ED-IPC2400

User Manual

by EDA Technology Co., Ltd

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1 Hardware Manual

This chapter introduces the product overview, packing list, appearance, button, indicator and interface.

1.1 Overview

ED-IPC2400 series is an industrial computer based on Raspberry Pi CM4. According to different application scenarios and user needs, different specifications of RAM and eMMC computer systems can be selected.

• RAM can choose 1GB、2GB、4GB and 8GB.
• eMMC can choose 8GB、16GB and 32GB.

ED-IPC2400 series includes three models, ED-IPC2410, ED-IPC2420 and ED-IPC2430, which provide common interfaces such as HDMI, USB, Ethernet, RS232 and RS485, and support access to the network through Wi-Fi and Ethernet. It integrates RTC, EEPROM and encryption chip, providing the ease of use and reliability of the product, which is mainly used in industrial control and IOT.

1.2 Packing List

• 1x ED-IPC2400 Unit
• [optional Wi-Fi/BT version] 1x 2.4GHz/5GHz Wi-Fi/BT Antenna
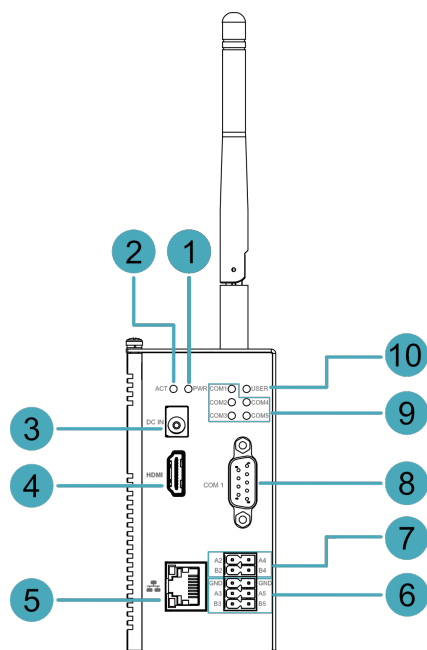
1.3 Appearance

Introducing the functions and definitions of interfaces on each panel.
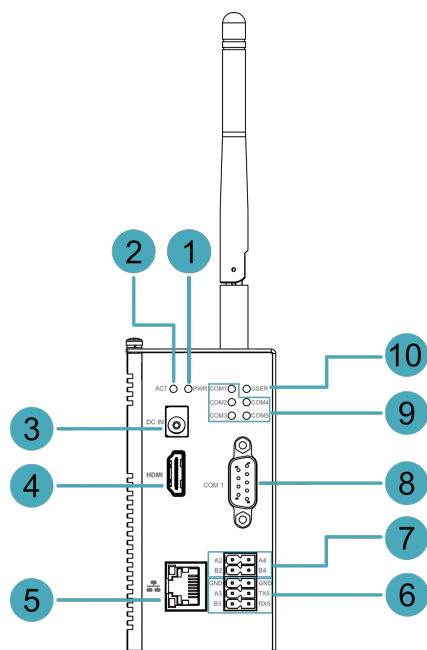
1.3.1 Front Panel

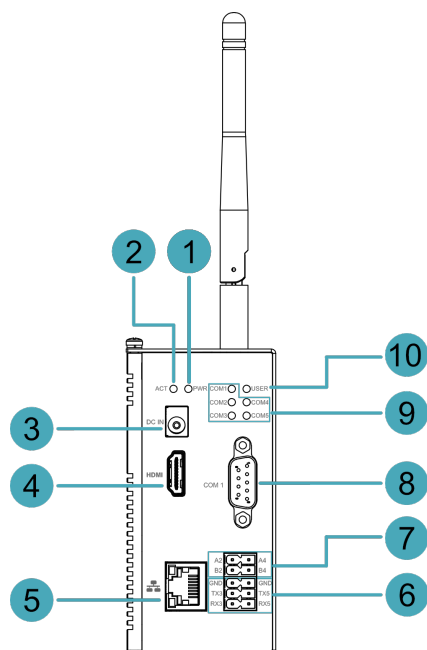Introducing the front panel interface types and definitions.

ED-IPC2410

NO.	Function Definition
1	1 x red power indicator, which is used to check the status of device power-on and power-off.
2	1 x green system status indicator, which is used to check the working status of device.
3	1 x DC input, DC Jack connector. It supports 9V~28V input.
4	1 x HDMI port, type A connector, which is compatibles with HDMI2.0 standard and supports 4K 60Hz. It supports to connect a displayer.
5	1 x 10/100/1000M adaptive ethernet port, RJ45 connector, with led indicator. It can be used to access the network.
6	2 x RS485 ports, 6-Pin 3.5mm spacing phoenix terminal, which is used to connect the third-party control equipment.
7	2 x RS485 ports, 4-Pin 3.5mm spacing phoenix terminal, which is used to connect the third-party control equipment.
8	1 x RS232 port, DB9 male terminal, using pins 2, 3 and 5 of the terminal, the corresponding signal is defined as RX/TX/GND.
9	5 x green UART port indicator, which is used to check the communication status of UART port.
10	1 x green user indicator, user can customize a status according to actual application.

ED-IPC2420

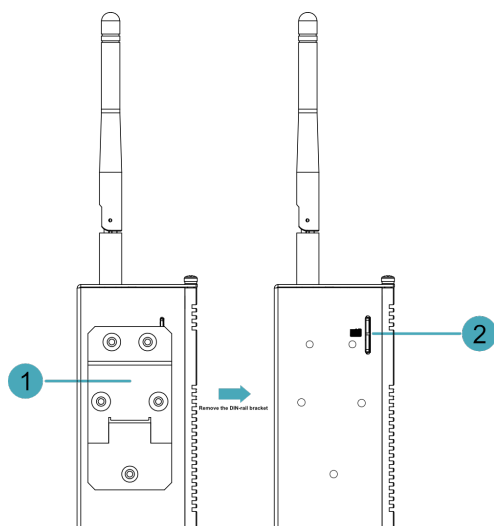| NO.	Function Definition
1	1 x red power indicator, which is used to check the status of device power-on and power-off.
2	1 x green system status indicator, which is used to check the working status of device.
3	1 x DC input, DC Jack connector. It supports 9V~28V input.
4	1 x HDMI port, type A connector, which is compatibles with HDMI2.0 standard and supports 4K 60Hz. It supports to connect a displayer.
5	1 x 10/100/1000M adaptive ethernet port, RJ45 connector, with led indicator. It can be used to access the network.
6	1 x RS485 port, 1 x RS232 port, 6-Pin 3.5mm spacing phoenix terminal, which is used to connect the third-party control equipment.
7	2 x RS485 ports, 4-Pin 3.5mm spacing phoenix terminal, which is used to connect the third-party control equipment.
8	1 x RS232 port, DB9 male terminal, using pins 2, 3 and 5 of the terminal, the corresponding signal is defined as RX/TX/GND.
9	5 x green UART port indicator, which is used to check the communication status of UART port.
10	1 x green user indicator, user can customize a status according to actual application.

ED-IPC2430

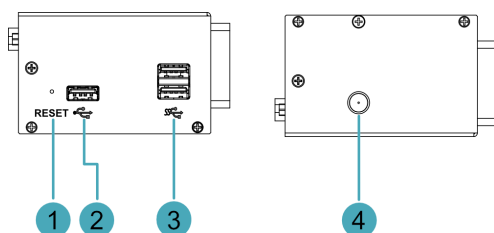| NO.	Function Definition
1	1 x red power indicator, which is used to check the status of device power-on and power-off.
2	1 x green system status indicator, which is used to check the working status of device.
3	1 x DC input, DC Jack connector. It supports 9V~28V input.
4	1 x HDMI port, type A connector, which is compatibles with HDMI2.0 standard and supports 4K 60Hz. It supports to connect a displayer.
5	1 x 10/100/1000M adaptive ethernet port, RJ45 connector, with led indicator. It can be used to access the network.
6	2 x RS232 ports, 6-Pin 3.5mm spacing phoenix terminal, which is used to connect the third-party control equipment.
7	2 x RS485 ports, 4-Pin 3.5mm spacing phoenix terminal, which is used to connect the third-party control equipment.
8	1 x RS232 port, DB9 male terminal, using pins 2, 3 and 5 of the terminal, the corresponding signal is defined as RX/TX/GND.
9	5 x green UART port indicator, which is used to check the communication status of UART port.
10	1 x green user indicator, user can customize a status according to actual application.

1.3.2 Rear Panel

Introducing the types and definitions of the rear panel interface.

NO.	Function Definition
1	1 x DIN-rail bracket, install ED-IPC2400 Unit on the DIN-rail through the bracket.
2	1 x Micro-SD card slot, it supports the installation of SD card for storing user data.

1.3.3 Side Panel

Introducing the types and definitions of side panel interfaces.

NO.	Function Definition
1	1 x Reset button, hidden button, press the button to restart the device.
2	1 x USB 2.0 port, type A connector, each channel supports up to 480Mbps.
3	2 x USB 3.0 ports, type A connector, each channel supports up to 5Gbps.
4	1 x Wi-Fi/BT antenna port, SMA connector, which can connect to Wi-Fi/BT antenna.

1.4 Button

ED-IPC2400 series device includes a RESET button, which is a hidden button, and the silkscreen on the case is "RESET". Pressing the RESET button will reset the device.

1.5 Indicator

Introducing the various statuses and meanings of indicators contained in ED-IPC2400 series device.

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.
USER	On	User can customize a status according to actual application.
	Off	The device is not powered on or not defined by the user, and the default status is off.
Yellow indicator for Ethernet port	On	The data transmission is abnormal.
	Blink	Data is being transmitted over the Ethernet port.
	Off	The Ethernet connection is not set up.
Green indicator for 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.
COM1~COM5	On/Blink	Data is being transmitted.
	Off	The device is not powered on or there is no data transmission.

1.6 Interface

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

1.6.1 SD Card Slot

The silkscreen on the case of Micro SD card slot is "■", which is used to install SD card for storing user data.

1.6.2 Power Supply Interface

The ED-IPC2400 series device includes one power input, DC Jack connector. It supports 9V~28V input, and the silkscreen of port is "DC IN".
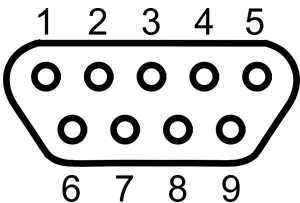
1.6.3 RS485/RS232 Interface

ED-IPC2400 series devices include 2~4 RS485 ports and 1~3 RS232 ports. Different product models correspond to different numbers of RS485 and RS232 ports:

- ED-IPC2410：4 x RS485、1x RS232
- ED-IPC2420：3 x RS485、2x RS232
- ED-IPC2430：2 x RS485、3 x RS232

The silkscreen of RS485 single port is "GND/A/B". The silkscreen of RS232 single port is "GND/TX/RX", and the spacing of the terminals is 3.5mm.

Pin Definition - DB9 Terminal

Terminal pins are defined as follows:

Pin ID	Pin Name
1	NC
2	RS232_TXD0
3	RS232_RXD0
4	NC
5	GND
6	NC
7	NC
8	NC
9	NC

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

Signal	CM4 GPIO Name	CM4 Pin Out
RS232_TXD0	GPIO14	UART0_TXD
RS232_RXD0	GPIO15	UART0_RXD

Pin Definition - Phoenix Terminal

Terminal pins are defined as follows:

Pin ID	Pin Name
1	RS485-4_A
2	RS485-2_A
3	RS485-4_B

4	RS485-2_B
5	GND
6	GND
7	RS232-5_TX or RS485-5_A
8	RS232-3_TX or RS485-3_A
9	RS232-5_RX or RS485-5_B
10	RS232-3_RX or RS485-3_B

The pin names of CM4 corresponding to RS485/RS232 interface are as follows:

Signal	CM4 GPIO Name	CM4 Pin Out
RS485-4_A	GPIO8	UART4_TXD
RS485-2_A	GPIO12	UART5_TXD
RS485-4_B	GPIO9	UART4_RXD
RS485-2_B	GPIO13	UART5_RXD
RS232-5_TX or RS485-5_A	GPIO4	UART3_TXD
RS232-3_TX or RS485-3_A	GPIO0	UART2_TXD
RS232-5_RX or RS485-5_B	GPIO5	UART3_RXD
RS232-3_RX or RS485-3_B	GPIO1	UART2_RXD

Connecting Cables

Schematic diagram of RS485 wires is as follows:
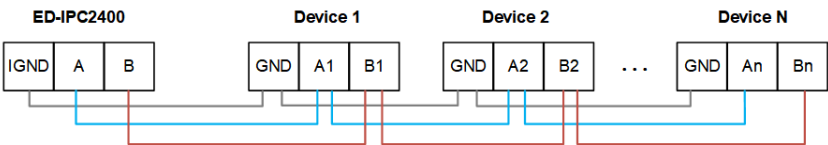
Schematic diagram of RS232 wires is as follows:

RS485 terminal resistance configuration

ED-IPC2400 device includes 2~4 RS485 ports, 120R jumper resistor is reserved between A and B of RS485 line, inserting jumper cap can enable this jumper resistor. The 120R termination resistor

function is disabled when the jumper cap is not connected in the default state. The positions of the jumper resistor in the PCBA is as follows: J24, J25, J26 and J27 (red box location).
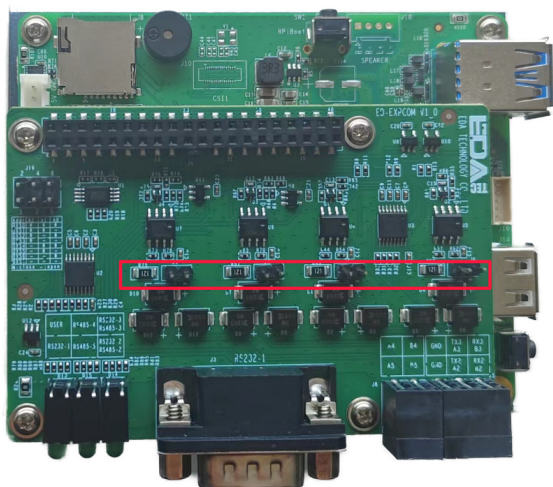
The corresponding relationship between 120R terminal resistance and serial port is as follows:

Location in PCBA	Corresponding COM port	The specific location of the corresponding COM
J24	COM2	
J25	COM4	
J26	COM3	
J27	COM5	

> **TIP**
>
> You need to open the device case to view the position of 120R jumper resistor. For detailed operations, please refer to 2.1.1 Open Device Case.

1.6.4 1000M Ethernet Interface

The ED-IPC2400 device includes one adaptive 10/100/1000M Ethernet port, and the silkscreen is "1000M". The connector is RJ45, which is used to access the Ethernet. The pins corresponding to the terminals are defined as follows:
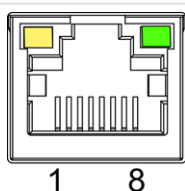
Pin ID	Pin Name
1	TX4-
2	TX4+
3	TX3-

4	TX3+
5	TX2-
6	TX2+
7	TX1-
8	TX1+

1.6.5 HDMI Interface

ED-IPC2400 series device includes one HDMI port, the silkscreen is "HDMI". The connector is type A HDMI, which can connect to an HDMI display and supports up to 4Kp60.

1.6.6 USB 2.0 Interface

ED-IPC2400 series device includes one USB2.0 port, the silkscreen is "![USB]". The connector is type A USB, which can connect to standard USB 2.0 peripherals and supports up to 480Mbps.

1.6.7 USB 3.0 Interface

ED-IPC2400 series device includes 2 USB3.0 ports, the silkscreen is "![USB]". The connector is type A USB, which can connect to standard USB 3.0 peripherals and supports up to 5Gbps.

1.6.8 Antenna Interface

The ED-IPC2400 series device includes up to one SMA antenna port, the silkscreen is "WiFi/BT" and it can be connected to the Wi-Fi/BT antenna.

1.6.9 Motherboard Interface

Introducing the interfaces reserved in the ED-IPC2400 series device, which can be obtained only after the device case is opened(For detailed operations, please refer to 2.1.1 Open Device Case), and can be expanded according to actual needs.
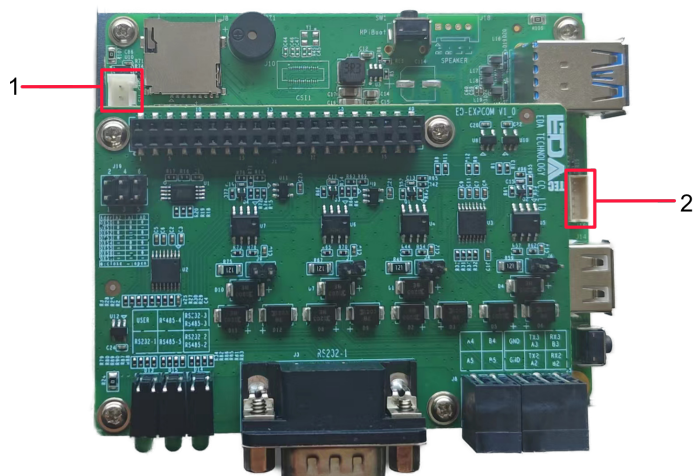
NO.	Function
1	5V 1A Output
2	USB 2.0 Pin Header

1.6.9.1 5V 1A Output

The motherboard of ED-IPC2400 series device includes an extended 5V 1A power 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

1.6.9.2 USB 2.0 Interface

The motherboard of ED-IPC2400 series device includes an extended USB 2.0 Pin Header with 5-Pin 1.5mm spacing WTB connector. It is used to expand a USB 2.0 interface, the pins are defined as follows:

Pin ID	Pin Name
1	VBUS
2	USB_DM
3	USB_DP
4	GND

	5	GND

2 Installing Components

This chapter describes how to install optional components.

2.1 Opening and closing the device case

If the user needs to open the device case, refer to the following to do so.

2.1.1 Open device case

Preparation:

A cross screwdriver has been prepared.

Steps:

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

3. Remove the front cover to the right, as shown in the figure below.
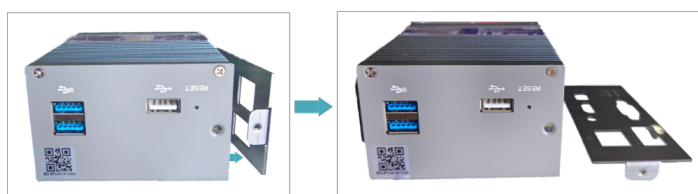
4. Use a screwdriver to loosen four M2.5 screws and one grounding screw on two sides counterclockwise, as shown in the figure below.

5. Remove the upper cover upward and turn it to the antenna port side, as shown in the figure below.
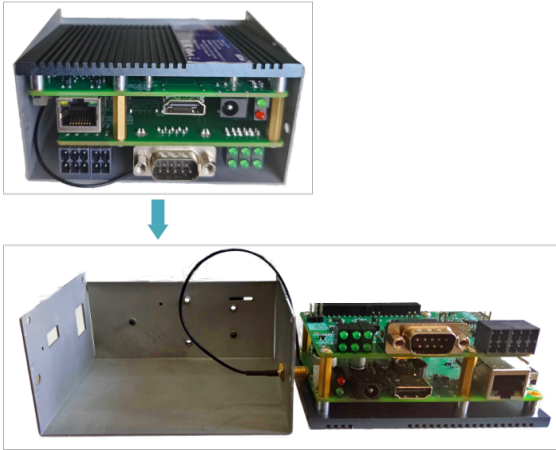
2.1.2 Close Device Case

Preparation:

A cross screwdriver has been prepared.

Steps:

1. Turn the upper cover downwards, align the ports on PCBA with the ports on each side panel and close the upper cover.
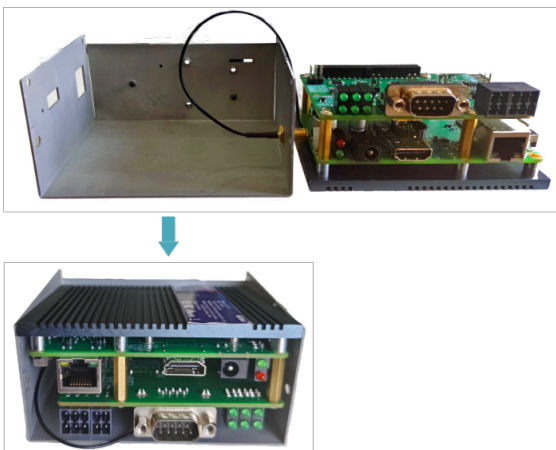
2. Align the screw holes on the upper and side panels, and use a screwdriver to tighten four M2.5 screws and one grounding screw on two sides clockwise, as shown in the following figure.

3. Align the ports on PCBA with the ports on the front panel, insert the front cover, and then use a screwdriver to fasten two M3 screws clockwise, as shown in the following figure.

4. Plug in the default configuration of phoenix connector.

2.2 Installing Other Components

If the selected ED-IPC2400 series device includes Wi-Fi functions, the antenna need to be installed before using the device.

2.2.1 Install Antenna

Preparation:

The corresponding antennas have been obtained from the packaging box.

Steps:

1. Locate the antenna port where the antenna is to be installed, as shown in the figure below.

2. Align the ports on both sides of the device and the antenna, and tighten them clockwise to ensure that they will not fall off.

2.2.2 Install Micro SD Card

Preparation:

The Micro SD card to be used has been obtained.

Steps:

1. Use a cross screwdriver to loosen 5 screws on the DIN-rail bracket counterclockwise and remove the default DIN-Rail bracket. As shown in the figure below.
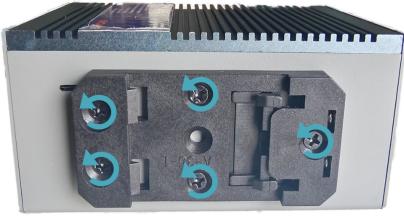
2. Locate the Micro SD card slot where the Micro SD is to be installed, as shown in the red box below.

3. Insert the Micro SD card with the contact side down into the corresponding card slot, and hear a sound to indicate that the installation is complete.
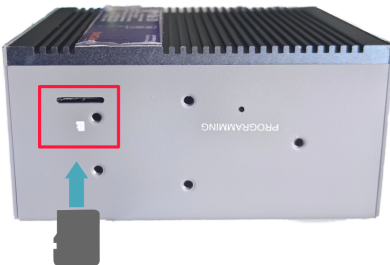
4. Install the DIN-Rail bracket onto the device case.

3 Installing Device

This chapter introduces how to install the device.

3.1 DIN-Rail Installation

When the ED-IPC2400 series device leaves the factory, the DIN-rail bracket is installed as standard by default.

Steps:

1. Face the side of the DIN-rail bracket to the rail to be installed, and the upper side of the bracket is sleeved on the upper side of the rail.
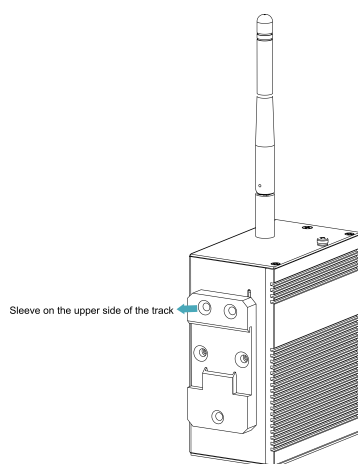
2. Press down the buckle on the lower side of the DIN-rail bracket until the bracket can be buckled on the rail, and the installation is completed.
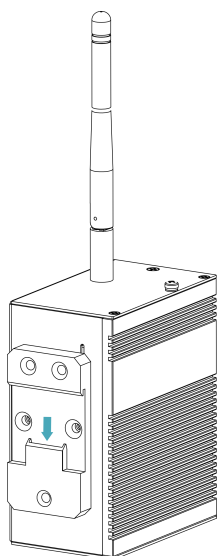
4 Booting the Device

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

4.1 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 Interfaces for the pin definition of each interface and the specific method of wiring.
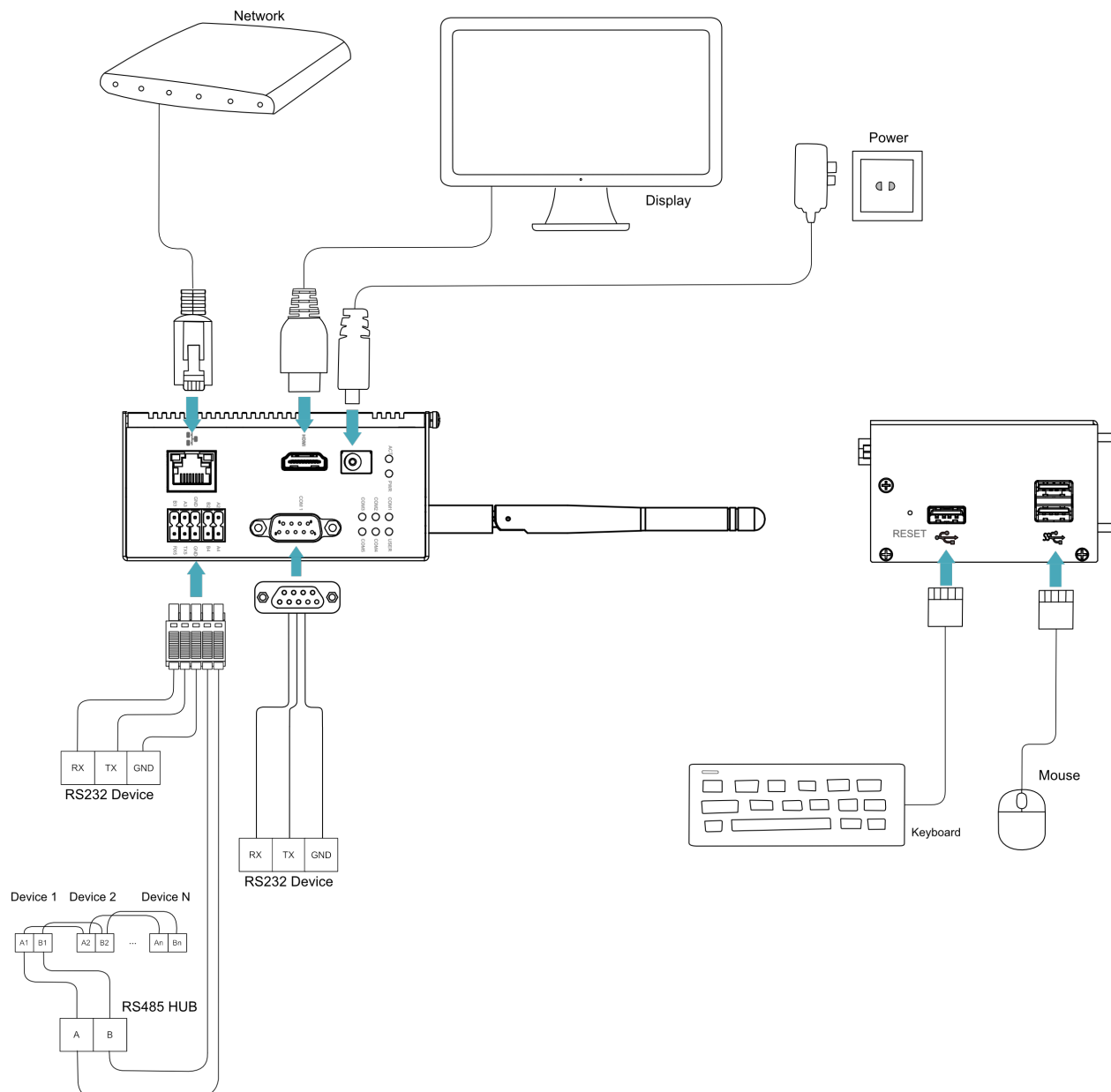
4.2 Booting The System For The First Time

ED-IPC2400 series device has no switching power supply. After the power supply is connected, 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 of Raspberry Pi will appear in the upper left corner of the screen.

> TIP
>
> Default username is `pi` , Default password is `raspberry` .

4.2.1 Raspberry Pi OS (Desktop)

If the Desktop version of the system is installed when the product leaves the factory, after the device is started, it will directly enter the desktop, as shown in the following figure.
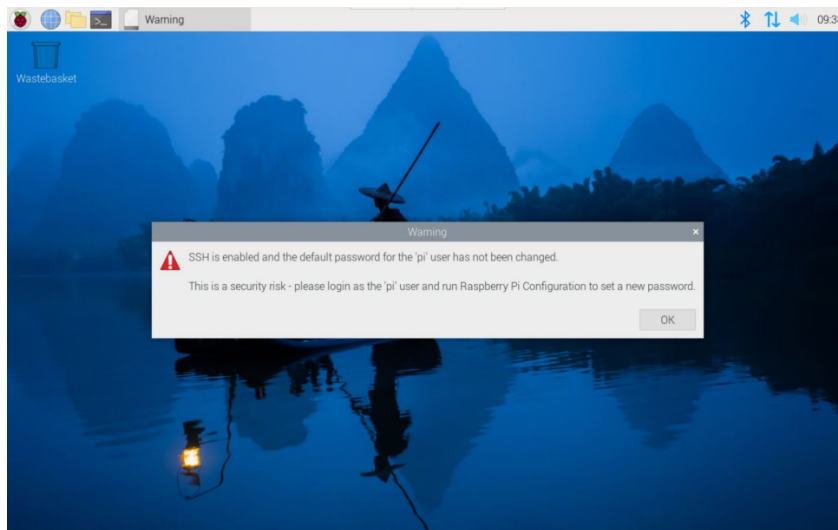
4.2.2 Raspberry Pi OS (Lite)

If the Lite version of the system is installed at the factory, the default username pi will be used to automatically log in after the device is started, and the default password is raspberry. The following figure shows that the system has been started normally.

5 Configuring System

This chapter introduces how to configure system.

5.1 Finding Device IP

Finding Device IP

5.2 Remote Login

Remote Login

5.3 Configuring Storage Devices

Configuring Storage Devices

5.4 Configuring Ethernet IP

Configuring Ethernet IP

5.5 Configuring Wi-Fi (Optional)

Configuring Wi-Fi

5.6 Configuring Bluetooth (Optional)

Configuring Bluetooth

5.7 Configuring Buzzer

Buzzer controlled by GPIO6.

- Turn on the buzzer:

```sh
raspi-gpio set 6 op dh
```

- Turn off the buzzer:

```sh
raspi-gpio set 6 op dl
```

5.8 Configuring RTC

Configuring RTC

5.9 Configuring Serial Port

This chapter introduces the configuration method of RS232 and RS485.

5.9.1 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.

```sh
sudo apt-get install picocom
```

5.9.2 Configuring RS232

ED-IPC2400 includes 1~3 RS232 ports with their corresponding COM ports and device files as follows:

ED-IPC2410

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

ED-IPC2420

Number of RS232 Ports	Corresponding COM Port	Corresponding Device File
2	COM1, COM5	/dev/com1, /dev/com5

ED-IPC2430

Number of RS232 Ports	Corresponding COM Port	Corresponding Device File
3	COM1, COM3, COM5	/dev/com1, /dev/com3, /dev/com5

Preparation:

The RS232 port of ED-IPC2400 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.

```sh
picocom -b 115200 /dev/com1
```

2. Input commands as needed to control external device.

5.9.3 Configuring RS485

ED-IPC2400 includes 4 RS485 ports, and the corresponding COM ports and device files are as follows:

ED-IPC2410

Number of RS485 Ports	Corresponding COM Port	Corresponding Device File
4	COM2, COM3, COM4, COM5	/dev/com2, /dev/com3, /dev/com4, /dev/com5

ED-IPC2420

Number of RS485 Ports	Corresponding COM Port	Corresponding Device File
3	COM2, COM3, COM4	/dev/com2, /dev/com3, /dev/com4

ED-IPC2430

Number of RS485 Ports	Corresponding COM Port	Corresponding Device File
2	COM2, COM4	/dev/com2, /dev/com4

Preparation:

The RS485 port of ED-IPC2400 has been connected with external devices.

Steps:

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

```sh
picocom -b 115200 /dev/com2
```

2. Input commands as needed to control external devices.

5.10 Configuring USER Indicator

USER indicator controlled by GPIO10.

• Light up the USER indicator:

```sh
raspi-gpio set 10 op dl
```

• Turn off the USER indicator:

```sh
raspi-gpio set 10 op dh
```

6 Installing OS (optional)

The device is shipped with an operating system by default. If the OS is corrupted during use or the user needs to replace the OS, it is necessary to re-download the appropriate system image and install it. Our company supports to install the OS by installing the standard Raspberry Pi OS first, and then install the Firmware package.

The following section describes the specific operations of image download, eMMC flashing and installation of Firmware packages.

6.1 Downloading OS File

You can download the corresponding official Raspberry Pi OS file according to your actual needs, the download path is listed below:

OS	Download Path
Raspberry Pi OS(Desktop) 64-bit-bookworm (Debian 12)	https://downloads.raspberrypi.com/raspios_arm64/images/raspios_arm64-2024-07-04/2024-07-04-raspios-bookworm-arm64.img.xz (https://downloads.raspberrypi.com/raspios_arm64/images/raspios_arm64-2024-07-04/2024-07-04-raspios-bookworm-arm64.img.xz)
Raspberry Pi OS(Lite) 64-bit-bookworm (Debian 12)	https://downloads.raspberrypi.com/raspios_lite_arm64/images/raspios_lite_arm64-2024-07-04/2024-07-04-raspios-bookworm-arm64-lite.img.xz (https://downloads.raspberrypi.com/raspios_lite_arm64/images/raspios_lite_arm64-2024-07-04/2024-07-04-raspios-bookworm-arm64-lite.img.xz)
Raspberry Pi OS(Desktop) 32-bit-bookworm (Debian 12)	https://downloads.raspberrypi.com/raspios_armhf/images/raspios_armhf-2024-07-04/2024-07-04-raspios-bookworm-armhf.img.xz (https://downloads.raspberrypi.com/raspios_armhf/images/raspios_armhf-2024-07-04/2024-07-04-raspios-bookworm-armhf.img.xz)
Raspberry Pi OS(Lite) 32-bit-bookworm (Debian 12)	https://downloads.raspberrypi.com/raspios_lite_armhf/images/raspios_lite_armhf-2024-07-04/2024-07-04-raspios-bookworm-armhf-lite.img.xz (https://downloads.raspberrypi.com/raspios_lite_armhf/images/raspios_lite_armhf-2024-07-04/2024-07-04-raspios-bookworm-armhf-lite.img.xz)

> **TIP**
>
> Our engineers are currently adapting and developing firmware packages for Raspberry Pi OS-trixie (Debian 13), so it is temporarily not supported. We recommend using the Raspberry Pi OS-bookworm (Debian 12) version of the operating system.

6.2 Flashing to eMMC

It is recommended to use the Raspberry Pi official tools. The download paths are as follows:

- Raspberry Pi Imager: https://downloads.raspberrypi.org/imager/imager_latest.exe (https:// downloads.raspberrypi.org/imager/imager_latest.exe)
- SD Card Formatter: https://www.sdcardformatter.com/download/ (https:// www.sdcardformatter.com/download/)
- Rpiboot: https://github.com/raspberrypi/usbboot/raw/master/win32/rpiboot_setup.exe (https:// github.com/raspberrypi/usbboot/raw/master/win32/rpiboot_setup.exe)
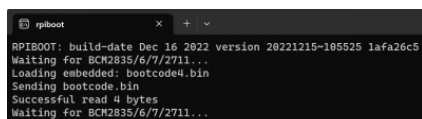
Preparation:

- The downloading and installation of the official tools to the computer have been completed.
- A USB-A to USB-A cable has been prepared.
- The OS file has been obtained.

Steps:

The steps are described using Windows system as an example.

1. When the device is not powered on, press and hold the PROGRAMMING button while connecting the power cord and USB flashing cable (USB-A to USB-A cable). Then, power up the device (release the PROGRAMMING button after powering up).

- Connecting to USB flashing cable: One end is connected to the USB 2.0 port on the device, and the other end is connected to the USB port on the PC.
- Connecting to power cord: One end is connected to the DC jack connector on the device, and the other end is connected to the external power supply.

2. Open rpiboot tool to automatically convert the drive to a letter

3. After the completion of the drive letter, the drive letter will pop up in the lower right corner of the computer.
4. Open SD Card Formatter, select the formatted drive letter, and click "Format" at the lower right to format.

Email: sales@edatec.cn / support@edatec.cn
Web: www.edatec.cn
Phone: +86-15921483028(China) | +86-18217351262(Overseas)
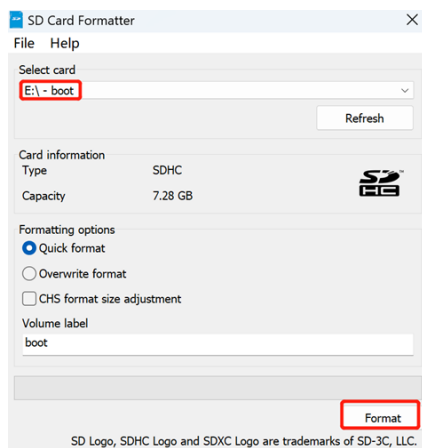
5. In the pop-up prompt box, select "Yes".
6. When the formatting is completed, click "OK" in the prompt box.
7. Close SD Card Formatter.
8. Open Raspberry Pi Imager, select "CHOOSE OS" and select "Use Custom " in the pop-up pane.
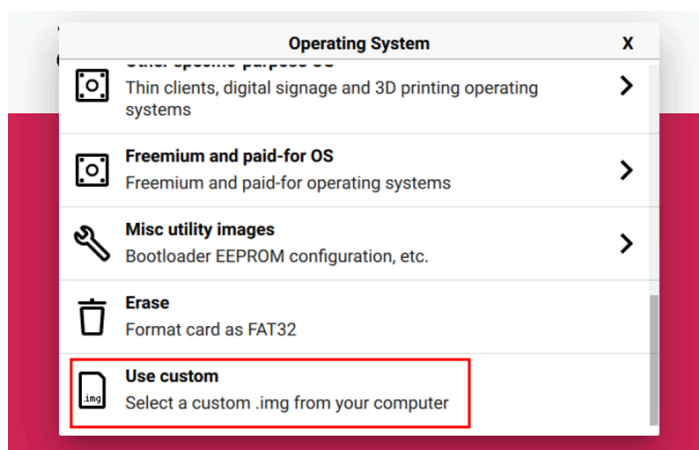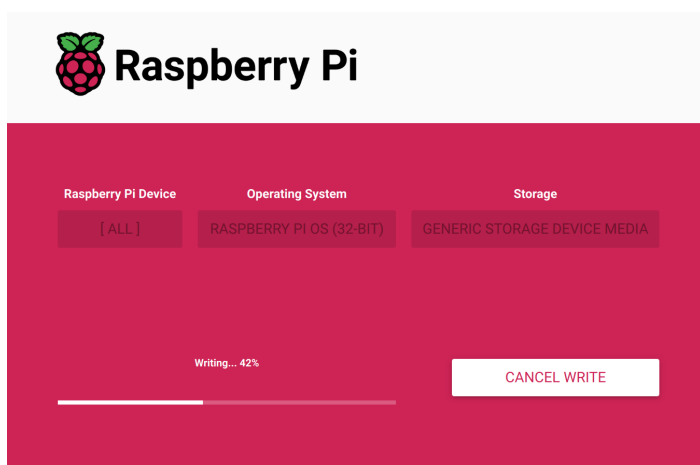

9. According to the prompt, select the OS file under the user-defined path and return to the main page.
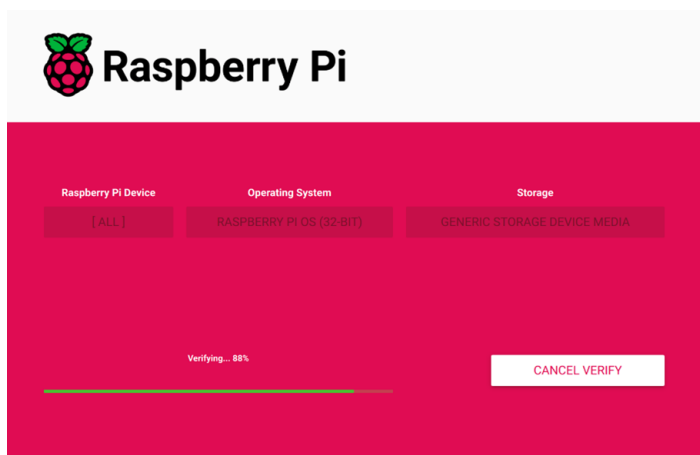10. Click "CHOOSE STORAGE", select the default device in the "Storage" interface, and return to the main page.
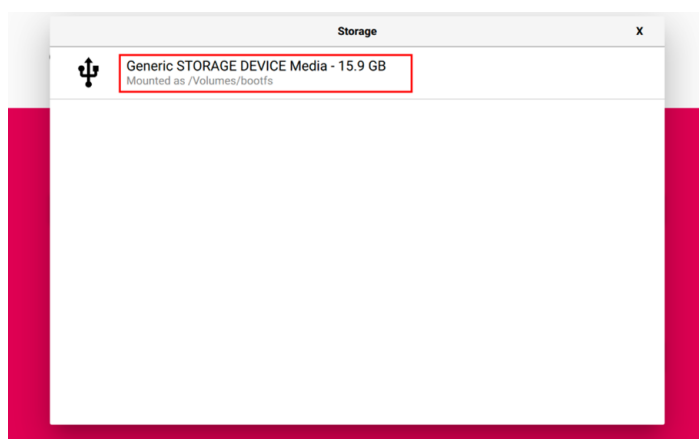
11. Click "NEXT", select "NO " in the pop-up "Use OS customization?" pane.
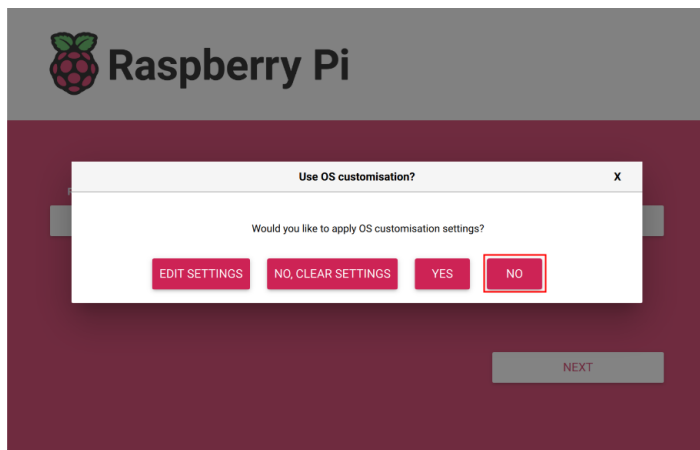
12. Select "YES" in the pop-up "Warning" pane to start writing the image.

13. After the OS writing is completed, the file will be verified.

14. After the verification is completed, click "CONTINUE" in the pop-up "Write Successful" box.
15. Close Raspberry Pi Imager, remove USB cable and power on the device again.

6.3 Installing Firmware Package

After you have finished flashing to eMMC on ED-IPC2400 Series, you need to configure the system by adding edatec apt source and installing firmware package to make the system work. The following is an example of Debian 12 (bookworm) desktop version and ED-IPC2410.

> ### TIP
>
> Our engineers are currently adapting and developing firmware packages for Raspberry Pi OS-trixie (Debian 13), so it is temporarily not supported. We recommend using the Raspberry Pi OS-bookworm (Debian 12) version of the operating system.

Preparation:

- The flashing to eMMC of the Raspberry Pi standard OS (bookworm) has been completed.
- The device has booted normally and the relevant boot configuration has been completed.

Steps: :

1. After the device starts normally, execute the following commands in the command pane to add the edatec apt source and installing firmware package.

```sh
curl -s https://apt.edatec.cn/bsp/ed-install.sh | sudo bash -s ipc2410
```


> ### TIP
>
> If the product models are ED-IPC2420 and ED-IPC2430, the names of the Firmware packages are ipc2420 and ipc2430.

2. After the installation is complete, the system automatically reboots.
3. Execute the following command to check whether the firmware package is installed successfully.

```sh
dpkg -l | grep ed-
```

The result in the picture below indicates that the firmware package has been installed successfully.

> ### TIP

If you have installed the wrong firmware package, you can execute `sudo apt-get --purge remove package` to delete it, where "package" is the package name.