO for Wi-Fi/BT modules)

Environment	
Operating Temperature	-40°C~ 85°C
Relative Humidity	0 ~ 90 %, non-condensing

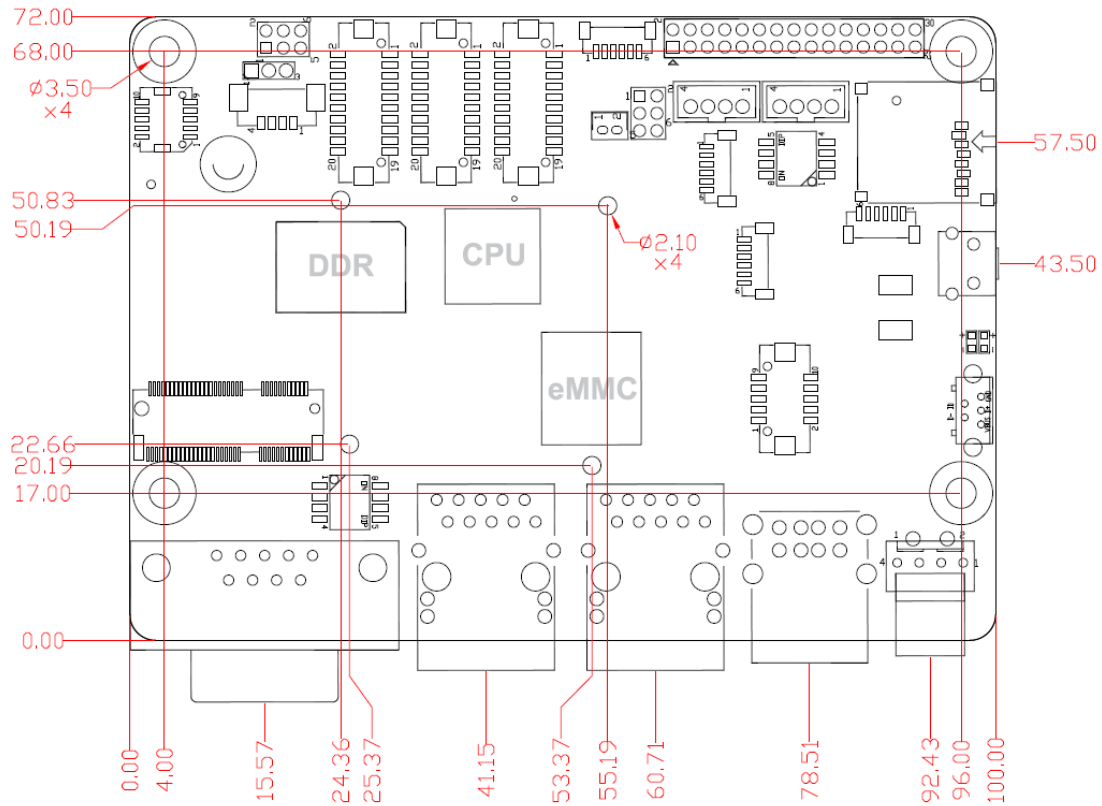
All specifications are subject to change without prior notice.

1.5 Product View



1.6 Dimensions

Unit: mm



Chapter 2

Hardware Configuration

This section contains general information about:

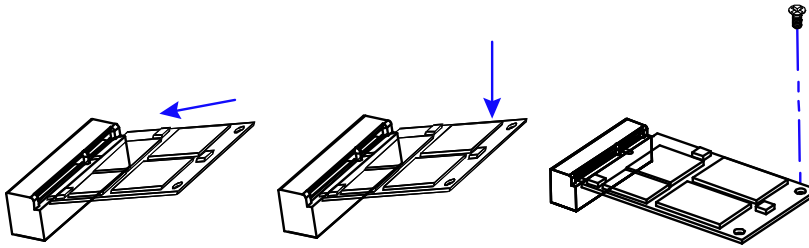
- Installations
- Connectors

2.1 Installations

There are several connectors, sockets and switches on the motherboard in the system.

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.

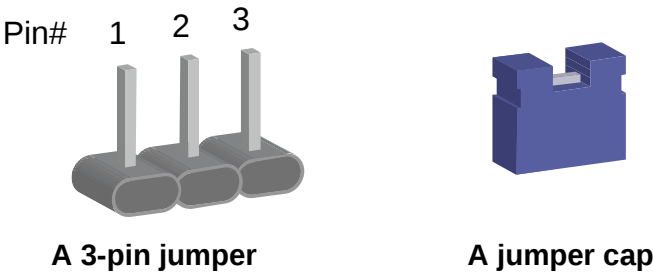


2.2 Setting the Jumpers

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.



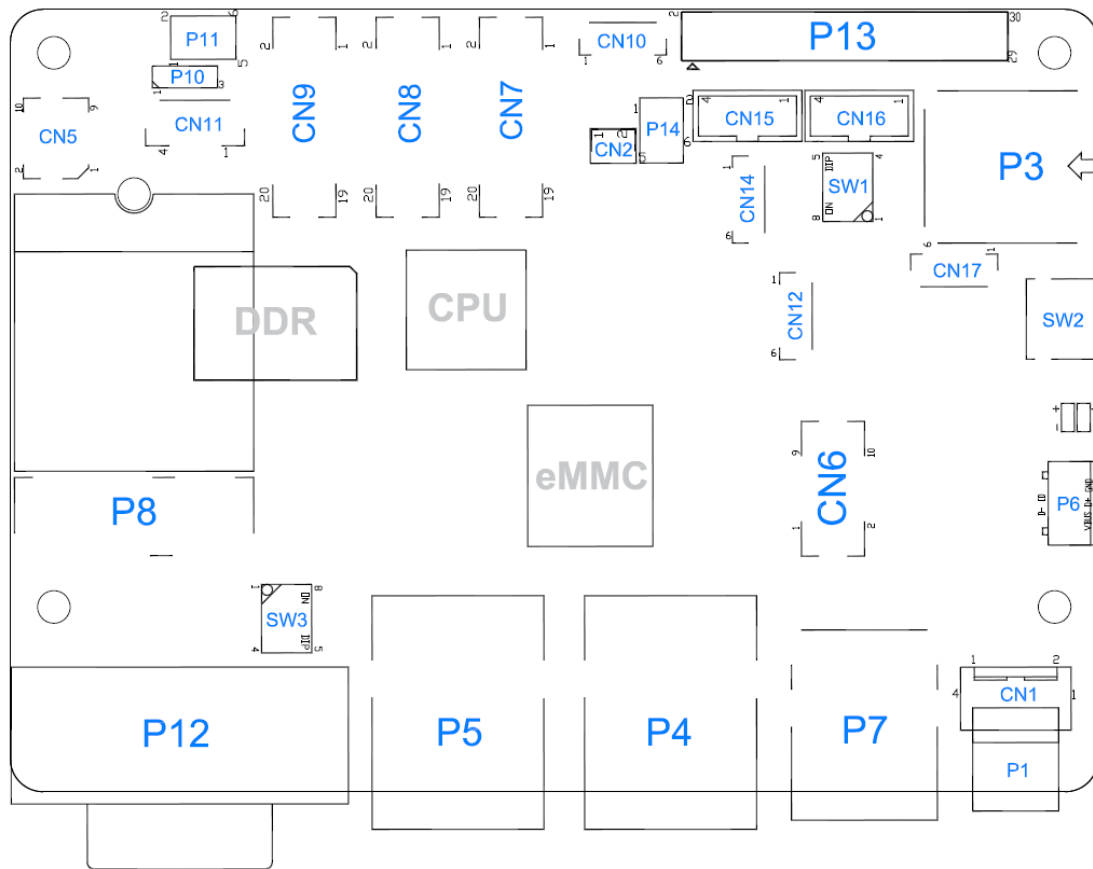
Refer to the illustration below to set jumpers.

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**.

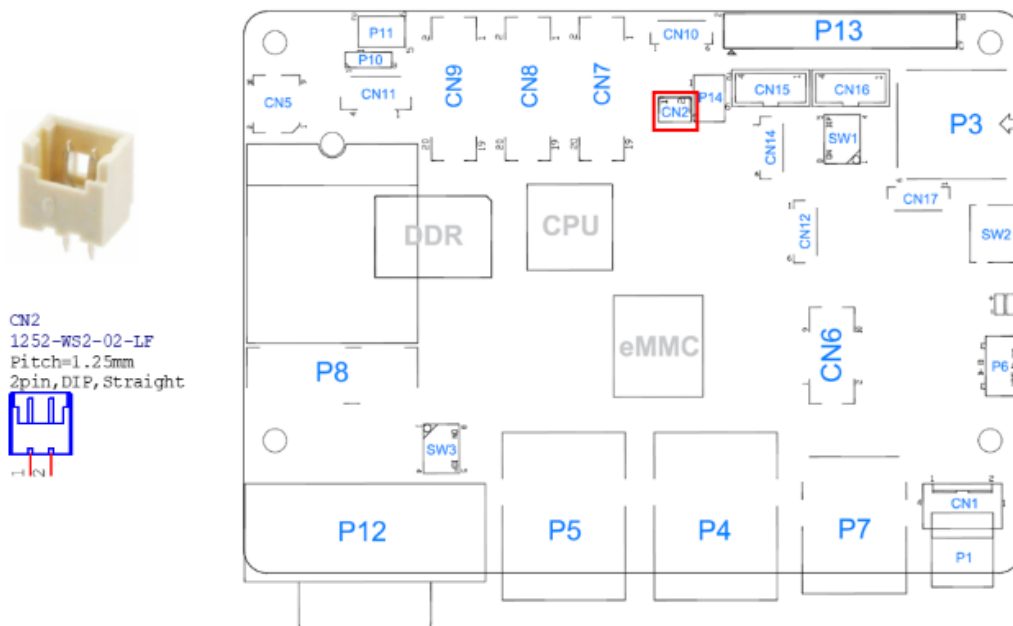
2.3 Connector Locations on Motherboard



2.4 Connectors Quick Reference

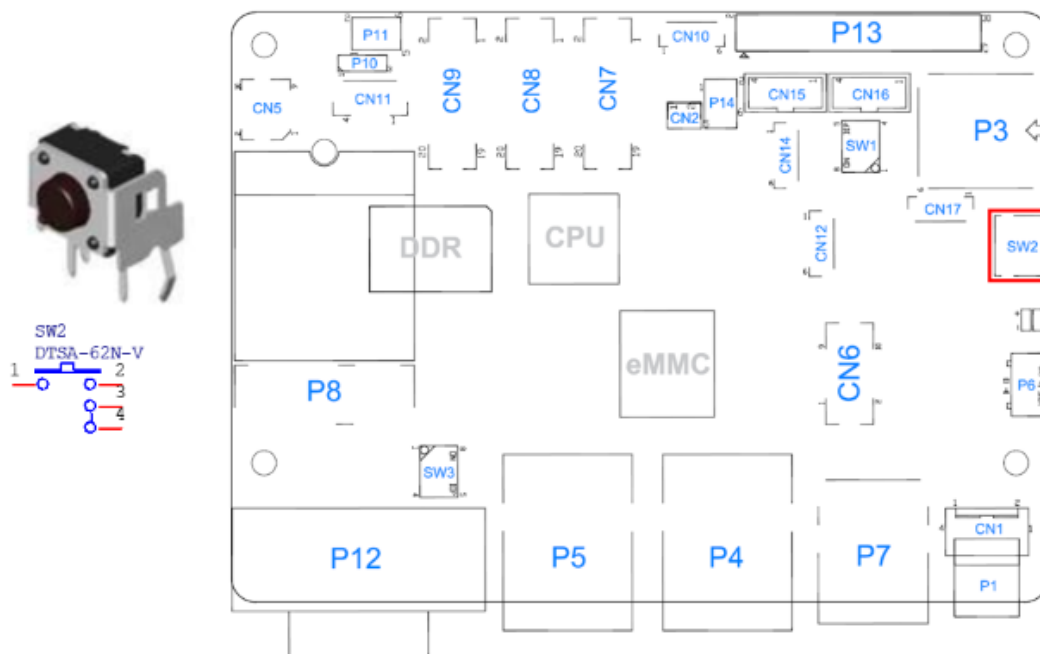
Function	Connector
RTC Lithium Cell Connector	CN2
COM1(RS232 Debug) Connector	CN15
COM2 Connector	CN16
COM3&COM8 Connector	CN17
CAN1&CAN2 Connector	CN12
System Reset Button	SW2
Running Mode	SW1
DC Power Input	P1, CN1
Audio Line-In & Line-Out Connector	CN5
Dual USB 2.0 (USB3&4) Connector	CN6
I ² C7 and Uart6 Connector	CN14
Micro SD Card Slot	P3
CSI Connector	CN7
DSI Connector	CN8
LVDS Connector	CN9
LVDS Backlight connector	CN11
LVDS POWER voltage SET	P10
LVDS Backlight voltage SET	P11
TP Connector	CN10
TP_VIO Jumper	P14
GbE LAN Port	P4, P5
Dual USB 2.0 (USB1&2) Type-A Port	P7
Mini-USB OTG Port	P6
M.2 Connector for Wi-Fi/BT	P8
COM7 Port	P12
COM7 mode SET (RS232/422/485)	SW3
I2C3/SPI6/SAI3/SPDIF/IOs/ADCs 2x15P Connector (NC)	P13

2.4.1 RTC Lithium Cell Connector (CN2)



Pin	Signal Name	Pin	Signal Name
1	LI_CELL	2	Ground

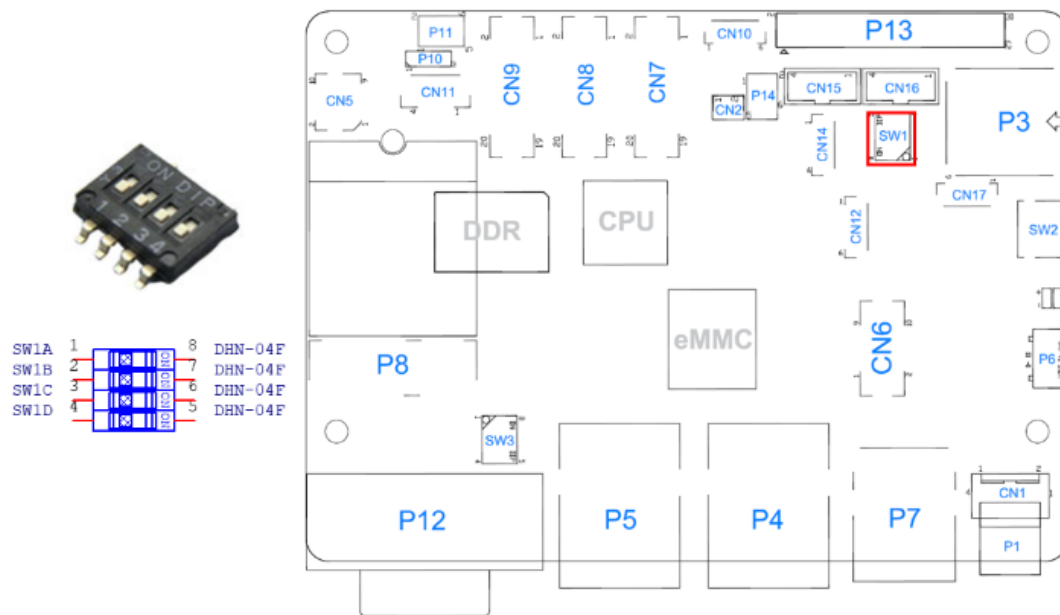
2.4.2 System Reset Button (SW2)



SW2: On/Off Switch

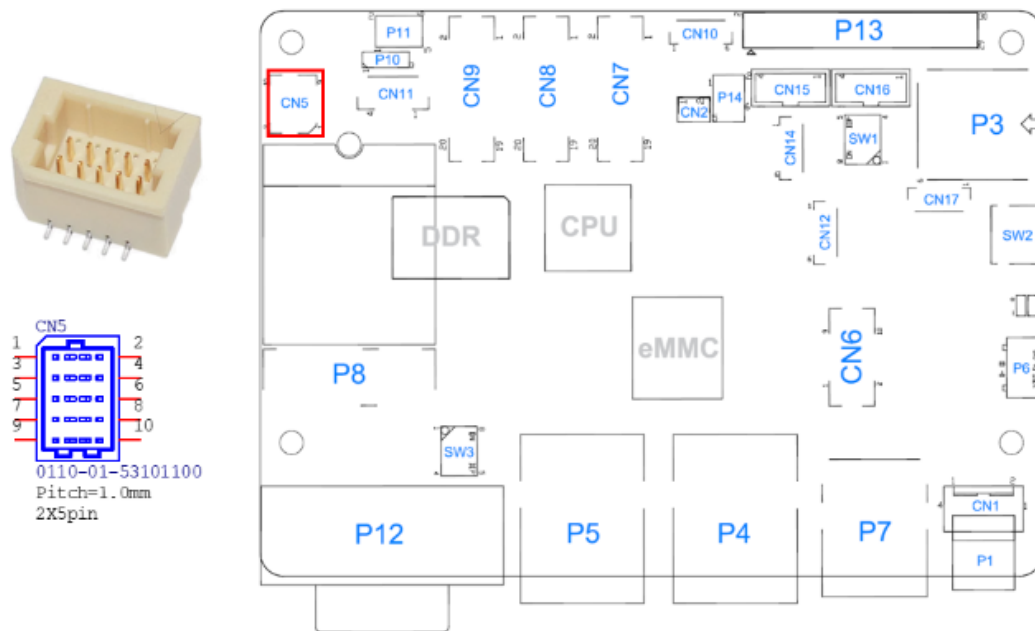
Pin	Signal Name	Pin	Signal Name
1	Ground	2	RST_B

2.4.3 Running Mode (SW1)



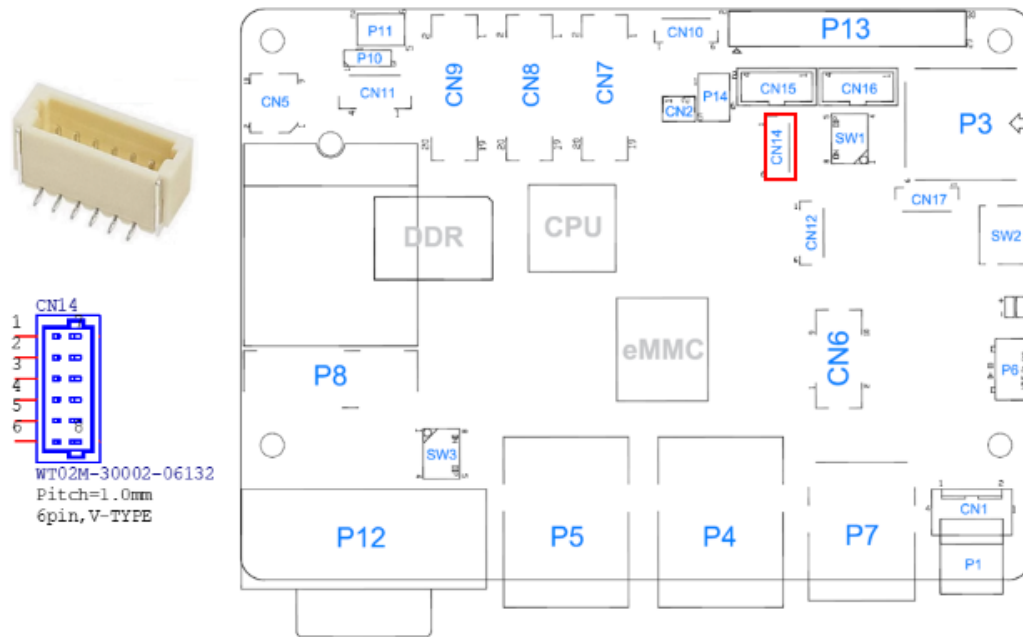
Running Mode	SW3C	SW4D
SDHC1(eMMC)	OFF	ON
SDHC2(SD)	OFF	OFF
USB Download	ON	OFF

2.4.4 Audio Line-In & Line-Out Connector (CN5)



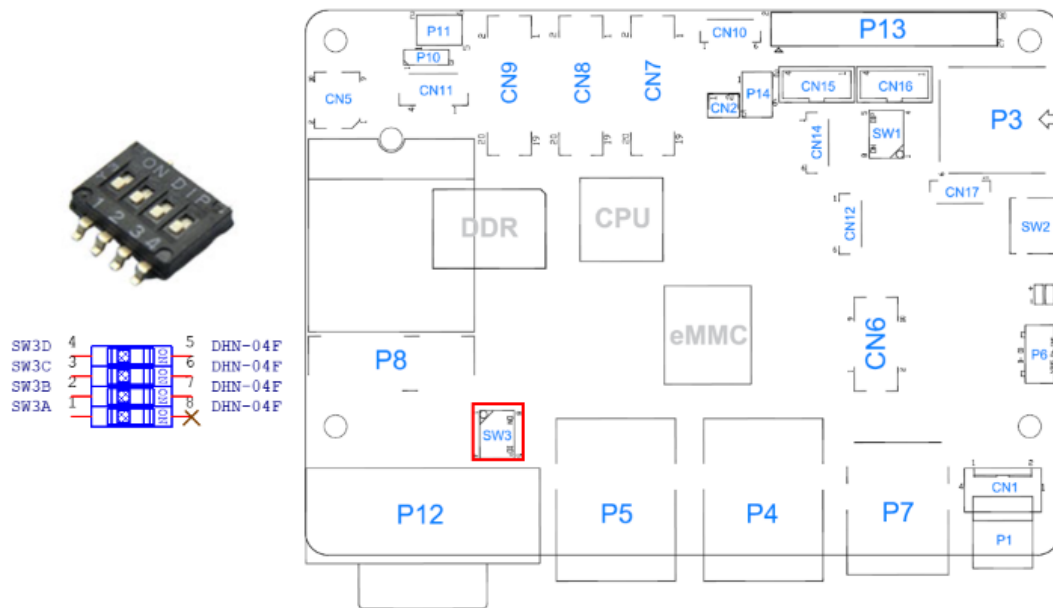
Pin	Signal Name	Pin	Signal Name
1	SPK_LN	2	SPK_LP
3	INR	4	SPK_RN
5	INL	6	SPK_RP
7	Ground	8	HP_L
9	Ground	10	HP_R

2.4.5 I2C & UART Connector (CN14)



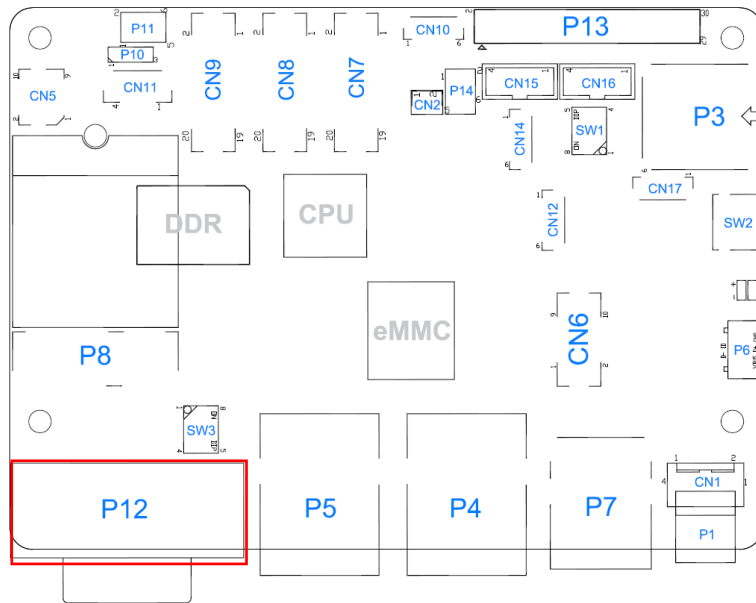
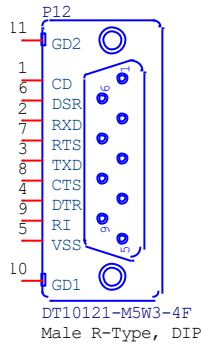
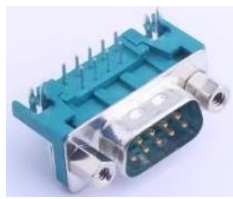
Pin	Signal Name	Pin	Signal Name
1	VDCDC5_3V3	2	I2C7_SCL
3	I2C7_SDA	4	UART6_TXD
5	UART6_RXD	6	Ground

2.4.6 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

2.4.7 COM RS-232/422/485 Port (P12)

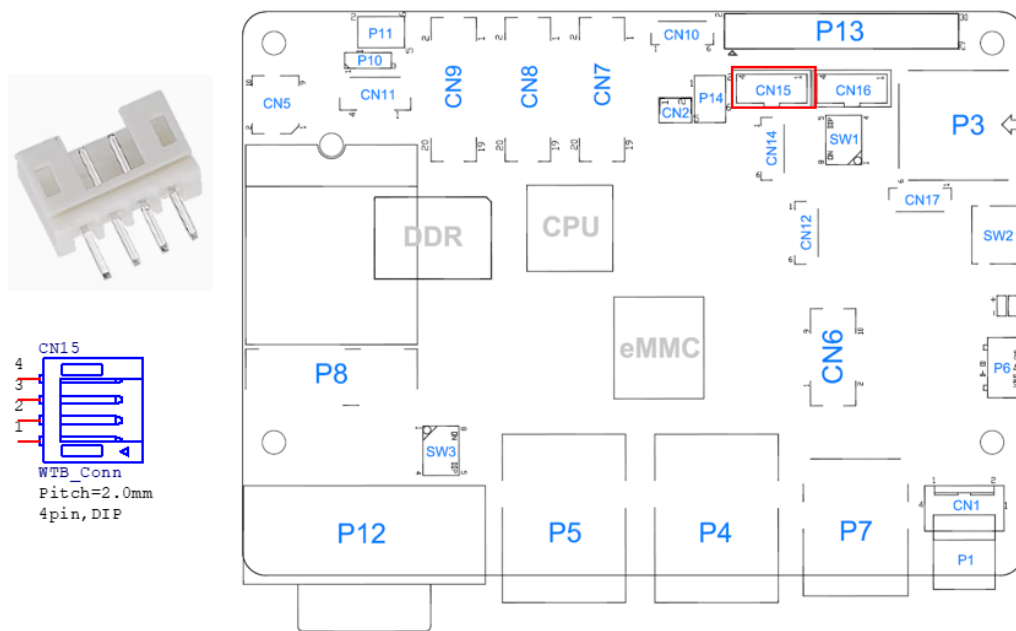


Pin	Signal Name	Pin	Signal Name
1	DCD, Data carrier detect	6	DSR, Data set ready
2	RXD, Receive data	7	RTS, Request to send
3	TXD, Transmit data	8	CTS, Clear to send
4	DTR, Data terminal ready	9	RI, Ring Indicator
5	Ground		

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

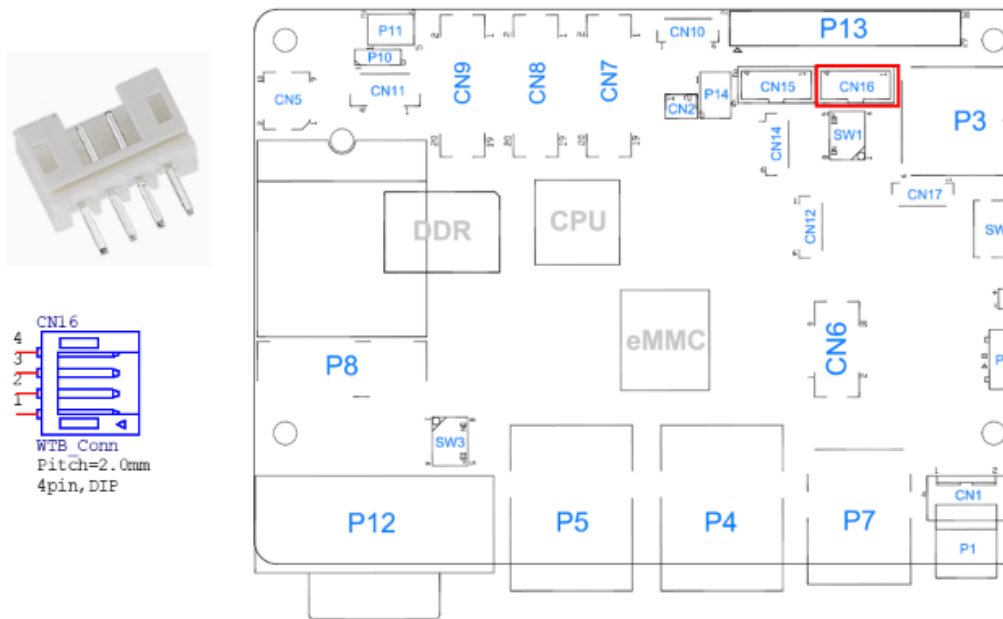
Pin	Assignment		
	RS-232	RS-422	RS-485
1	NC	TX-	DATA-
2	RX	TX+	DATA+
3	TX	RX+	NC
4	NC	RX-	NC
5	Ground	Ground	Ground
6	NC	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	NC	NC	NC

2.4.8 UART1 Debug Connector (CN15)



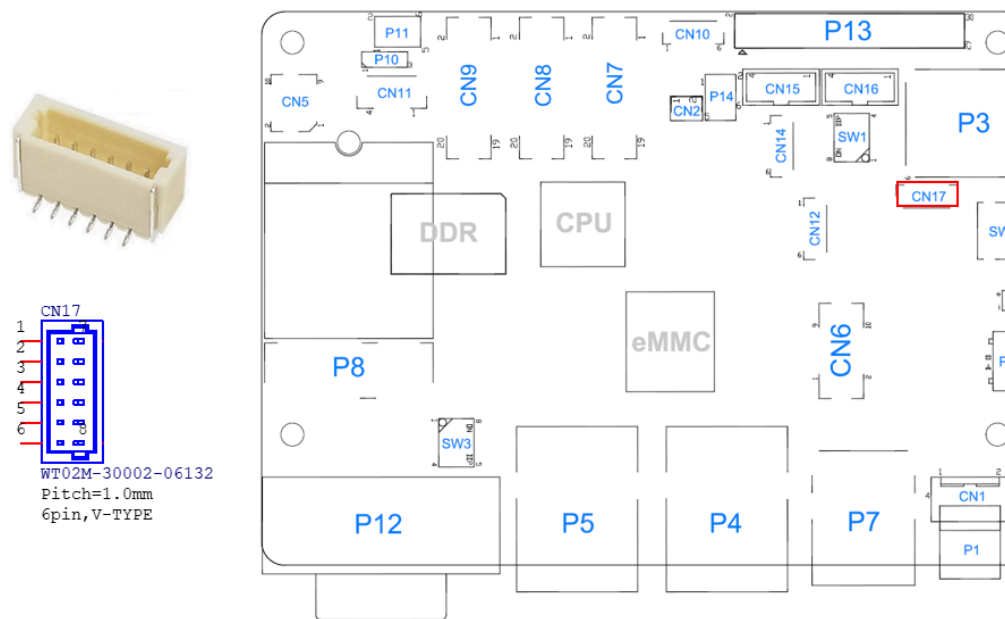
Pin	Signal Name
1	DEBUG_RX
2	DEBUG_TX
3	Ground
4	NC

2.4.9 UART2 Connector (CN16)



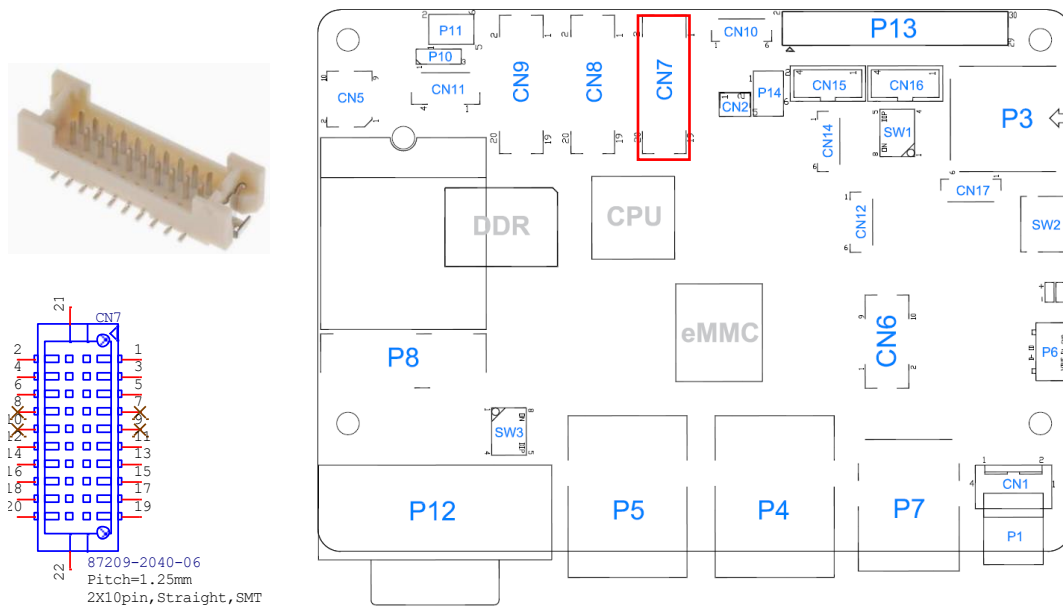
Pin	Signal Name
1	UART2_RX
2	UART2_TX
3	Ground
4	NC

2.4.10 UART3 & UART8 Connector (CN17)



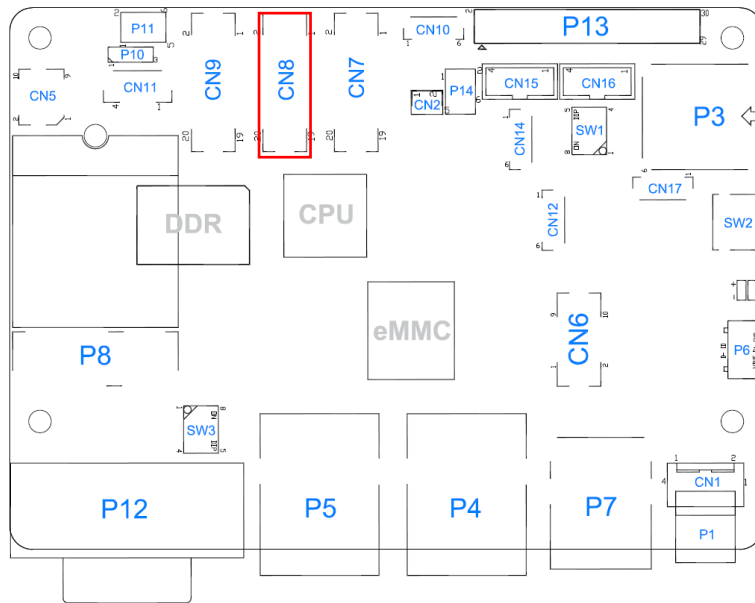
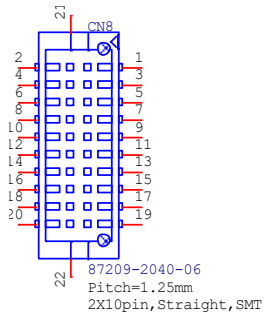
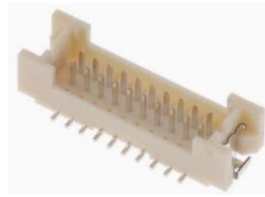
Pin	Signal Name	Pin	Signal Name
1	UART3_TXD	2	UART3_RXD
3	Ground	4	UART8_TXD
5	UART8_RXD	6	Ground

2.4.11 MIPI-CSI Connector (CN7)



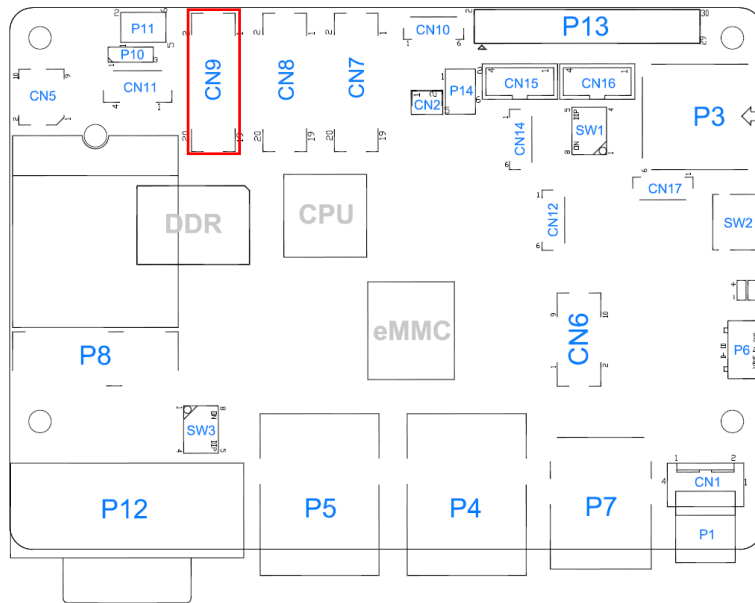
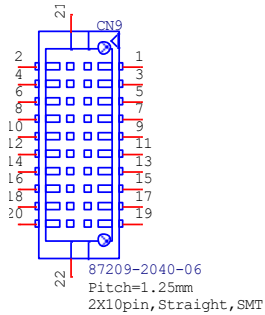
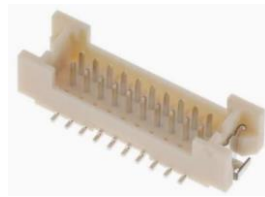
Pin	Signal Name	Pin	Signal Name
1	MIPI_CSI1_CKP	2	MIPI_CSI1_CKN
3	MIPI_CSI1_DP0	4	MIPI_CSI1_DN0
5	MIPI_CSI1_DP1	6	MIPI_CSI1_DN1
7	NC	8	NC
9	NC	10	NC
11	Ground	12	Ground
13	CSI1_SCL	14	CSI1_SDA
15	CSI1_RST_B	16	VDD_2V8
17	CSI1_PWEN_B	18	VDD_1V8
19	CSI1_MCLK	20	Ground

2.4.12 DSI Display Connector (CN8)



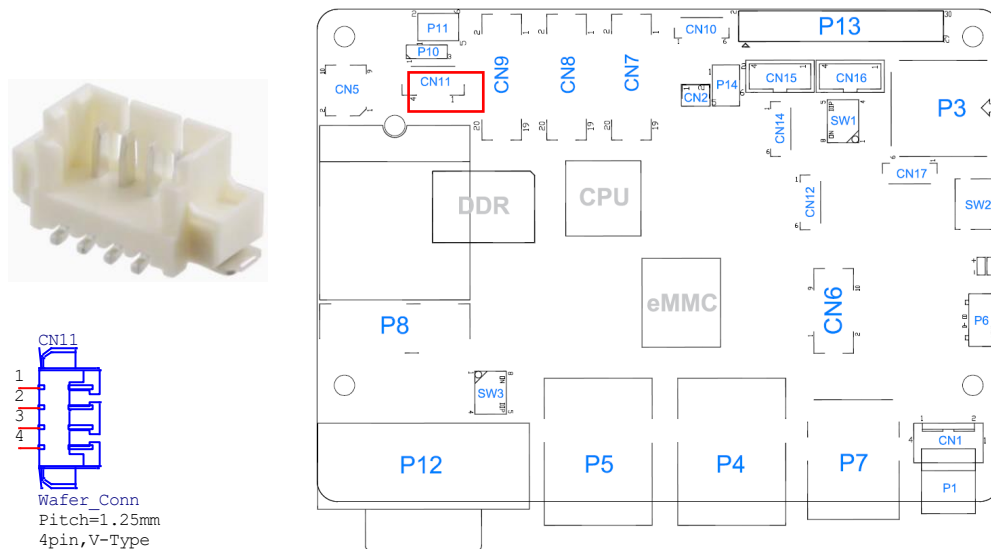
Pin	Signal Name	Pin	Signal Name
1	MIPI_DSI_CKP	2	MIPI_DSI_CKN
3	Ground	4	Ground
5	MIPI_DSI_DP0	6	MIPI_DSI_DN0
7	Ground	8	LVDS_VCC
9	MIPI_DSI_DP1	10	MIPI_DSI_DN1
11	MIPI_DSI_DP2	12	MIPI_DSI_DN2
13	DSI_INT_B	14	DSI_PWEN_B
15	MIPI_DSI_DP3	16	MIPI_DSI_DN3
17	I2C1_SCL	18	LVDS_VCC
19	I2C1_SDA	20	LVDS_BKLT

2.4.13 LVDS Display Connector (CN9)



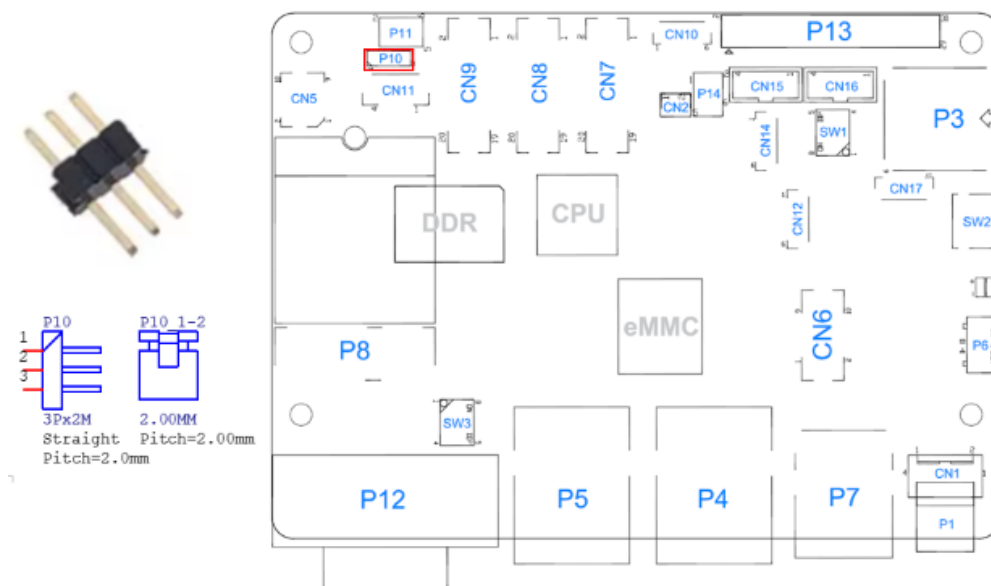
Pin	Signal Name	Pin	Signal Name
1	LCD0_TX0_P	2	LCD0_TX0_N
3	Ground	4	Ground
5	LCD0_TX1_P	6	LCD0_TX1_N
7	Ground	8	LCD_VDD
9	LCD0_TX3_P	10	LCD0_TX3_N
11	LCD0_TX2_P	12	LCD0_TX2_N
13	Ground	14	Ground
15	LCD0_CLK_P	16	LCD0_CLK_N
17	BKLT_PWM	18	LCD_VDD
19	BKLT_VCC	20	BKLT_VCC

2.4.14 LCD Backlight Control Connector (CN11)



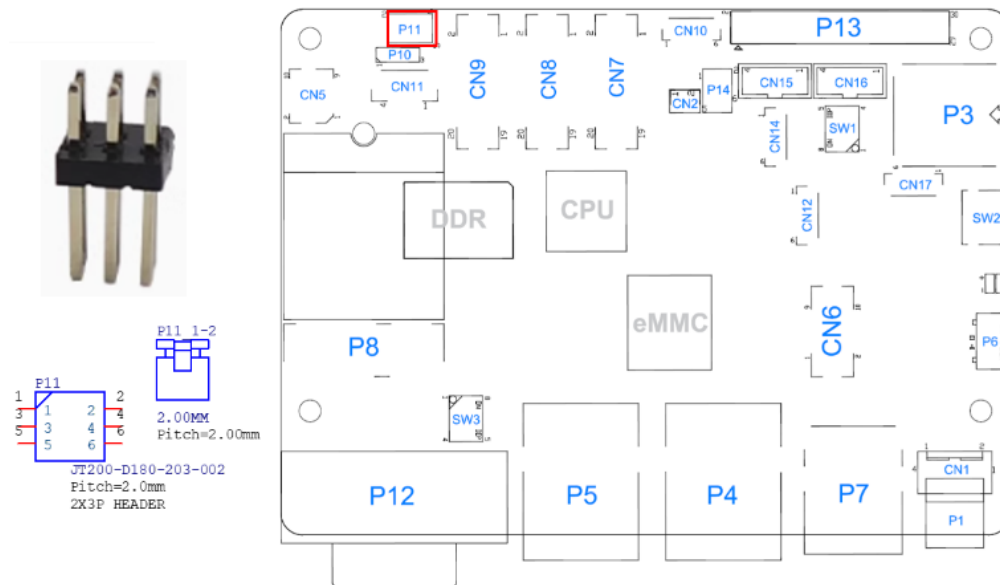
Pin	Signal Name	Pin	Signal Name
1	BKLT_VCC	3	LCD_BKLT_PWM
2	LCD_BKLT_EN	4	Ground

2.4.15 LVDS Power Jumper (P10)



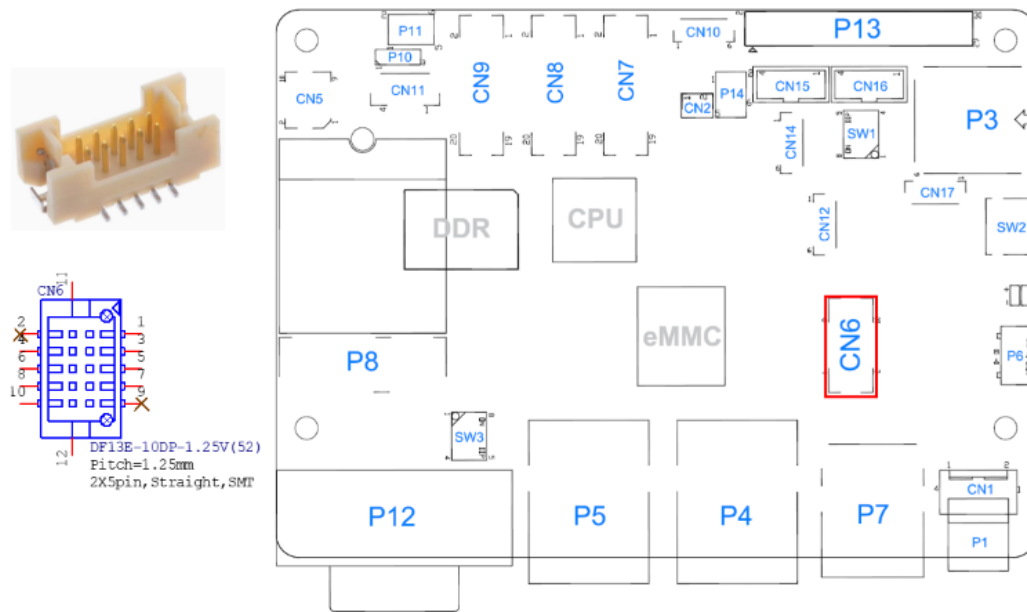
Function	Pin closed
3V3	1-2
5V	2-3

2.4.16 LCD Backlight Power Jumper (P11)



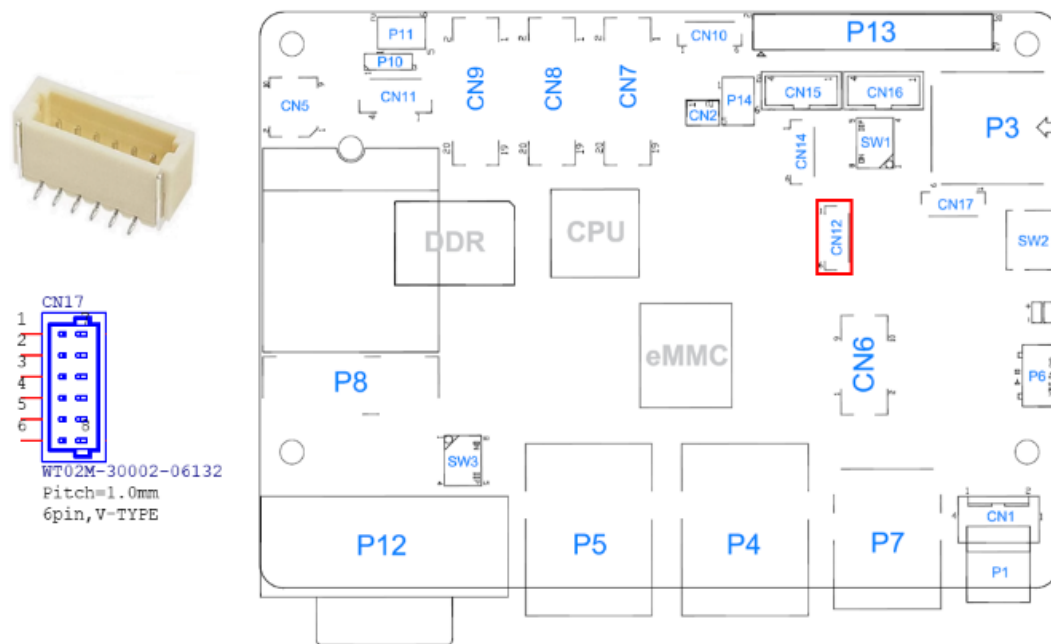
Function	Pin closed
3V3	1-2
5V	3-4
12V	5-6

2.4.17 Internal USB2.0 Connector (CN6)



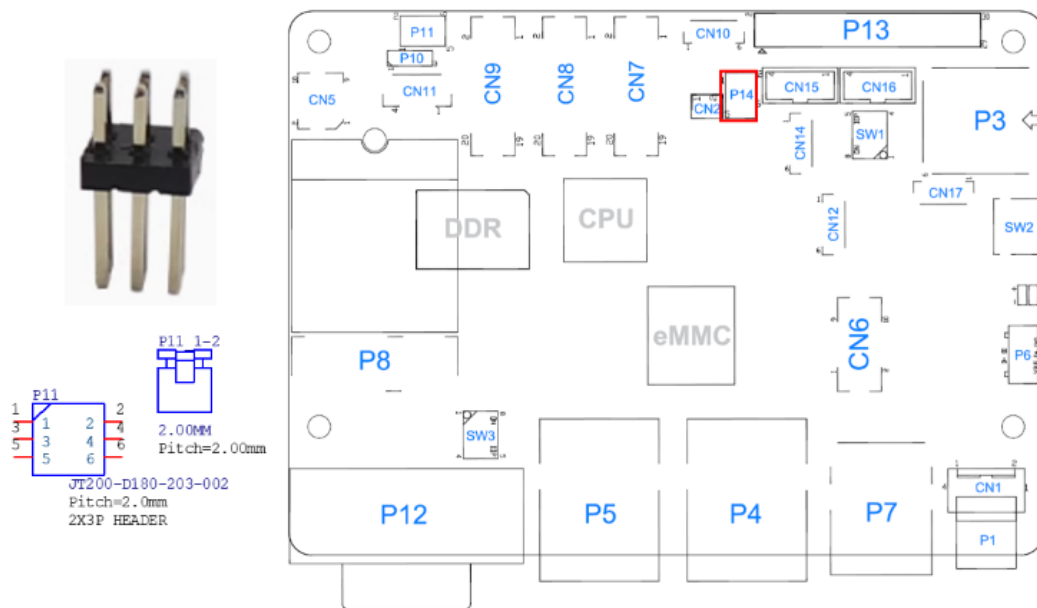
Pin	Signal Name	Pin	Signal Name
1	Ground	2	NC
3	DP3	4	+5V
5	DM3	6	DM4
7	+5V	8	DP4
9	NC	10	Ground

2.4.18 CAN1 & CAN2 Connector (CN12)



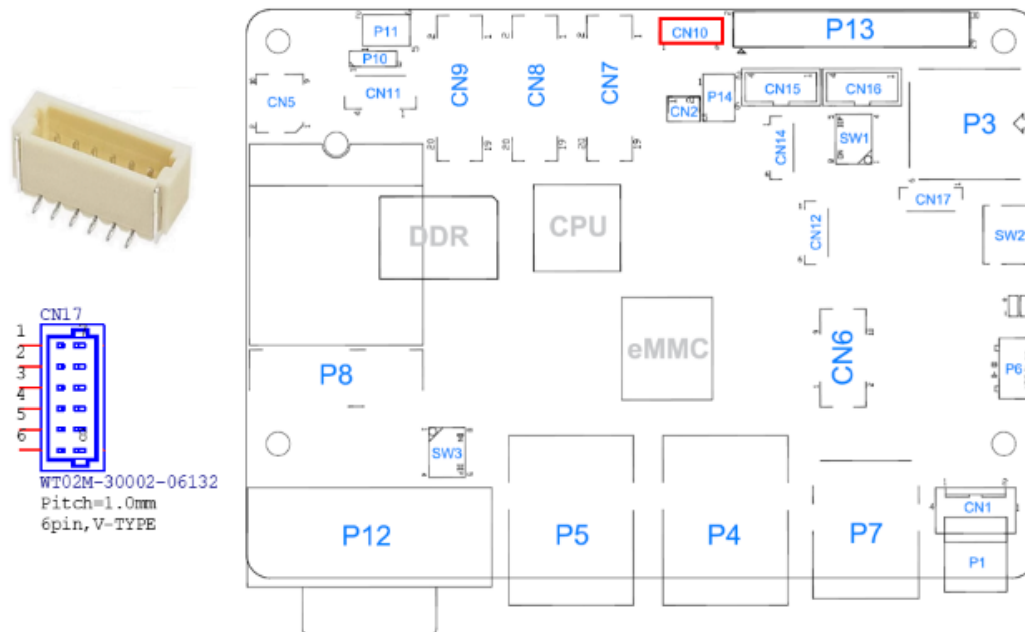
Pin	Signal Name	Pin	Signal Name
1	CAN1_H	2	CAN1_L
3	Ground	4	CAN2_H
5	CAN2_L	6	Ground

2.4.19 Capacitive Touch Panel Voltage Jumper (P14)

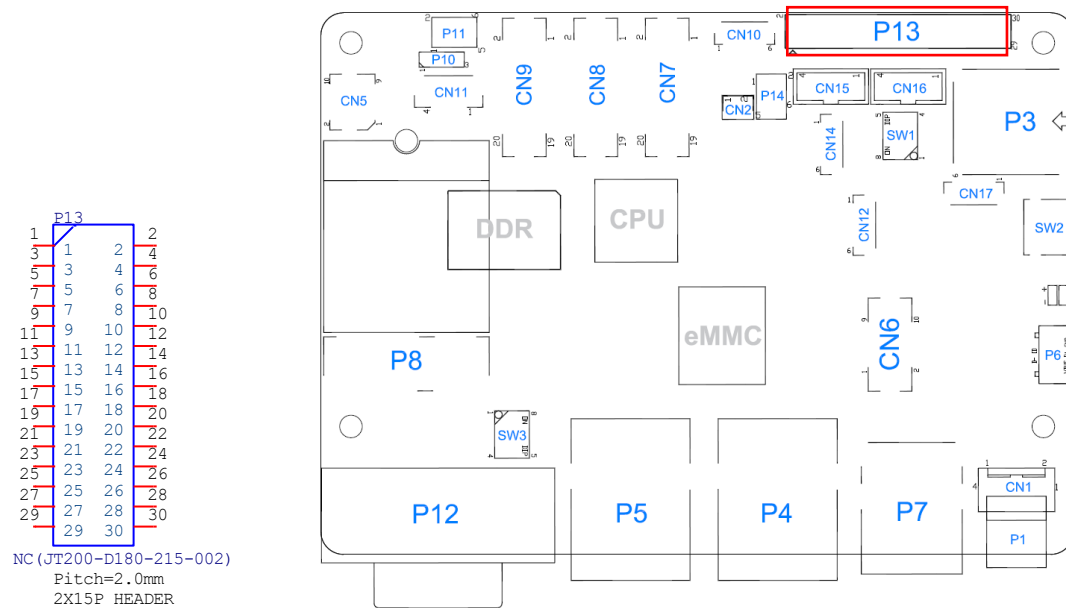


Function	Pin closed
3V3	1-2
1.8V	3-4
5V	5-6

2.4.20 Capacitive Touch Panel Interface (CN10)



2.4.21 External IO Connector (CN10)



Pin	Signal Name	Pin	Signal Name
1	3V3	2	5V
3	I2C3_SDA/GPIO2_28	4	5V
5	I2C3_SCL/GPIO2_29	6	Ground
7	SPI6_CS0/GPIO2_00	8	GPIO2_18
9	Ground	10	GPIO2_19
11	SPI6_MOSI/GPIO2_01	12	GPIO2_24
13	SPI6_MISO/GPIO2_02	14	Ground
15	SPI6_SCLK/GPIO2_03	16	SPDIF_IN/GPIO2_22
17	3V3	18	SPDIF_OUT/GPIO2_23
19	SAI3_BCLK/GPIO2_16	20	Ground
21	SAI3_MCLK/GPIO2_17	22	ADC_IN0
23	SAI3_RXD0/GPIO2_20	24	ADC_IN1
25	Ground	26	ADC_IN2
27	SAI3_TXD0/GPIO2_21	28	ADC_IN3
29	SAI3_SYNC/GPIO2_26	30	Ground

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.

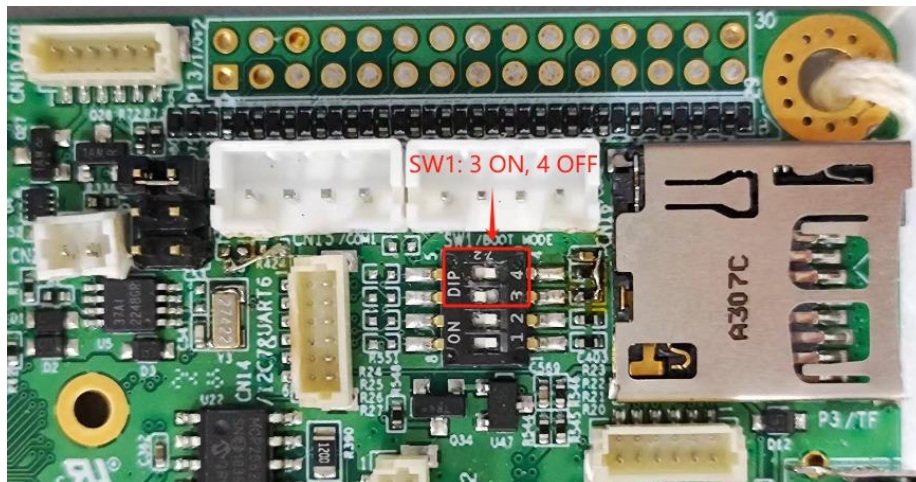
Basically, IBR300 is preloaded with O.S (Android or Yocto) into eMMC by default. Connect the DSI to HDMI module with IBR300, and 12V power directly.

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 P3 connector), connect the board to PC through the mini-USB port (i.e. the P6 connector), and change the boot mode to download mode.



- 3) boot IBR300 and flash SD via CMD command “uuu.exe uuu-sdcard.auto” or double click “FW_down-sdcard.bat”

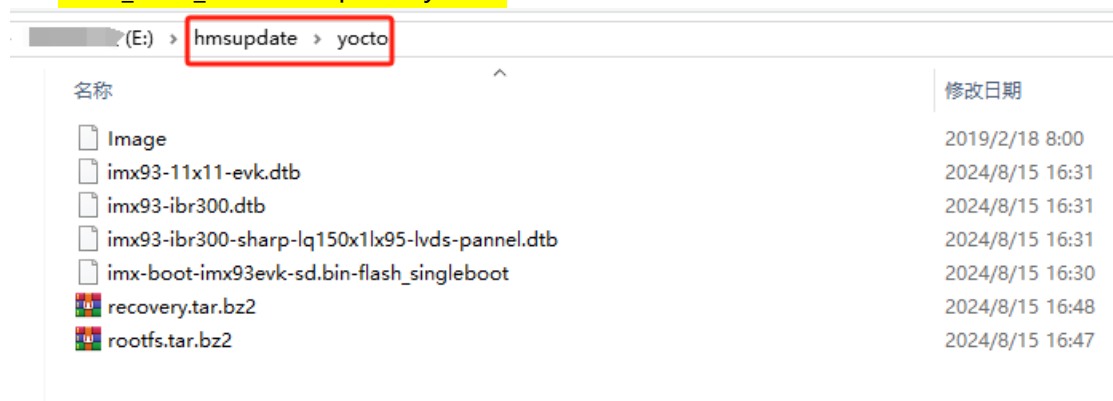
名称	修改日期	类型	大小
changelog.txt	2024/7/10 18:59	文本文档	1 KB
FW_down-sdcard.bat	2024/7/10 18:53	Windows 批处理...	1 KB
FW_down-uboot.bat	2024/7/10 18:53	Windows 批处理...	1 KB
imx-boot-imx93evk-sd.bin-flash_singl...	2024/7/10 15:36	BIN-FLASH_SIN...	1,465 KB
imx-image-multimedia-imx93evk.sdc...	2024/7/10 18:48	SDCARD 文件	669,456 KB
uuu.exe	2024/6/6 22:17	应用程序	1,257 KB
uuu-sdcard.auto	2024/7/10 16:38	AUTO 文件	1 KB
uuu-uboot.auto	2024/7/10 14:54	AUTO 文件	2 KB

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/



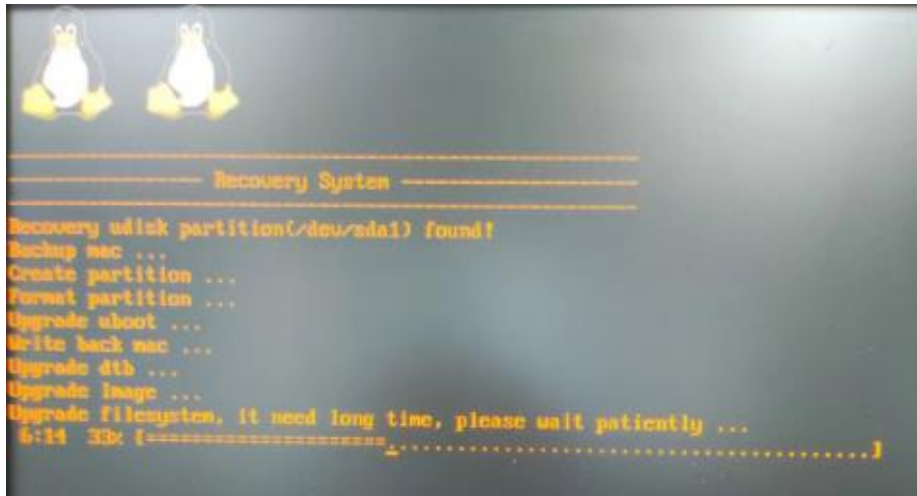
B> Android: Copy all recovery files into PATH:

/USB_flash_disk/hmsupdate/android/

- 2) Plug (step1)SD and (step2)USB flash disk into IBR300
- 3) Change IBR300 back to Normal boot mode (SW1 pin3 OFF pin4 ON)



- 4) Power on and the system will recovery eMMC automatically



- 5) The update information will show on HDMI.



Show "Recovery Success" , 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

- 1) The recommended minimum Ubuntu version is 20.04 or later.
- 2) Install necessary packages before building:

```
$ sudo apt install gawk wget git diffstat unzip texinfo gcc build-essential \
chrpath socat cpio python3 python3-pip python3-pexpect xz-utils debianutils \
iputils-ping python3-git python3-jinja2 libegl1-mesa libsdl1.2-dev \
python3-subunit mesa-common-dev zstd liblz4-tool file locales -y
$ sudo locale-gen en_US.UTF-8
```

- 3) Decompress the IBR300 BSP file (example ibr300-bsp.tar.bz2) into "/home/" folder.

4.1.2 Building release

4.1.2.1 For Yocto/Ubuntu/Debian

```
cd /home/bsp-folder
./build-6.1.55-bsp.sh
```

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 or double click "FW_down-emmc.bat"
```

Appendix

This chapter contains the following information:

Onboard Connector Types



Onboard Connector Types

Function	Connector	Onboard Type	Compatible Mating Type for Reference
RTC Lithium Cell Connector	CN2	TechBest 1252-WS2-02-LF	Molex 51021-0200
COM1(RS232 Debug) Connector	CN15	E-CALL 0110-161-040	JST PHNR-04-H
COM2 Connector	CN16	E-CALL 0110-161-040	JST PHNR-04-H
COM3 & COM8 Connector	CN17	TechBest WT02M-30002-06132	JST SHR-06V-S-B
CAN1 & CAN2 Connector	CN12	TechBest WT02M-30002-06132	JST SHR-06V-S-B
Audio Line-In & Line-Out Connector	CN5	E-Call 0110-01-53101100	JST SHDR-20V-S-B
Dual USB 2.0 (USB3&4) Connector	CN6	Hirose DF13E-10DP-1.25V	Hirose DF13-10DS-1.25C
I2C and UART Connector	CN14	TechBest WT02M-30002-06132	JST SHR-06V-S-B
CSI Connector	CN7	Aces 87209-2040-06	Hirose DF13-20DS-1.25C
DSI Connector	CN8	Aces 87209-2040-06	Hirose DF13-20DS-1.25C
LVDS Connector	CN9	Aces 87209-2040-06	Hirose DF13-20DS-1.25C
LVDS Backlight connector	CN11	TechBest 1024041008	Molex 51021-0400
TP Connector	CN10	TechBest WT02M-30002-06132	JST SHR-06V-S-B
I2C3/SPI6/SAI3/SPDIF/IOs/ADCs 2x15P Connector (NC)	P13	JT JT200-D180 -215-002	-

Connector types may be subject to change without prior notice.