ED-IPC3020

High-Performance Industrial PC Based on Raspberry Pi 5

User Manual

EDA Technology Co., LTD

January 2024

Contact Us

Thank you very much for purchasing and using our products, and we will serve you wholeheartedly.

As one of the global design partners of Raspberry Pi, we are committed to providing hardware solutions for IOT, industrial control, automation, green energy and artificial intelligence based on Raspberry Pi technology platform.

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Foreword

Related Manuals

All kinds of product documents contained in the product are shown in the following table, and users can choose to view the corresponding documents according to their needs.

Documents	Instruction
ED-IPC3020 Datasheet	This document introduces the product features, software and hardware specifications, dimensions and ordering code of ED-IPC3020 to help users understand the overall system parameters of the products.
ED-IPC3020 User Manual	This document introduces the appearance, installation, startup and configuration of ED-IPC3020 to help users use the product better.
ED-IPC3020 Application Guide	This document introduces downloading OS file, flashing to SD card, Firmware Update, and Configuring booting from SSD of ED-IPC3020 to help users use the product better.

Users can visit the following website for more information:

https://www.edatec.cn

Reader Scope

This manual is applicable to the following readers:

- Mechanical Engineer
- Electrical Engineer
- Software Engineer
- System Engineer

Related Agreement

Symbolic Convention

Symbolic	Instruction
	Prompt symbols, indicating important features or operations.
	Notice symbols, which may cause personal injury, system damage, or signal interruption/loss.
	Warning symbols, which may cause great harm to people.

Safety Instructions

- This product should be used in an environment that meets the requirements of design specifications, otherwise it may cause failure, and functional abnormality or component damage caused by non-compliance with relevant regulations are not within the product quality assurance scope.

- Our company will not bear any legal responsibility for personal safety accidents and property losses caused by illegal operation of products.

- Please do not modify the equipment without permission, which may cause equipment failure.

- When installing equipment, it is necessary to fix the equipment to prevent it from falling.

- If the equipment is equipped with an antenna, please keep a distance of at least 20cm from the equipment during use.

- Do not use liquid cleaning equipment, and keep away from liquids and flammable materials.

- This product is only supported for indoor use.

Content

1 Product Description

This chapter introduces the product overview, packing list, appearance, button, indicators and interfaces.

- ✓ Overview
- ✓ Packing List
- ✓ Appearance
- ✓ Button
- ✓ Indicator
- ✓ Interface

1.1 Overview

ED-IPC3020 is a high-performance industrial PC based on Raspberry Pi 5. According to different application scenarios and user needs, different specifications of RAM, SD card and SSD computer systems can be selected.

- RAM can choose 4GB and 8GB
- SD card can choose 32GB and 64GB
- SSD can choose 128GB and 256GB

ED-IPC3020 provides HDMI, USB 2.0, USB 3.0, RS232, RS485, Audio and Ethernet interfaces, supporting access to the network through Wi-Fi and Ethernet. ED-IPC3020 integrates RTC and is mainly used in industrial control and IOT.

1.2 Packing List

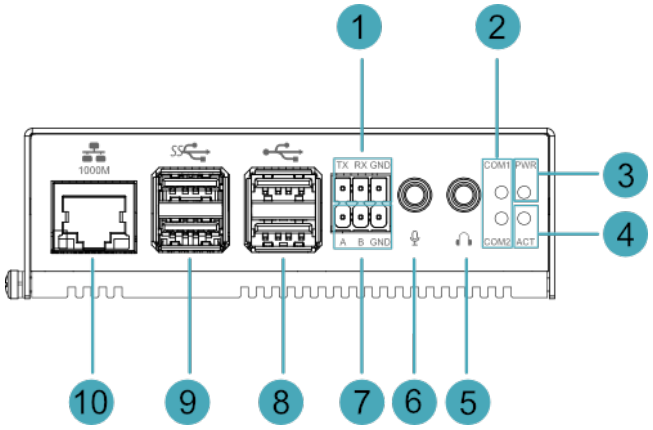
- 1x ED-IPC3020 Unit
- 4x Pads
- 1 x Tweezers (using to insert/remove SD card)

1.3 Appearance

Introducing the functions and definitions of interfaces on each panel.

1.3.1 Front Panel

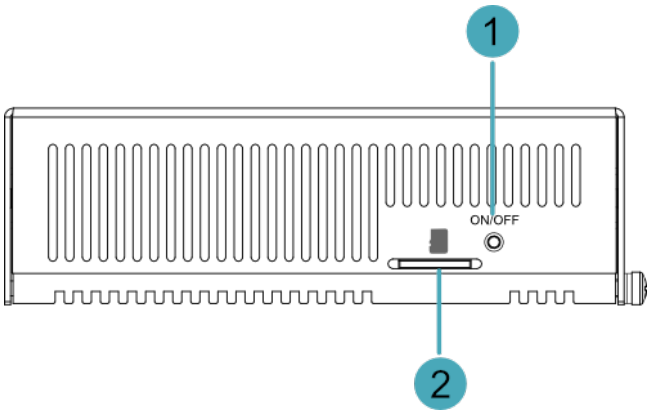
This section introduces functions and definitions of front panel.



NO.	Function Definition
1	1 x RS232 port, 3-Pin 3.5mm spacing phoenix terminal, which is used to connect the third-party control equipment.
2	2 x green UART indicators, which is used to check the communication status of UART port.
3	1 x red power indicator, which is used to check the status of device power-on and power-off.
4	1 x green system status indicator, which is used to check the working status of device.
5	1 x Audio Output (HPO), 3.5mm audio jack connector(green), stereo audio output.
6	1 x Audio Input (LINE IN), 3.5mm audio jack connector(red), supporting stereo audio input.
7	1 x RS485 port, 3-Pin 3.5mm spacing phoenix terminal, which is used to connect the third-party control equipment.
8	2 x USB 2.0 ports, type A connector, each channel supports up to 480Mbps.
9	2 x USB 3.0 ports, type A connector, each channel supports up to 480Mbps.
10	1 x 10/100/1000M adaptive ethernet port, RJ45 connector, with led indicator. It can be used to access the network.

1.3.2 Rear Panel

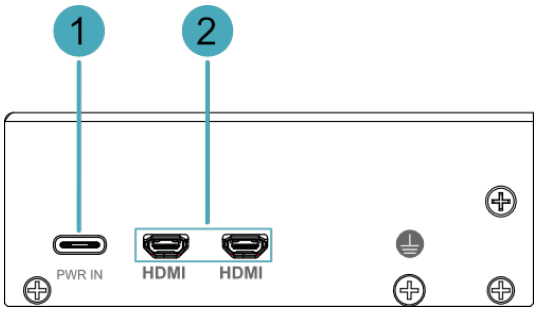
This section introduces interfaces and definitions of rear panel.



NO.	Function Definition
1	1 x power button, which is used to turn on and turn off the device.
2	1 x Micro SD card slot, which is used to install SD card. It supports booting the OS from SD card.

1.3.3 Side Panel

This section introduces interfaces and definitions of side panel.



NO.	Function Definition
1	1 x DC input, USB Type-C connector, which supports 5V 5A power input.
2	2 x HDMI ports, micro-HDMI connector, which can connect a display and supports 4K 60Hz.

1.4 Button

The ED-IPC3020 includes a ON/OFF button, and the silkscreen is “ON/OFF”. If you run Raspberry Pi Desktop, you can initiate a clean shutdown by briefly pressing the power button. A menu will appear asking whether you want to shutdown, reboot, or logout:

TIP:

If you run Raspberry Pi Desktop, you can press the power button twice in quick succession to shut down.

1.5 Indicator

This section introduces various statuses and meanings of indicators contained in ED-IPC3020.

Indicator	Status	Description
PWR	On	The device has been powered on.
	Blink	Power supply of the device is abnormal, please stop the power supply immediately.
	Off	The device is not powered on.
ACT	Blink	The system started successfully and is reading and writing data.
	Off	The device is not powered on or does not read and write data.
COM1~COM2	On/Blink	Data is being transmitted.
	Off	The device is not powered on or there is no data transmission.
Yellow indicator of Ethernet port	On	The Ethernet connection is in the normal state.
	Blink	The Ethernet connection is abnormal.
	Off	The Ethernet connection is not set up.
Green indicator of Ethernet port	On	The Ethernet connection is in the normal state.
	Blink	Data is being transmitted over the Ethernet port
	Off	The Ethernet connection is not set up.

1.6 Interface

Introducing the definition and function of each interface in the product.

1.6.1 SD Card Slot

The ED-IPC3020 includes a Micro-SD card slot, and the silkscreen is “  ”, which supports the installation of an SD card for booting the system.

1.6.2 Power Supply

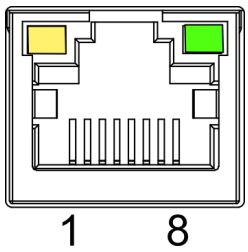
The ED-IPC3020 includes one power input, and the silkscreen is “PWR IN”. The connector is USB Type-C, which supports 5V 5A power input.

TIP:

In order for Raspberry Pi 5 to achieve better performance, it is recommended to use a 5V 5A power adapter.

1.6.3 1000M Ethernet

ED-IPC3020 includes one adaptive 10/100/1000M Ethernet port, and the silkscreen is "  ". The connector is RJ45, which is used to access to network. It is recommended to use the network cable of Cat6 and above. The pins corresponding to the terminal are defined as follows:



Pin ID	Pin Name
1	TX4-
2	TX4+
3	TX3-
4	TX3+
5	TX2-
6	TX2+
7	TX1-
8	TX1+

1.6.4 HDMI

ED-IPC3020 includes 2 HDMI ports, and the silkscreen is "**HDMI**". The connector is micro-HDMI, which can connect to HDMI displays and supports up to 4Kp60.

1.6.5 USB 2.0

ED-IPC3020 includes 2 USB 2.0 ports, and the silkscreen is "". The connector is USB Type-A, which can connect to standard USB 2.0 peripherals and supports up to 480Mbps.

1.6.6 USB 3.0

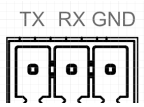
ED-IPC3020 includes 2 USB 3.0 ports, and the silkscreen is "". The connector is USB Type-A, which can connect to standard USB 3.0 peripherals and supports up to 5Gbps.

1.6.7 RS232

ED-IPC3020 contains 1 RS232 port, 3-Pin 3.5mm spacing phoenix terminals. The silkscreen is "TX/RX/GND".

Pin Definition

Terminal pins are defined as follows:



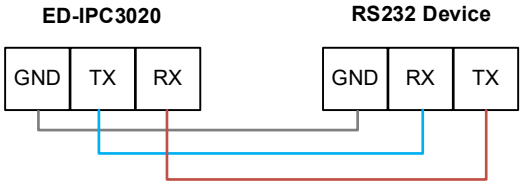
Pin ID	Pin Name
1	TX
2	RX
3	GND

The pin names of CM4 corresponding to RS232 interface are as follows:

Signal	CM4 GPIO Name	CM4 Pin Out
TX	GPIO4	UART3_TXD
RX	GPIO5	UART3_RXD

Connecting Cables

Schematic diagram of RS232 wires is as follows:



1.6.8 RS485

ED-IPC3020 contains 1 RS485 port, 3-Pin 3.5mm spacing phoenix terminals. The silkscreen is "A/B/GND".

Pin Definition

Terminal pins are defined as follows:

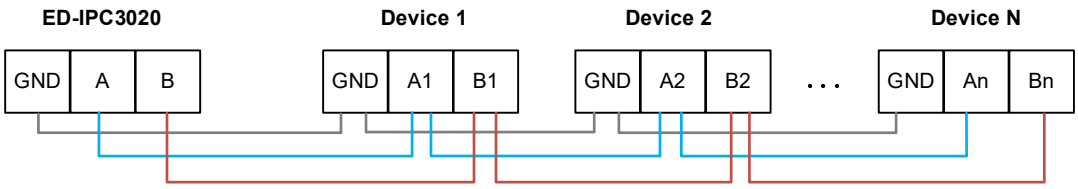
Pin ID	Pin Name
1	A
2	B
3	GND

The pin names of CM4 corresponding to RS485 interface are as follows:

Signal	CM4 GPIO Name	CM4 Pin Out
A	GPIO12	UART5_TXD
B	GPIO13	UART5_RXD

Connecting Cables

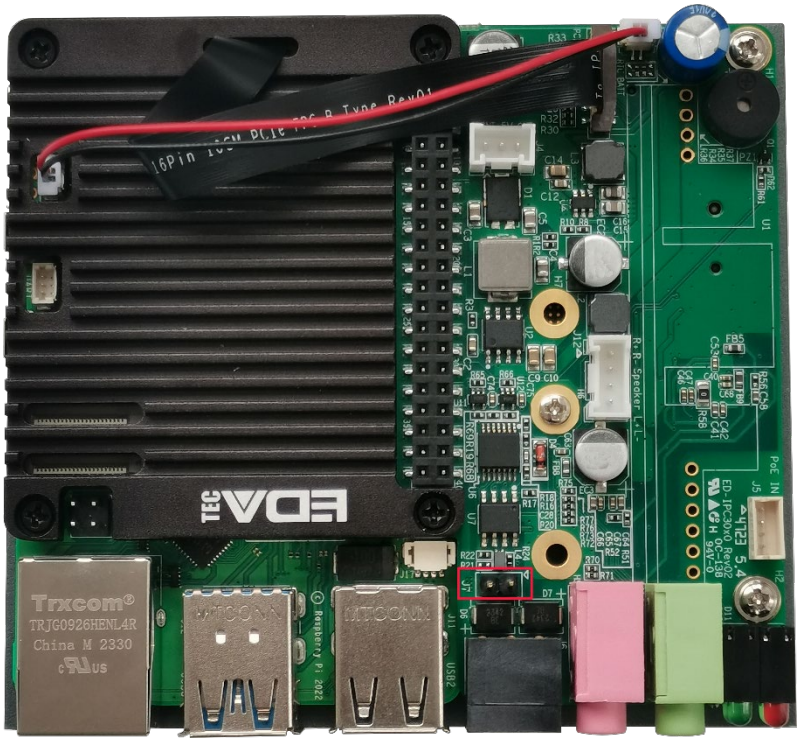
Schematic diagram of RS485 wires is as follows:



RS485 Terminal Resistor

ED-IPC3020 contains a RS485 port. A 120R jumper resistor is reserved between A and B of RS485 line. The jumper cap can be inserted to enable the jumper resistor. By default, the jumper

cap is not connected, and the 120R jumper resistor function is disabled. The position of jumper resistor in the PCBA is J7 in the figure below (red box position).



TIP:

You need to open the device case to view the position of 120R jumper resistor. For detailed operations, please refer to 2.3 Open Device Case.

1.6.9 Audio In

ED-IPC3020 contains one audio input (LINE IN), 3.5mm audio jack connector(red). The silkscreen is "", supporting stereo audio input.

1.6.10 Audio Out

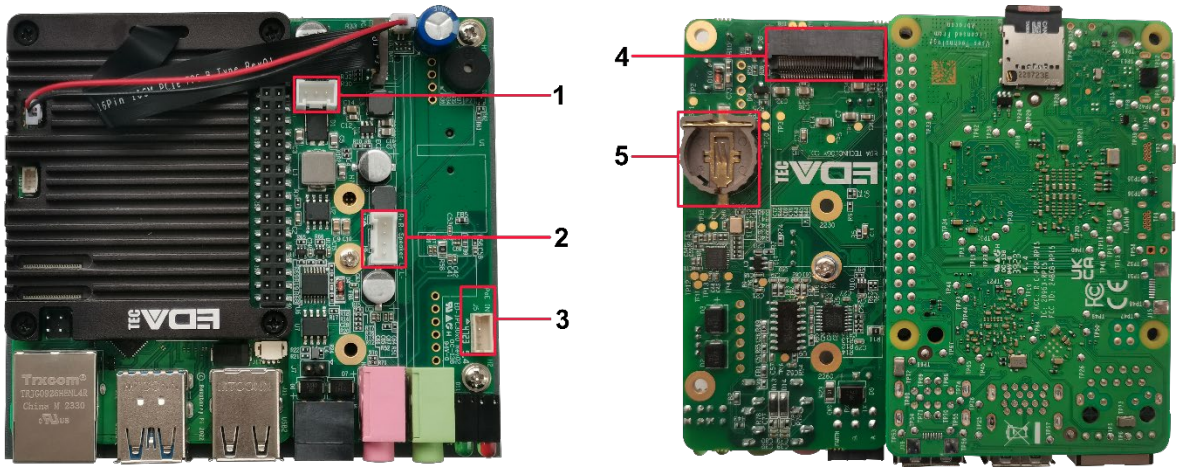
ED-IPC3020 contains one audio output (HPO), 3.5mm audio jack connector(green). The silkscreen is "", supporting stereo audio output.

1.6.11 Motherboard

Introducing the interfaces reserved in the ED-IPC3020, which can be obtained only after the device case is opened, and can be expanded according to actual needs.

TIP:

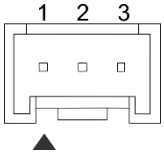
You need to open the device case to view motherboard interface. For detailed operations, please refer to 2.3 Open Device Case.



NO.	Function Definition
1	5V output
2	Speaker
3	PoE
4	M.2 M-key connector
5	RTC battery base

1.6.11.1 5V Output

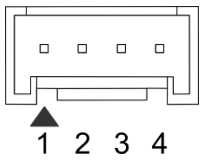
The motherboard of ED-IPC3020 includes an extended 5V output port with 3-Pin 2.0mm spacing white WTB connector, which is reserved for the extended LCD screen to supply power. The pins are defined as follows:



Pin ID	Pin Name
1	GND
2	5V
3	GND

1.6.11.2 Speaker

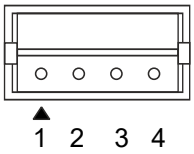
The motherboard of ED-IPC3020 includes one extended Speaker output with 4-Pin 2.0mm spacing WTB connector. Dual-channel stereo output, which can be extended to connect two 4Ω 3W stereo speakers. The pins are defined as follows:



Pin ID	Pin Name
1	R+
2	R-
3	L+
4	L-

1.6.11.3 PoE

The motherboard of ED-IPC3020 includes one extended PoE port with 4-Pin 1.5mm spacing WTB connector, which can be extended to connect PoE AC voltage. The pins are defined as follows:



Pin ID	Pin Name
1	VB2
2	VB1
3	VA2
4	VA1

1.6.11.4 M.2 M Key Connector

The motherboard of ED-IPC3020 includes one M.2 M-key connector, using to connect SSD and other fast peripherals. It compatibles with M.2 2230, M.2 2242 and M.2 2260, supporting to boot the OS from SSD.

1.6.11.5 RTC Battery Base

The motherboard of ED-IPC3020 is integrated with RTC. For the version sold in China, we will install CR1220 battery (RTC backup power supply) by default.

TIP:

Some international logistics do not support the transportation of batteries, and some ex-factory devices are not equipped with CR1220 batteries. Therefore, before using RTC, please prepare a CR1220 battery and install it on the motherboard.

2 Installing/removing Components (optional)

This chapter introduces how to install/remove components.

- ✓ Pull Out SD Card
- ✓ Insert SD Card
- ✓ Open Device Case
- ✓ Remove SSD
- ✓ Install SSD
- ✓ Install RTC Battery
- ✓ Close Device Case

2.1 Pull Out SD Card

If you need to remove the SD card while using the product, you can refer to the following instructions.

NOTE:

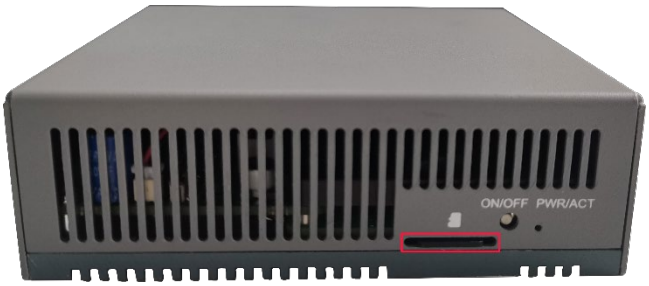
Please turn off the power before inserting or removing the SD card.

Preparation:

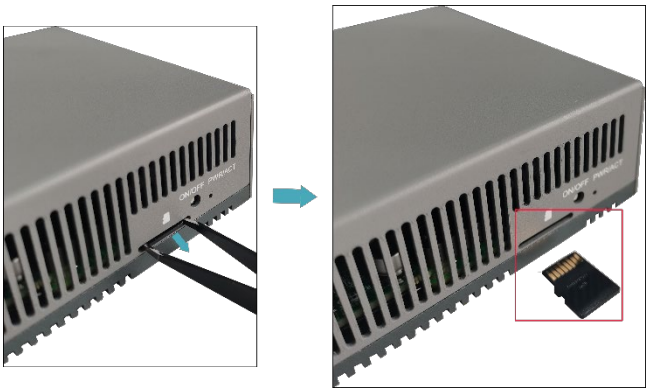
- A pair of tweezers is ready.
- The device has been disconnected from power.

Steps:

1. Find the location of the SD card, as shown in red mark of figure below.



2. Use tweezers to hold the SD card and pull it out.



2.2 Insert SD Card

If the product model includes an SD card, the SD card will be installed by default. If the product model does not include an SD card, you will need to use the SD card later. Please refer to the following to install it.

NOTE:

Please turn off the power before inserting or removing the SD card.

Preparation:

- SD card is ready.
- The device has been disconnected from power.

Steps:

1. Find the location of the SD card slot, as shown in red mark of figure below.

2. Insert the SD card into the corresponding card slot with the contact side facing up, making sure it will not fall out.

2.3 Open Device Case

If you need to open the device case while using the product, please refer to the following instructions.

Preparation:

- A cross screwdriver has been prepared.
- The device has been disconnected from power.

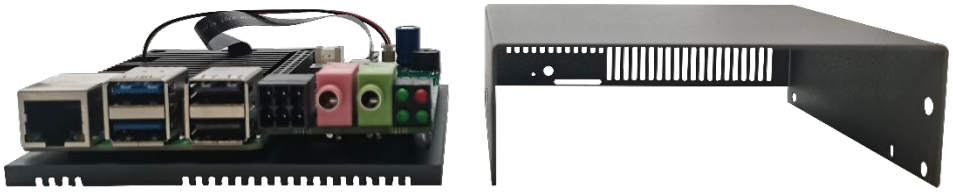
Steps:

1. Pull out the default configuration of phoenix connector (male for wiring).
2. Use a screwdriver to loosen two M3 screws on two sides counterclockwise, as shown in the red mark of figure below.

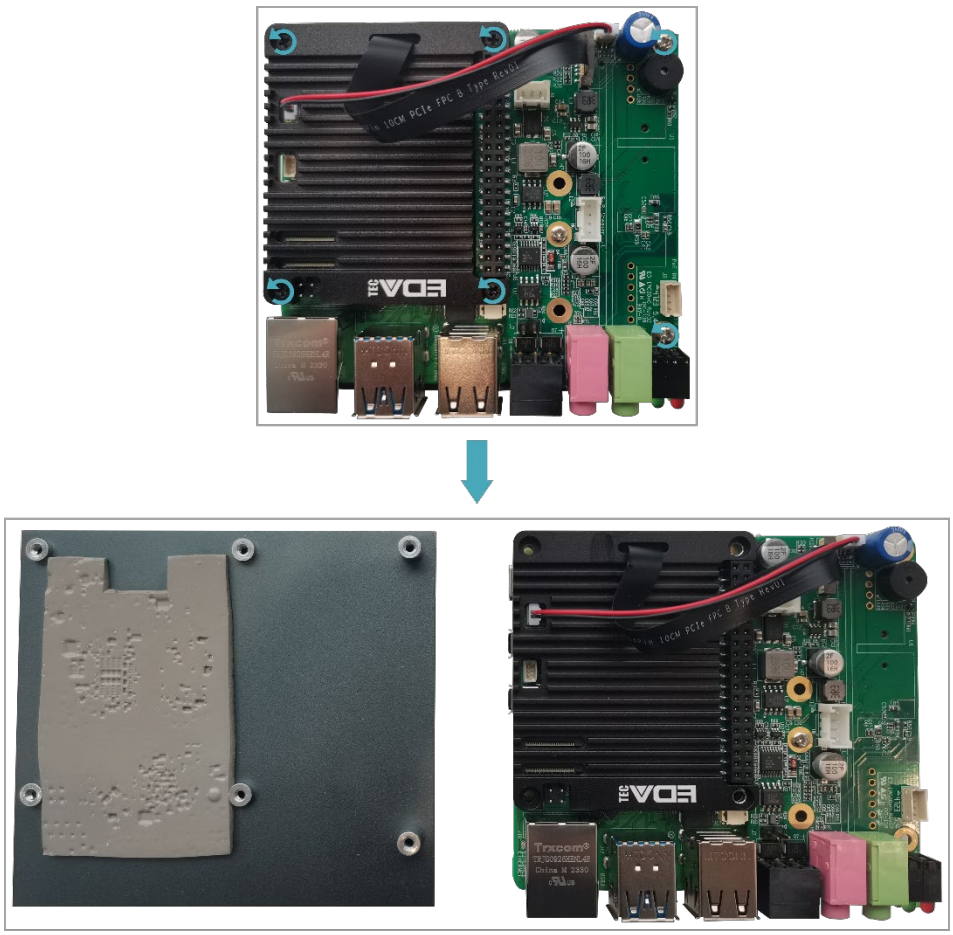
3. Remove the front cover to the right, as shown in the figure below.

4. Use a screwdriver to loosen four M2.5 screws and one grounding screw on two sides counterclockwise, as shown in the red mark in the figure below.

5. Remove the upper cover upward.



6. Use a screwdriver to loosen 6 screws of PCBA mounting counterclockwise and remove the bottom cover.



2.4 Remove SSD

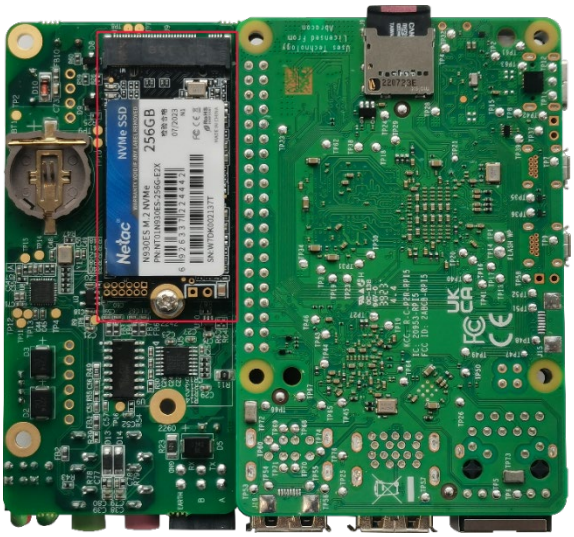
If the SSD is damaged during use and needs to be replaced, the damaged SSD needs to be removed first.

Preparation:

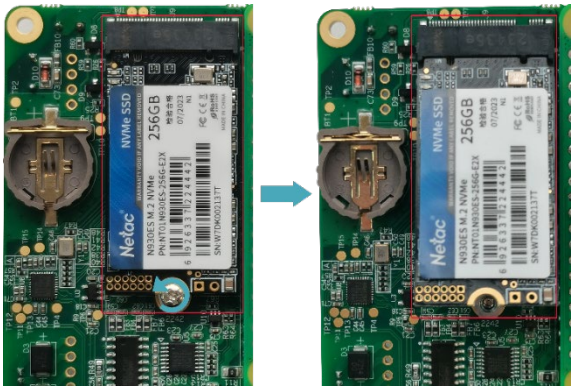
- The device case has been open.
- A cross screwdriver has been prepared.

Steps:

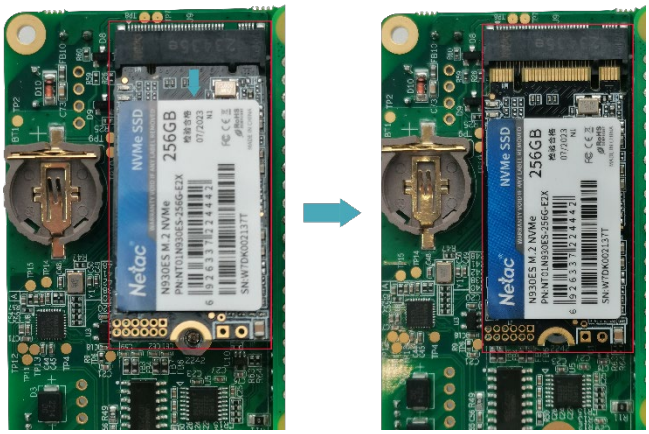
1. Find the location of SSD, as shown in the red mark of figure below.



2. Use a screwdriver to loosen the screws that secure the SSD counterclockwise.



3. Hold both sides of the SSD with your hands and pull it out in the direction of the arrow.


NVMe SSD
256GB
Netac

2.5 Install SSD

If you choose a model without SSD when purchasing the product, and you need to use an SSD later, please refer to the following to install the SSD.

TIP:

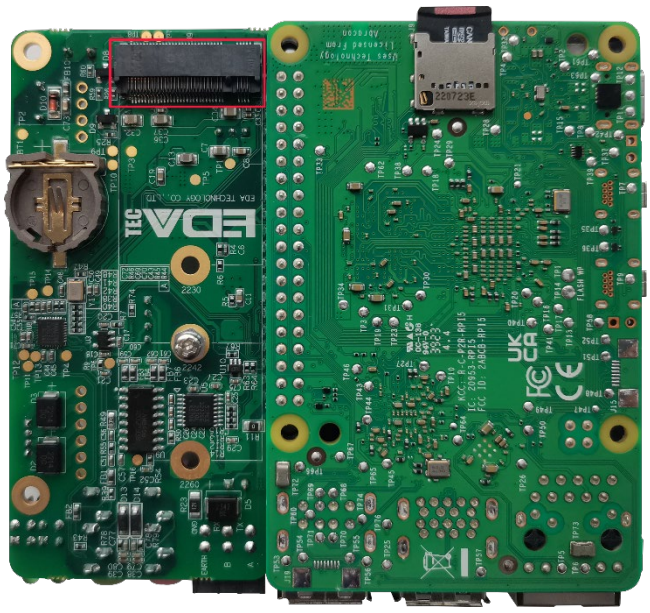
Only compatible with M.2 2230, M.2 2242 and M.2 2260 SSD.

Preparation:

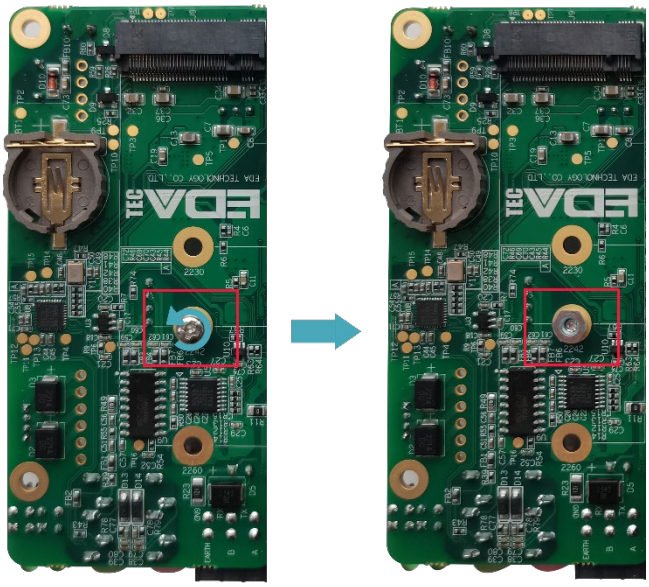
- The device case has been open.
- A cross screwdriver has been prepared.
- SSD is ready.

Steps:

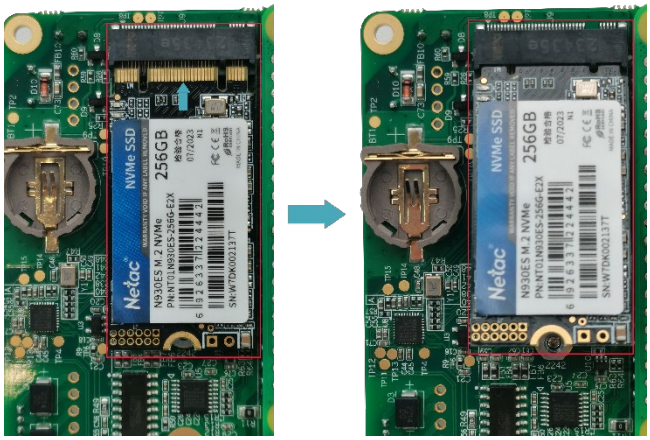
1. Find the location of SSD connector, as shown in the red mark of figure below.



4. Use a screwdriver to loosen the screws that secure the SSD counterclockwise.



2. Insert the SSD into the connector with the contacts facing up.



3. Insert the screws that secure the SSD and tighten clockwise to secure the SSD to the PCBA.

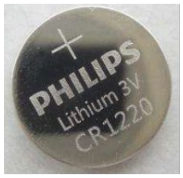
2.6 Install RTC Battery

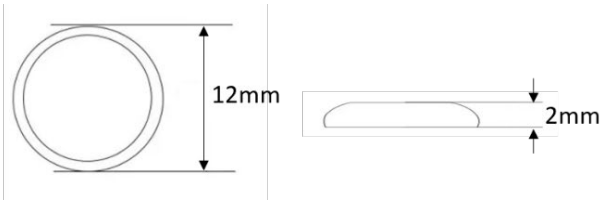
TIP:

Some international logistics do not support the transportation of batteries, and some ex-factory devices are not equipped with CR1220 batteries. Therefore, before using RTC, please prepare a CR1220 battery and install it on the motherboard.

Preparation:

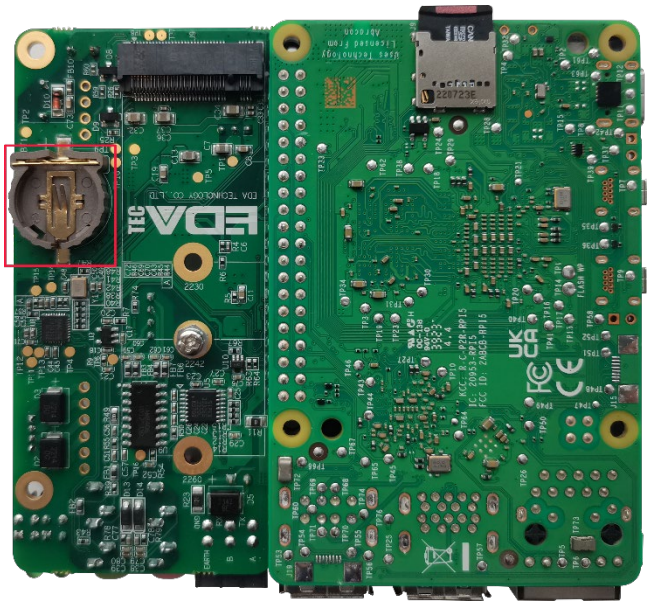
- The device case has been open.
- The battery CR1220 is ready.



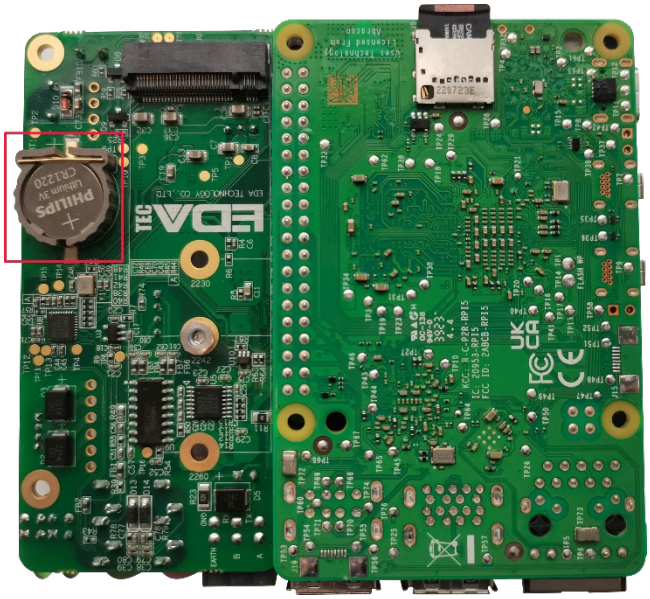


Steps:

1. Find the location of RTC battery base, as shown in the red mark of figure below.



2. Place the positive terminal of the battery facing up, and press it into the RTC base. The completed installation is as shown below.


PHILIPS
Lithium 3V
CR1220
EDA

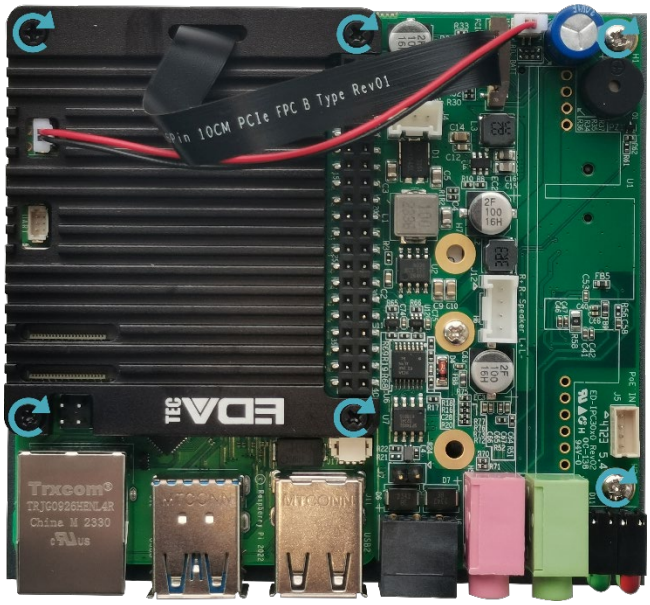
2.7 Close Device Case

Preparation:

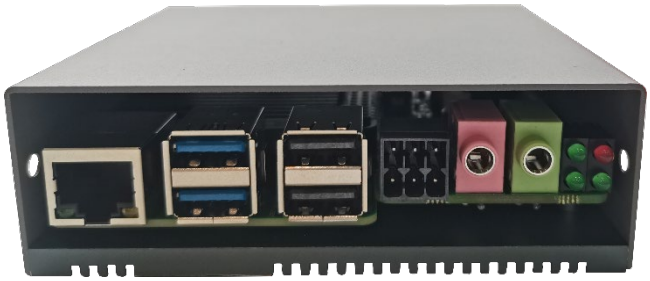
A cross screwdriver has been prepared.

Steps:

1. Place the PCBA on the bottom cover of ED-IPC3020, align the 6 mounting holes on the PCBA with the studs on the bottom cover, then insert 6 mounting screws, and tighten clockwise to fix the PCBA on the bottom cover.



2. Close the upper cover.



3. Align the screw holes on the upper and bottom cover, and use a screwdriver to tighten four M2.5 screws and one grounding screw on two sides clockwise.

4. Align the interface on the PCBA with the interface holes on the front panel, insert the front cover, and then use a screwdriver to tighten the 2 M3 screws clockwise.

5. Plug in the default configuration of phoenix connector.

3 Booting The Device

This chapter introduces how to connect cables and boot the device.

- ✓ Connecting Cables
- ✓ Booting The System For The First Time

3.1 Connecting Cables

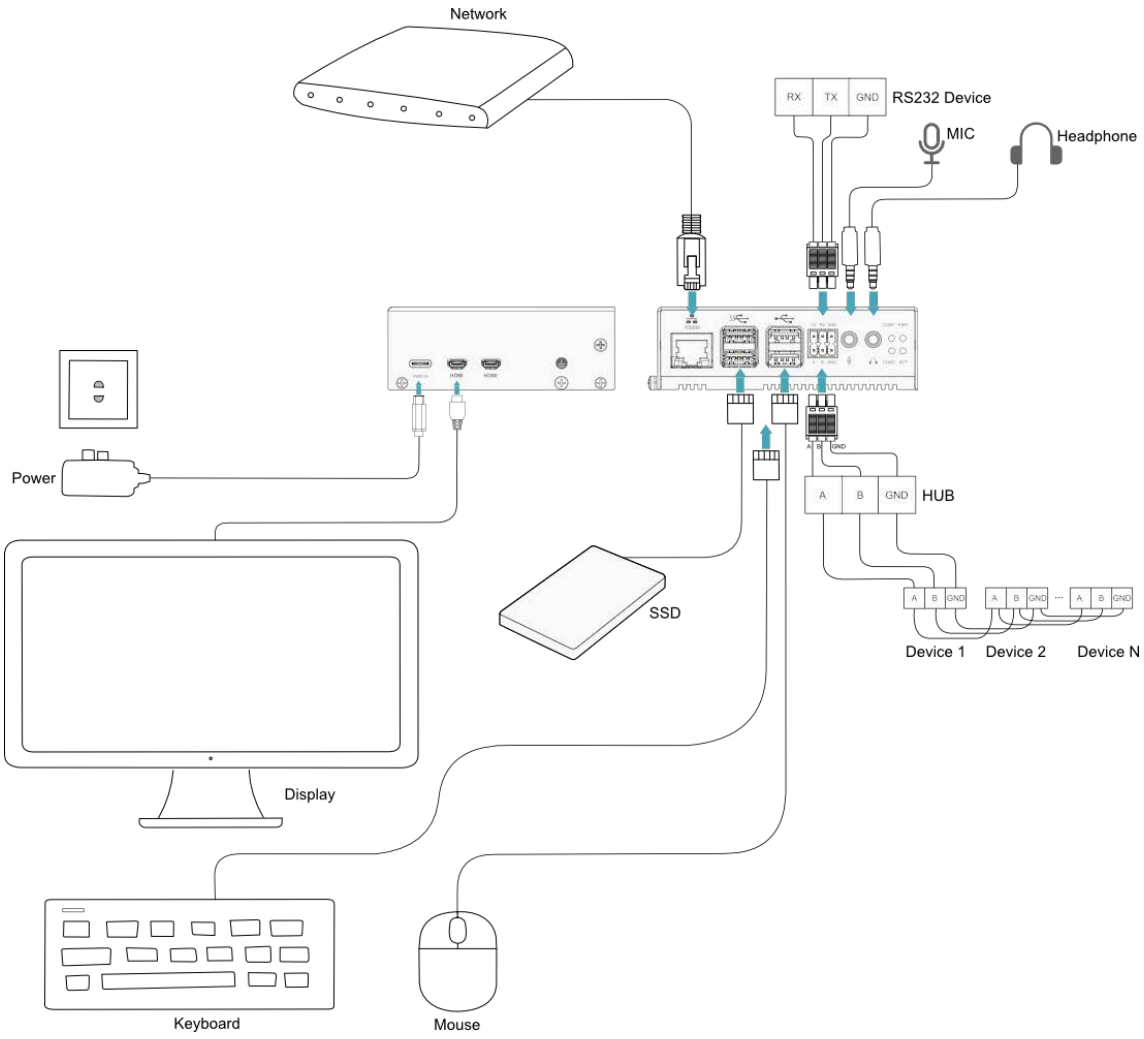
This section describes how to connect cables.

Preparation:

- Accessories such as display, mouse, keyboard and power adapter that can be used normally have been ready.
- A network that can be used normally.
- Get the HDMI cable and network cable that can be used normally.

Schematic diagram of connecting cables:

Please refer to **1.6 Interface** for the pin definition of each interface and the specific method of wiring.

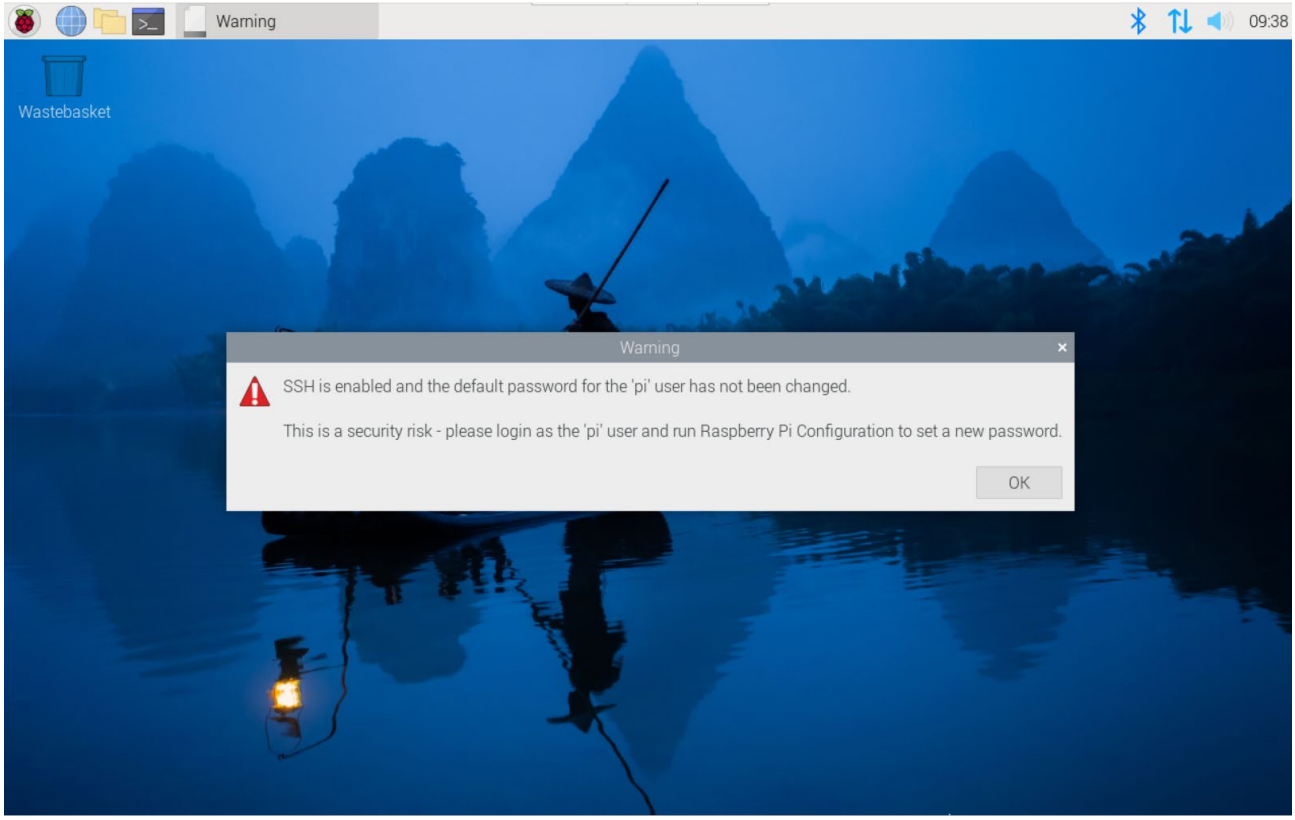


3.2 Booting The System For The First Time

After ED-IPC3020 is connected to the power supply, the system will start.

- The red PWR indicator is on, indicating that the device has been powered normally.
- The green ACT indicator is blinking, indicating that the system is started normally, and then the logo will appear in the screen.

The product is installed with the Desktop version system when it leaves the factory. After the device is started, it will directly enter the desktop.



TIP:

Default username is pi, Default password is raspberry.

4 Configuring System

This chapter introduces how to configure system.

- ✓ Finding Device IP address
- ✓ Remote Login
- ✓ Configuring Wi-Fi
- ✓ Configuring Ethernet IP
- ✓ Configuring Bluetooth
- ✓ Configuring Buzzer
- ✓ Configuring RTC
- ✓ Configuring Serial Port
- ✓ Configuring Audio
- ✓ Configuring SSD (optional)

4.1 Finding Device IP address

In some application scenarios, it is necessary to remotely log in or manage devices, so it is necessary to obtain the device IP address.

4.1.1 View IP address at the Network icon of Desktop

After the device starting normally and the display is connected, you can view the current device IP address at the Network icon.

TIP:

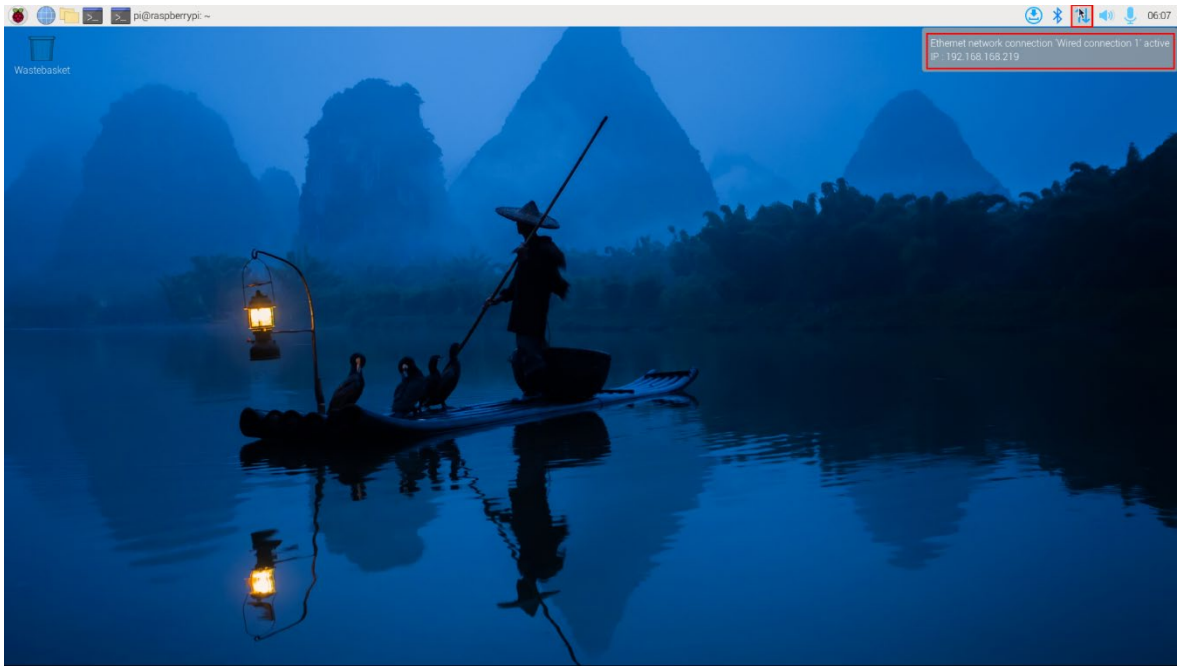
Only supported by Desktop version system.

Preparation:

ED-IPC3020 has been connected to the network through the router.

Steps:

Hover over the network icon in the system tray, and a tooltip will appear. This tooltip displays the name of the network you're currently connected to and your IP address.



4.1.2 Hostname command to query

After the device starting normally and the display is connected, you can query the current device IP address by using hostname command.

Preparation:

ED-IPC3020 has been connected to the network through the router.

Steps:

Run the following command in the command pane to obtain IP address.

hostname -I

```
pi@raspberrypi:~ $ hostname -I
192.168.168.219
```

4.1.3 Query IP by Using ifconfig Command

After the device is started normally and the display is connected, you can use the ifconfig command to view the current device IP.

Preparation:

ED-IPC3020 has been connected to the network through the router.

Steps:

Run the following command in the command pane to view the detailed information of each port of the device, where the inet value in the eth interface is the device IP, as shown in the following figure.

ifconfig

```
pi@raspberrypi:~ $ ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.168.219  netmask 255.255.255.0  broadcast 192.168.168.255
        inet6 fe80::382a:b964:5832:e59a  prefixlen 64  scopeid 0x20<link>
        ether d8:3a:dd:bf:be:c5  txqueuelen 1000  (Ethernet)
        RX packets 31528594  bytes 5334561751 (4.9 GiB)
        RX errors 0  dropped 31428512  overruns 0  frame 0
        TX packets 16597  bytes 12404868 (11.8 MiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
        device interrupt 108
```

4.1.4 Query IP by Using Network Manager CLI

After the device is started normally and the display is connected, you can use the built-in Network Manager CLI (nmcli) to view details about your network.

Preparation:

ED-IPC3020 has been connected to the network through the router.

Steps:

Run the following command in the command pane to view the detailed network information.

nmcli device show

```
pi@raspberrypi:~ $ nmcli device show
GENERAL.DEVICE:                         eth0
GENERAL.TYPE:                           ethernet
GENERAL.HWADDR:                         D8:3A:DD:BF:BE:C5
GENERAL.MTU:                            1500
GENERAL.STATE:                          100 (connected)
GENERAL.CONNECTION:                     Wired connection 1
GENERAL.CON-PATH:                       /org/freedesktop/NetworkManager/ActiveConnection/3
WIRED-PROPERTIES.CARRIER:               on
IP4.ADDRESS[1]:                         192.168.168.219/24
IP4.GATEWAY:                            192.168.168.1
IP4.ROUTE[1]:                           dst = 192.168.168.0/24, nh = 0.0.0.0, mt = 100
IP4.ROUTE[2]:                           dst = 0.0.0.0/0, nh = 192.168.168.1, mt = 100
IP4.DNS[1]:                             192.168.168.1
IP6.ADDRESS[1]:                         fe80::382a:b964:5832:e59a/64
IP6.GATEWAY:                            --
IP6.ROUTE[1]:                           dst = fe80::/64, nh = ::, mt = 1024
```

4.1.5 Login Router to Query IP

When the device starts normally but the display is not connected, you can log in to the router to check the current device IP.

Preparation:

- ED-IPC3020 has been connected to the network through the router.
- The IP and network password of the router in the network have been obtained, and the IP address is 192.168.X.X.

Steps:

1. Open a browser, Enter the router IP of the network where ED-IPC3020 is located in the

address bar: 192.168.x.x, and press Enter to enter the router login interface.

2. According to the interface prompts, enter the network password and enter the router management interface.

3. Find the IP address of ED-IPC3020 in the terminal device of the management interface.

4.1.6 Scan For Using NMAP Tool

When the device starts normally but the display is not connected, you can use nmap tool to scan the IP under the current network to obtain the IP information of the device. Nmap supports Linux, macOS, Windows and other platforms.

Preparation:

- ED-IPC3020 has been connected to the network through the router.
- The IP segment and mask of the router in the network have been obtained, for example, 192.168.X.X/24, where 24 is the subnet mask.

Steps:

For example, using nmap to scan the network segments from 192.168.3.0 to 255, you can use the following steps:

1. Open the nmap tool and scan the hosts in the 192.168.X.X/24 network segment.

 **NOTE:**

The nmap tool operates differently in different operating systems, so please follow the actual interface or command prompts.

2. According to the scanned results, get the device IP of ED-IPC3020.

4.2 Remote Login

There are many remote login methods, and users can choose according to their actual needs. This chapter only introduces SSH and VNC.

4.2.1 Connect To The Device Via SSH

After the device starts normally, you can choose to remotely connect to the device through SSH to configure or debug it.

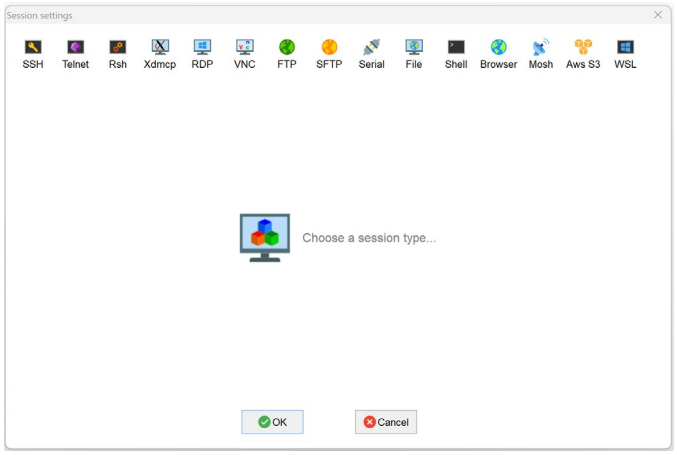
The tools for remote login are selected by users themselves, and the following is an example of logging in through MobaXterm.

Preparation:

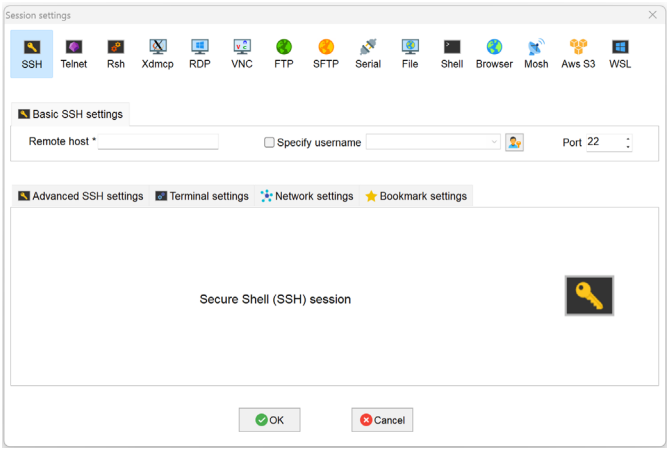
- The MobaXterm tool has been installed on the PC.
- ED-IPC3020 has been connected to the network through the router.
- IP address of ED-IPC3020 has been get.

Steps:

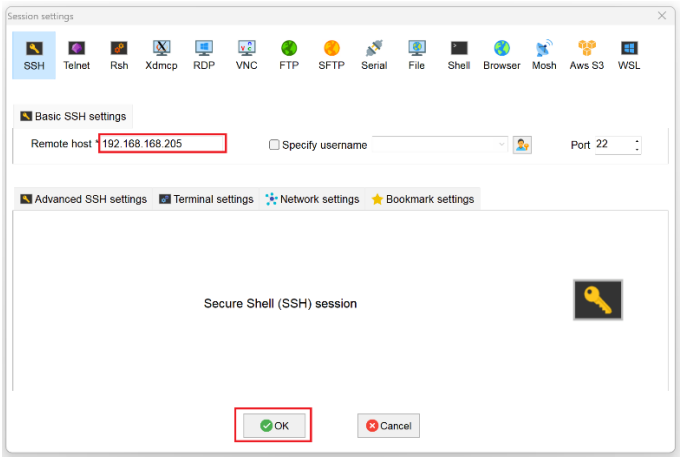
1. Open MobaXterm, click Session, and open the window for creating connection, as shown in the figure below.



2. Click SSH, in the upper left corner to open the SSH connection interface.



3. After entering the IP address of ED-IPC3020, click "OK".

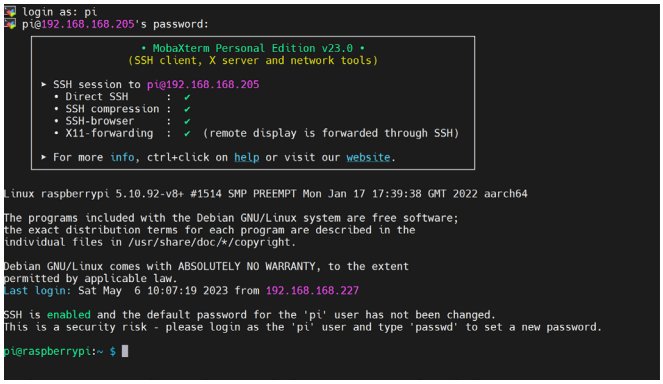


4. Click "Accept" in the pop-up prompt box to enter the system login interface.

5. Enter the username and password according to the prompt, and enter the system after logging in.

TIP:

Default username is pi, Default password is raspberry.

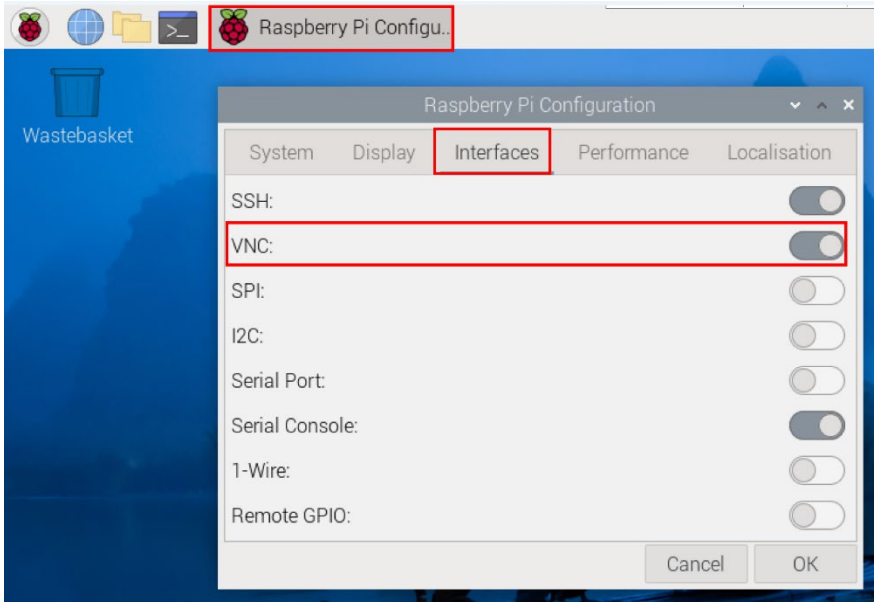


4.2.2 Connecting To The Device Desktop Through VNC

After the device starts normally, you can choose to remotely connect to the device through VNC to configure or debug it.

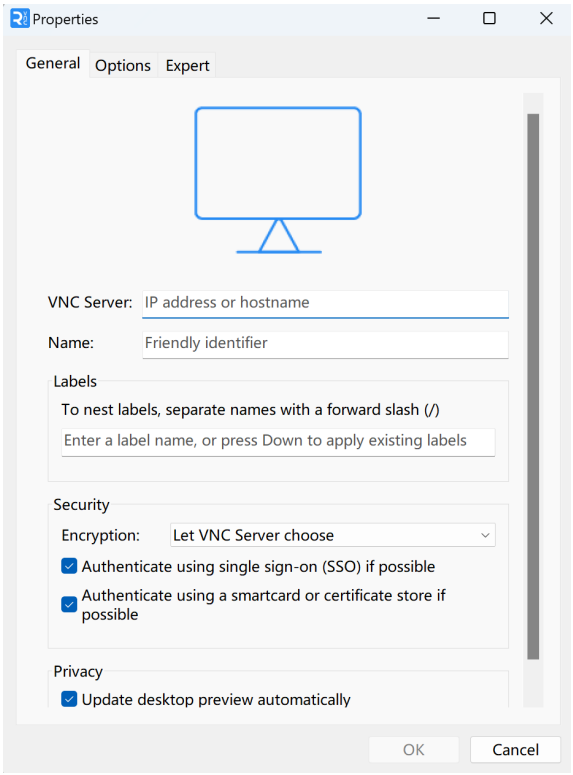
Preparation:

- The RealVNC Viewer tool has been installed on PC.
- ED-IPC3020 has been connected to the network through the router.
- IP address of ED-IPC3020 has been get.
- The VNC function in the ED-IPC3020 system has been turned on, as shown in the following figure.

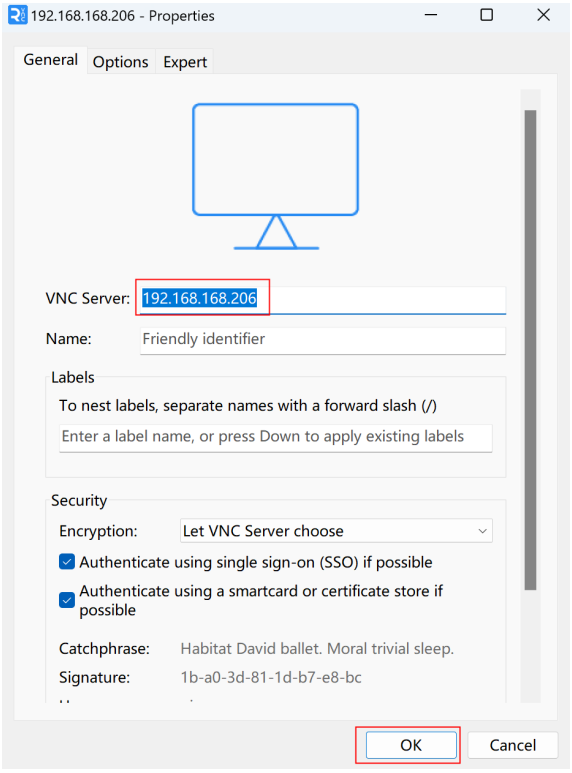


Steps:

1. Open RealVNC Viewer and select "New connection…" in the File in the menu bar to open the window for creating a connection, as shown in the following figure.



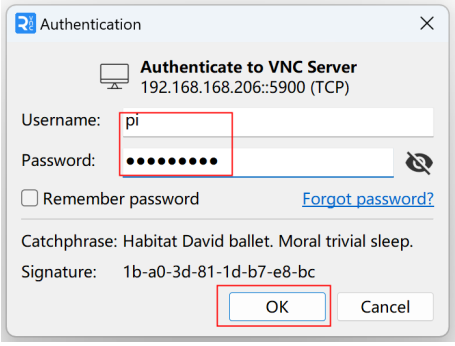
2. After entering the IP address of ED-IPC3020, click "OK".



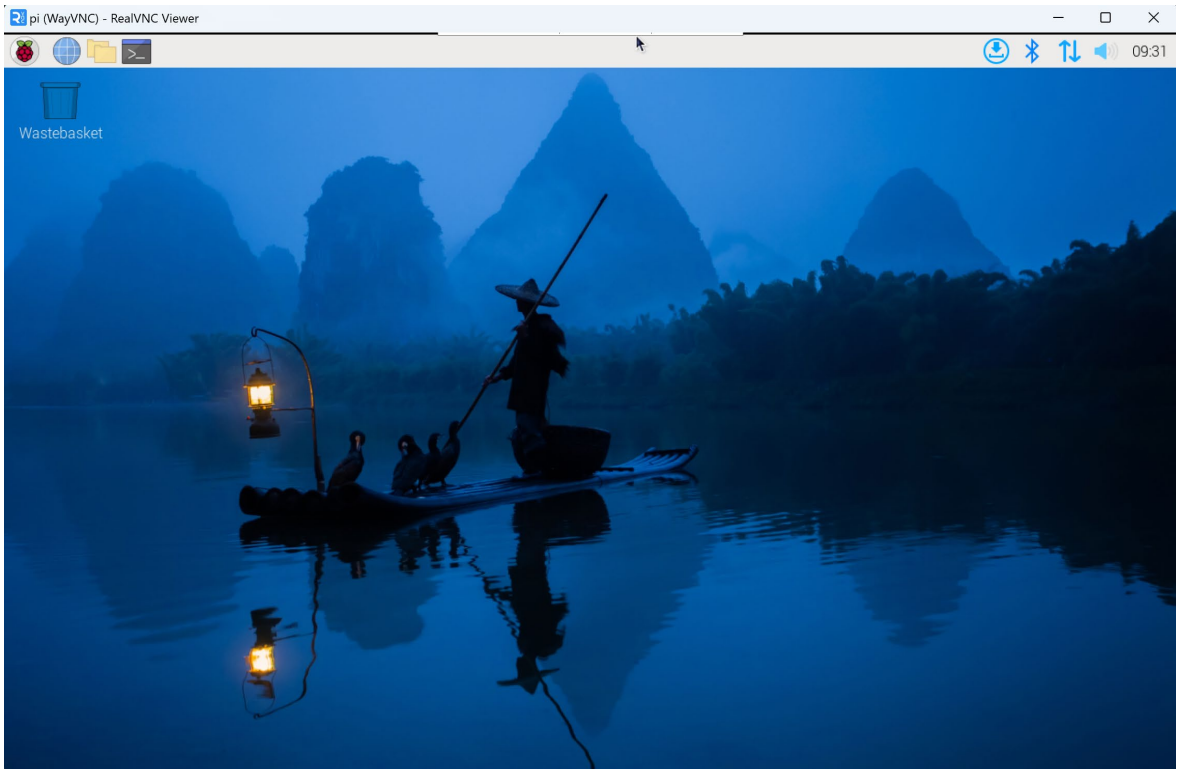
3. Enter the username and password in the Authentication prompt box that pops up.

TIP:

Default username is pi, Default password is raspberry.



4. Select "OK" to log in and connect to the remote desktop.



4.3 Configuring Wi-Fi

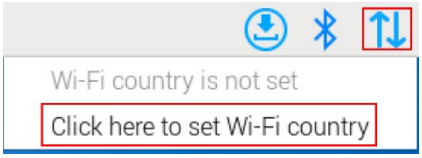
ED-IPC3020 supports Wi-Fi function by default, and you need to configure it before using Wi-Fi.

4.3.1 Enable Wi-Fi

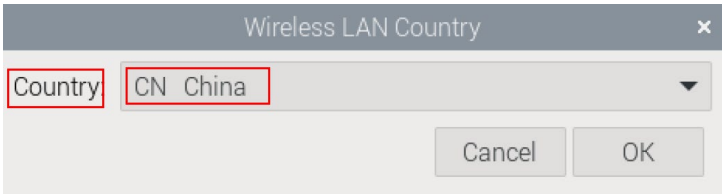
The Wi-Fi function is blocked by default, and you need to set the country region to enable it. You can open the configuration windows through the desktop icon for settings.

Steps:

1. Left-click the icon in the upper right corner of the desktop and select “Click here to set Wi-Fi country”.



2. Set the value of Country in the pop-up “Wireless LAN Country” pane, and select it according to the actual region.



3. Select “OK” to complete the setting.

4.3.2 Configuring Wi-Fi Connection

After enabling the Wi-Fi function, you can connect to Wi-Fi through the desktop icon.

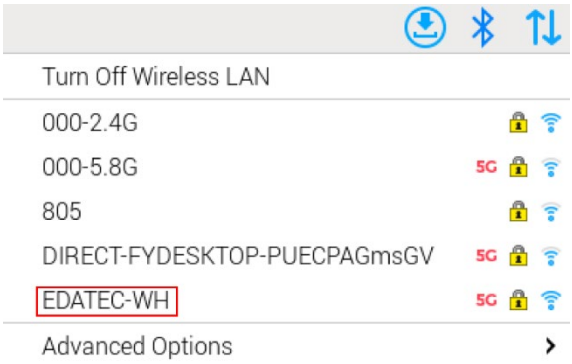
Preparation:

Wi-Fi function is enabled.

Steps:

1. Left-click the icon in the upper right corner of the desktop, select the Wi-Fi to be

connected in the pop-up Wi-Fi list and click it.



2. Enter the Wi-Fi Password in the pop-up "Wi-Fi Network Authentication Required" pane.

3. Click “Connect” to connect the network. After the connection is completed, the Wi-Fi icon will be displayed normally in the upper right corner of the desktop.

4.4 Configuring Ethernet IP

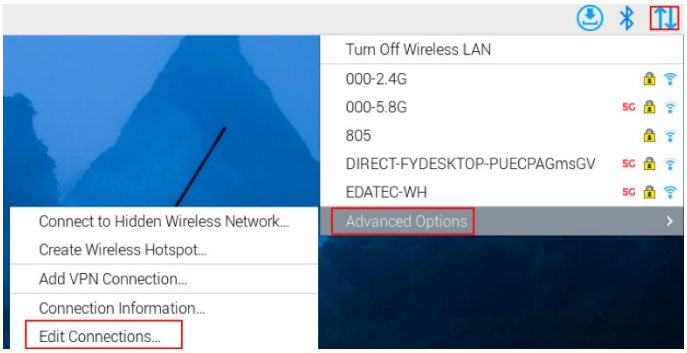
The IP address is automatically obtained by default. If you need to reconfigure the IP, you can configure it on the desktop.

Preparation:

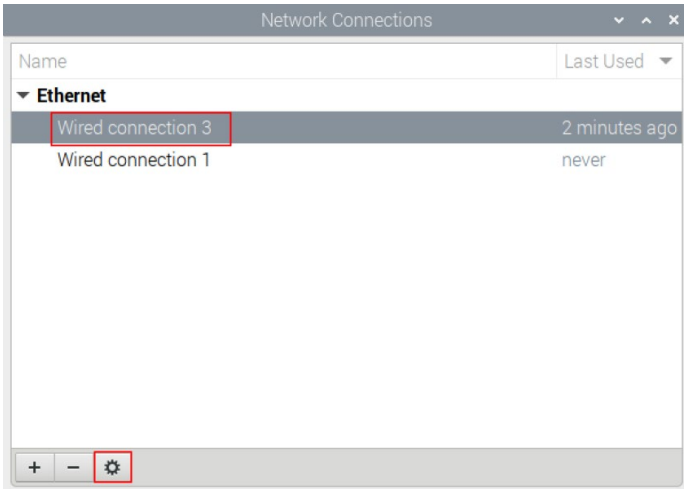
Wi-Fi function is enabled.

Steps:

1. Left-click the icon in the upper right corner of the desktop and select “Advanced Options →Edit Connections” in the pop-up menu.



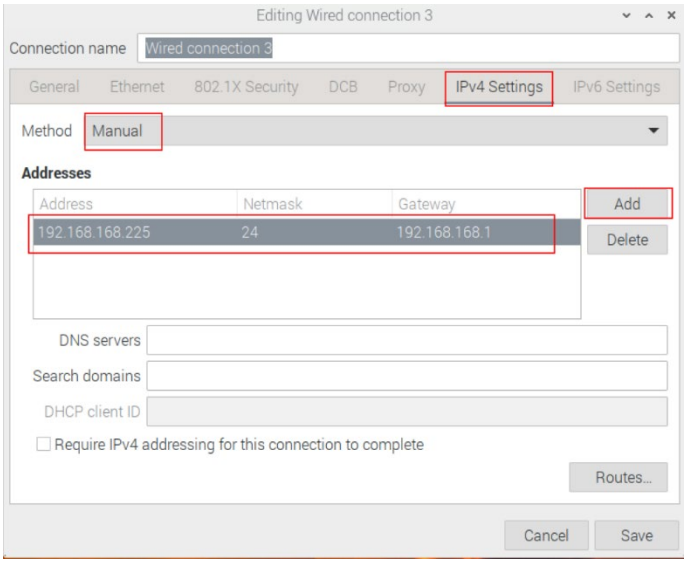
2. In the pop-up "Network Connections" pane, select the connection name to be modified, and then click the Settings button below.



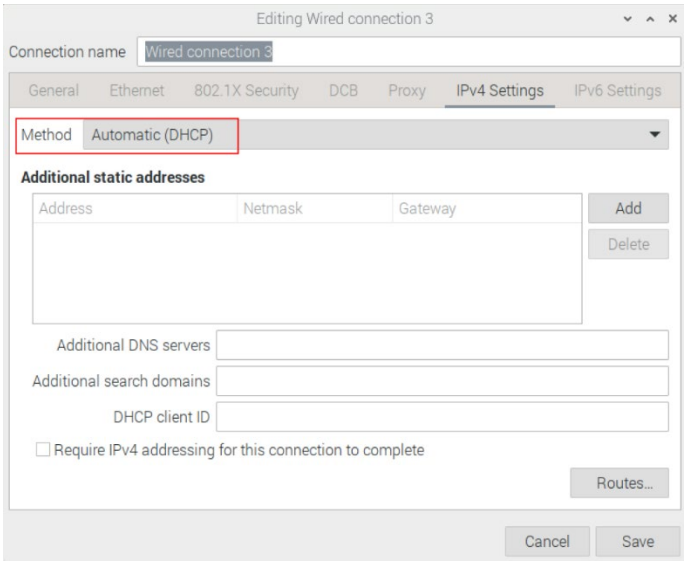
3. In the pop-up "Editing Wired connection" pane, select the "IPv4 Settings" page, and then set the IP address as required.

   - If you want to set the IP as a static IP, set the "Method" as "Manual", add an entry in

Addresses and enter the corresponding IP address information.



- If you want to set the IP to automatic acquisition mode, you only need to set the "Method" as "Automatic(DHCP) ".



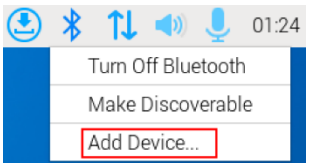
4. Click "save" to return to "Network Connections" pane and close the page.
5. Execute the **sudo reboot** command to restart the device.

4.5 Configuring Bluetooth

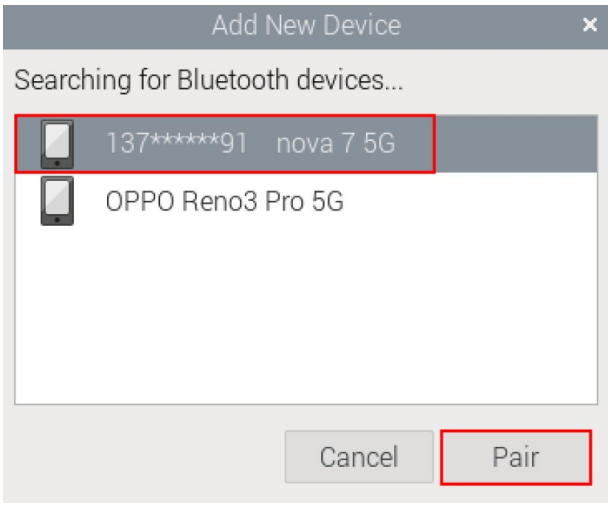
ED-IPC3020 supports Bluetooth function, which is enabled by default. You need to finish related configurations such as adding devices, scanning devices and device pairing before using Bluetooth.

Steps:

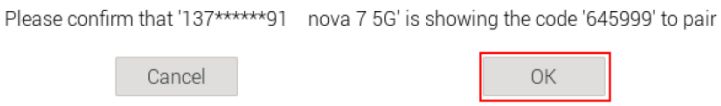
1. Left-click the icon in the upper right corner of the desktop and select “Add Device” in the pop-up menu.



2. In the pop-up "Add New Device" pane, view the scanned Bluetooth devices. Then you can select a Bluetooth device, and click “Pair” to start pairing.



3. Select “OK” in the pop-up prompt box to confirm the pairing request.

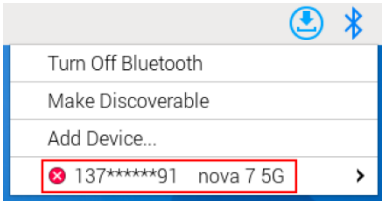


TIP:

You need confirm the pairing request on connected Bluetooth device, otherwise the pairing will fail.

4. After successful Bluetooth pairing, click “OK” in the pop-up prompt to close the page.

5. Left-click the icon in the upper right corner of the desktop to view the connected Bluetooth device.



4.6 Configuring Buzzer

ED-IPC3020 contains a buzzer, which supports manually configure the buzzer to turn on and off.

1. Execute the following commands to detect and install gpiod tools.

   sudo apt update

   sudo apt install gpiod

2. Execute the following commands to check the number of gpiochip.

   gpiodetect

   In the result, the gpiochip of [pinctrl-rp1] (54 lines) is the gpiochip of the buzzer.

3. Execute the following command to turn on and turn off the buzzer.

   - Turn on the buzzer:

     gpioset 4 6=1

     - ✓ 4 indicates the number of gpiochip queried in **step 2**.
     - ✓ 6 indicates that the controlled gpio pin is GPIO6.
     - ✓ 1 indicates the high level.

   - Turn off the buzzer:

     gpioset 4 6=0

     - ✓ 4 indicates the number of gpiochip queried in **step 2**.
     - ✓ 6 indicates that the controlled gpio pin is GPIO6.
     - ✓ 0 indicates the low level.

4.7 Configuring RTC

ED-IPC3020 contains an integrated RTC, which automatically reads the system time synchronously by default, and you can manually read and write the system time into RTC.

- Execute the following command to read the RTC time manually.

  sudo hwclock -r

- Execute the following command to write the system time into RTC.

  sudo hwclock -w

4.8 Configuring Serial Port

This chapter introduces the configuration method of RS232 and RS485.

4.8.1 Installing picocom tool

In the Linux environment, you can use the picocom tool to debug the serial ports RS232 and RS485.

Execute the following command to install the picocom tool.

sudo apt-get install picocom

4.8.2 Configuring RS232

ED-IPC3020 contains 1 RS232 port, and its corresponding COM port and device file are detailed in the following table.

Number of RS232 port	Corresponding COM Port	Corresponding Device File
1	COM1	/dev/com1

Preparation:

The RS232 port of ED-IPC3020 has been connected with external device.

Steps:

1. Execute the following command to open the serial port com1, and configure the serial port baud rate to 115200.

   picocom -b *115200 /dev/com1*

2. Input commands as needed to control external device.

4.8.3 Configuring RS485

ED-IPC3020 contains 1 RS485 port, and its corresponding COM port and device file are detailed in the following table.

Number of RS485 port	Corresponding COM Port	Corresponding Device File
1	COM2	/dev/com2

Preparation:

The RS485 port of ED-IPC3020 has been connected with external device.

Steps:

1. Execute the following command to open the serial port com2, and configure the serial port baud rate to 115200.

   picocom -b *115200 /dev/com2*

2. Input commands as needed to control external device.

4.9 Configuring Audio

ED-IPC3020 contains one audio input (supports access to MIC) and one audio output. The volume of Master and MIC can be adjusted, and it supports audio recording of MIC.

4.9.1 Adjusting The Volume

It supports manual adjustment of MIC and Master volume.

- Adjusting the volume of MIC and Master through desktop icons.

Steps:

1. Click the icon  or  , in the upper right corner of the desktop to open the volume adjustment colume.

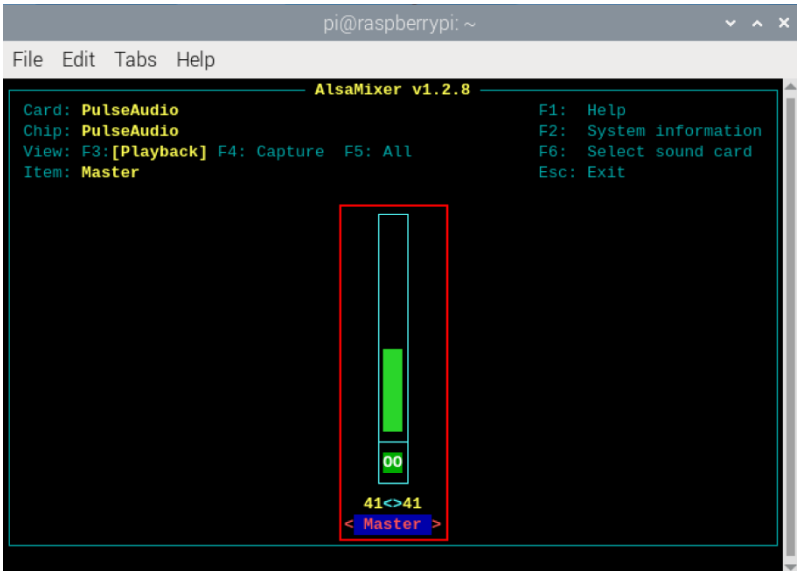
2. Drag the button of the volume adjustment column up and down to adjust the volume, check or uncheck the Mute check box to mute and unmute the audio.

- Opening the volume adjustment interface through the command line to adjust the volume

Steps:

1. Execute the following command to open the volume adjustment interface.

   alsamixer



2. View the volume value of the current Master in the opened interface. You can adjust the volume through the ↑ key and ↓ key on the keyboard, and press the M key to mute and unmute the audio.

Keyboard Key	Function
↑	Volume+
↓	Volume-
M	Mute or Unmute

4.9.2 Configuring Recording

It supports the audio recording of MIC input.

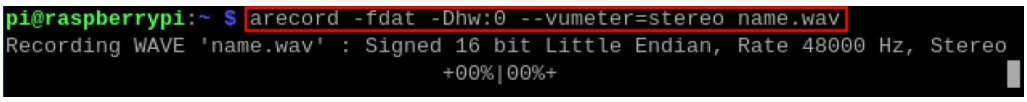
Preparation:

The audio input interface is connected to the MIC, and the MIC is not muted.

Steps:

1. Execute the following command to start recording audio named **name.wav**, as shown in the figure below.

   arecord -f*dat* **-Dhw:***0* **--vumeter=stereo** name.wav



Parameters	Description
dat	Indicating the audio format, and only supports recording in **dat** format.

0	Indicating the sound card for recording, it needs to be obtained by executing **arecord -l** before recording, as shown in the following figure:
	`pi@raspberrypi:~ $ arecord -l`
	`**** List of CAPTURE Hardware Devices ****`
	`card 0: rt5616codec [rt5616-codec], device 0: 1f000a0000.i2s-rt5616-aif1 rt5616-aif1-0 [1f000a0000.i2s-rt5616-aif1 rt5616-aif1-0]`
	`  Subdevices: 1/1`
	`  Subdevice #0: subdevice #0`

name.wav	Indicating the recorded file name, which can be customized by the user.

2. Input Ctrl+C to save and close the recording.

3. Execute the following command to obtain the storage path of the recording file.

pwd

```
pi@raspberrypi:~ $ pwd
/home/pi
```

4.10 Configuring SSD (optional)

ED-IPC3020 supports optional SSD. If the product model contains an SSD, you need to finish creating partition, formatting and mounting before using SSD.

4.10.1 Creating Partition

Preparation:

ED-IPC3020 contains an SSD.

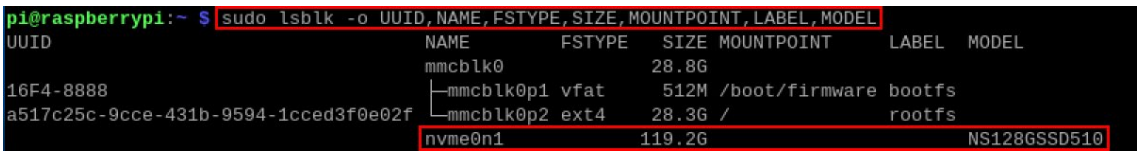
Steps:

1. Run the following command to view all disk partitions on the ED-IPC3020.

   sudo lsblk *-o UUID,NAME,FSTYPE,SIZE,MOUNTPOINT,LABEL,MODEL*

   After running the command, the information displayed is as follows:

   In the figure, the disk whose “NAME” is “nvme0n1” indicates the SSD. As can be seen from the figure below, the SSD is not partitioned.



   - UUID, NAME, FSTYPE, SIZE, MOUNTPOINT, LABEL and MODEL are disk parameters that need to be listed.
   - The types of MOUNTPOINT are “/” and “/boot”.
   - LABEL is the corresponding disk model.
   - FSTYPE indicates the file system type contained.

2. Run the following command to create a partition for the SSD.

   sudo fdisk /dev/nvme0n1

   Set the partition parameters according to the prompts:

```
pi@raspberrypi:~ $ sudo fdisk /dev/nvme0n1

Welcome to fdisk (util-linux 2.38.1).
Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Device does not contain a recognized partition table.
Created a new DOS (MBR) disklabel with disk identifier 0x5153cfa3.

Command (m for help): n
Partition type
   p   primary (0 primary, 0 extended, 4 free)
   e   extended (container for logical partitions)
Select (default p):

Using default response p.
Partition number (1-4, default 1):
First sector (2048-1000215215, default 2048):
Last sector, +/-sectors or +/-size{K,M,G,T,P} (2048-1000215215, default 1000215215):

Created a new partition 1 of type 'Linux' and of size 476.9 GiB.

Command (m for help): w
The partition table has been altered.
Calling ioctl() to re-read partition table.
Syncing disks.
```

3. Run the following command to check whether the partition is created successfully.

   lsblk

```
pi@raspberrypi:~ $ lsblk
NAME        MAJ:MIN RM   SIZE RO TYPE MOUNTPOINTS
mmcblk0     179:0    0  28.8G  0 disk
├─mmcblk0p1 179:1    0   512M  0 part /boot/firmware
└─mmcblk0p2 179:2    0  28.3G  0 part /
nvme0n1     259:0    0 119.2G  0 disk
└─nvme0n1p1 259:1    0 119.2G  0 part
```

   ✓ After executing the command, if the “TYPE” column displays “part”, it means that the partition is successful.

   ✓ After executing the command, if the “TYPE” column does not display “part”, it means that the partition is failed.

4.10.2 Formatting

The SSD of ED-IPC3020 by default is not formatted. After the disk partition is completed, it needs to be formatted into ext4 format.

Preparation:

Disk partitioning of SSD has been completed.

Steps:

Execute the following command to format the SSD named **nvme0n1p1** into ext4 format.

sudo mkfs.ext4 /dev/nvme0n1p1

```
pi@raspberrypi:~ $ sudo mkfs.ext4 /dev/nvme0n1p1
mke2fs 1.47.0 (5-Feb-2023)
Discarding device blocks: done
Creating filesystem with 31258452 4k blocks and 7815168 inodes
Filesystem UUID: 6d7e7a27-a2f9-4f04-b209-8e85ddef767f
Superblock backups stored on blocks:
        32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632, 2654208,
        4096000, 7962624, 11239424, 20480000, 23887872

Allocating group tables: done
Writing inode tables: done
Creating journal (131072 blocks): done
Writing superblocks and filesystem accounting information: done
```

4.10.3 Mounting SSD

The SSD of ED-IPC3020 by default needs to be configured to mount SSD in a specific folder, usually in the “/mnt” folder (such as “/mnt/SSD”).

Preparation:

Partitioning and formatting of the SSD have been completed.

Steps:

1. Run the following command to view all disk partitions on the ED-IPC3020.

   sudo lsblk *-o UUID,NAME,FSTYPE,SIZE,MOUNTPOINT,LABEL,MODEL*

   After running the command, the information displayed is as follows:

   In the figure, the disk whose “NAME” is “nvme0n1p1” indicates the SSD to be mounted.

```
pi@raspberrypi:~ $ sudo lsblk -o UUID,NAME,FSTYPE,SIZE,MOUNTPOINT,LABEL,MODEL
UUID                                 NAME        FSTYPE   SIZE MOUNTPOINT     LABEL  MODEL
                                     mmcblk0              28.8G
16F4-8888                            ├─mmcblk0p1 vfat     512M /boot/firmware bootfs
a517c25c-9cce-431b-9594-1cced3f0e02f └─mmcblk0p2 ext4    28.3G /             rootfs
                                     nvme0n1             119.2G                     NS128GSSD510
6d7e7a27-a2f9-4f04-b209-8e85ddef767f └─nvme0n1p1 ext4    119.2G
```

- UUID, NAME, FSTYPE, SIZE, MOUNTPOINT, LABEL and MODEL are disk parameters that need to be listed.

- The types of MOUNTPOINT are “/” and “/boot”.
- LABEL is the corresponding disk model.
- FSTYPE indicates the file system type contained.

2. Run the following command to obtain the location of disk partition.

   sudo blkid

   After executing the command, the following information is displayed, which the SSD partition is displayed as “/dev/nvme0n1p1”.

3. Create a target folder as the mount point of SSD. Assuming that the mount name is SSD and the directory to be mounted is “/mnt”, the command to be executed is as follows:

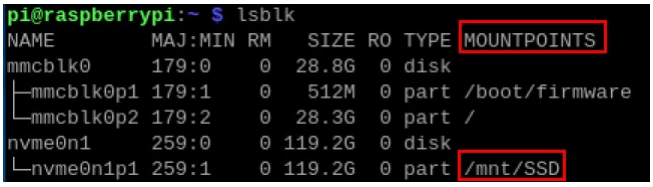
   sudo mkdir */mnt/SSD*

4. Mount the SSD at the created mount point, and execute the following command:

   sudo mount */dev/*nvme0n*1p1 /mnt/SSD*

5. Run the following command to check whether the SSD is mounted successfully.

   lsblk



   ✓ After executing the command, if the display information lists the mount point “/mnt/SSD”, it means the mount of SSD is successful.

   ✓ After executing the command, if the displayed information does not list the mount point information, it means that the mount of SSD is failed.