ED-IPC2000

User Manual

by EDA Technology Co., Ltd

built: 2026-07-29

1 Product Overview

ED-IPC2000 series are computers based on Raspberry Pi CM4 for industrial application scenarios. ED-IPC2000 series are compatible with the hardware and software of Raspberry Pi, and its overall size is slightly larger than that of Pi4. It has made a lot of enhancements to industrial applications, adding an aluminum alloy shell outside to greatly improve the heat dissipation performance, and adding additional encryption chips and RTC and other common modules on the board.

1.1 Target Application

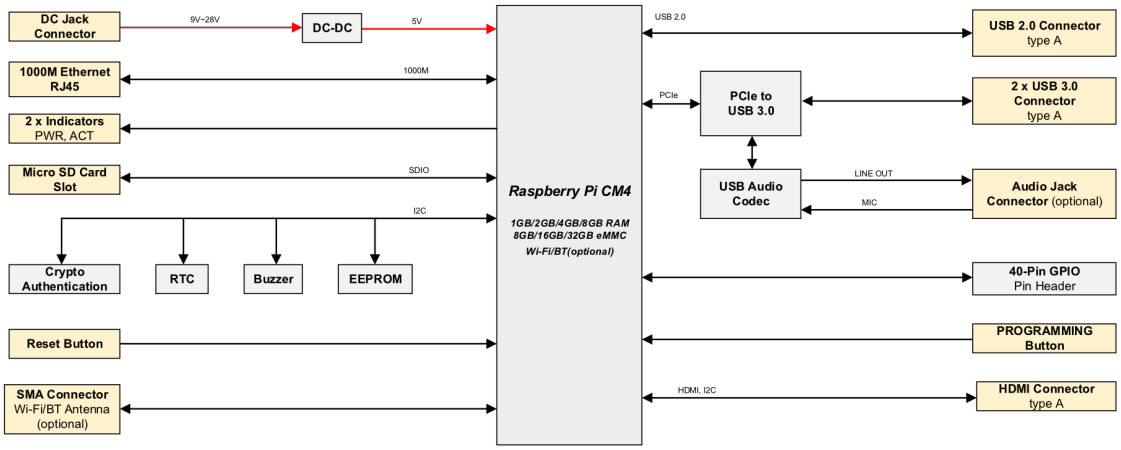
- Multimedia entertainment
- AI development
- Intelligent instrument
- Panoramic display
- Intelligent life

1.2 Specifications and Parameters

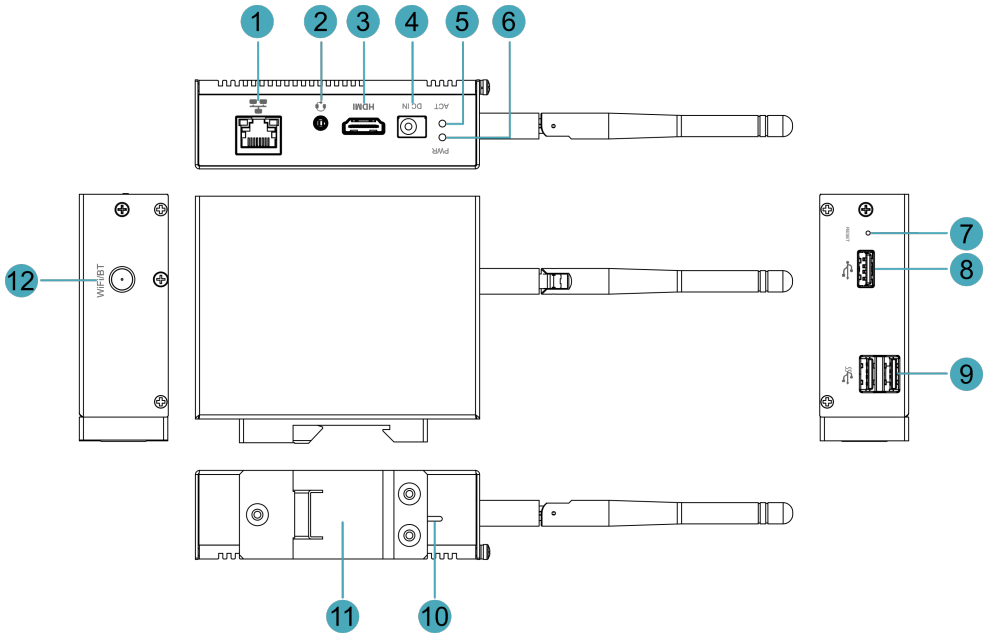
Function	Parameters
CPU	Broadcom BCM2711 4 core Cortex A72 1.5GHz (ARM v8) 64-bit SoC
RAM	1GB/2GB/4GB/8GB optional
eMMC	8GB/16GB/32GB optional
WiFi/BT	2.4GHz and 5GHz dual-band WiFi, Bluetooth 5.0
Ethernet	10/100/1000M adaptive ethernet port
SD card slot	Supports installation of Micro SD card for extended user data storage
HDMI	1x Standard HDMI port, type A connector, compatible with HDMI 2.0 standard, resolution support 4K 60Hz
USB	2x standard USB 3.0 ports, 1x standard USB 2.0 port
Real Time Clock	Support RTC
Encryption Chip	Built-in encryption chip ATECC608
Buzzer	1x buzzer
Audio (optional)	1 x Audio Input/Stereo Output, 3.5mm audio jack that can be used as microphone input and stereo output. Note: Only ED-IPC2020 includes this interface.
40-Pin Connector	Raspberry Pi standard 40-Pin interface
PROGRAMMING Button	Used to flash to eMMC

Function	Parameters
Reset Button	Used to reset the device
LED	Green (system status), red (power supply)
Power Input	Supports 9 ~ 28V input, DC Jack Connector (5.5x2.5mm)
Dimension	102.8mm(W) x 80mm(D) x 32mm(H)
Case	Full metal case, supports DIN rail mounting
Antenna	External antenna
Working environment temperature	-25°C~60°C
OS	Compatible with Raspberry Pi OS

1.3 System Diagram



1.4 Functional layout

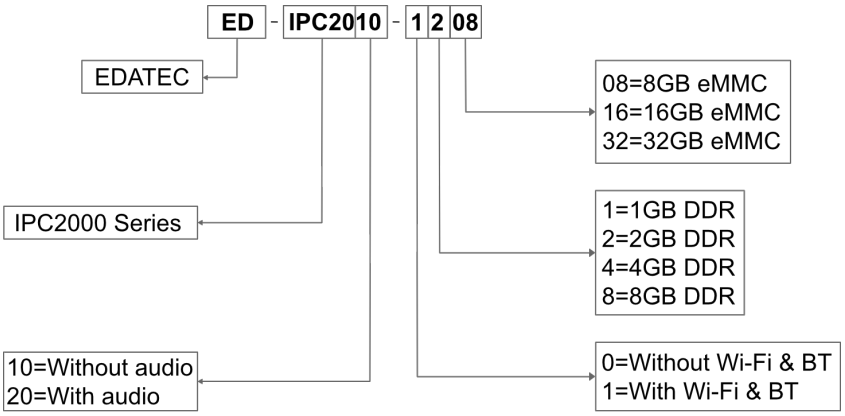


NO.	Function Definition
1	1 x 10/100/1000M adaptive ethernet port, RJ45 connector, with led indicator. It can be used to access the network.
2	1 x Audio input/Stereo output, 3.5mm audio jack connector. It can be used as MIC IN and LINE OUT. • When a headphone is connected, the audio output is switched to the headphone. • When a headphone is not connected, the audio output is switched to the speaker. Note: Only ED-IPC2020 contains this interface.
3	1 x HDMI, Type-A connector, HDMI 2.0 compatible, supports 4K resolution at 60Hz, for connecting to a display.
4	1 x DC Input, DC Jack connector (5.5x2.5mm), supports 9V~28V input.
5	1 x System Status Indicator, green, indicates system read/write data activity.
6	1 x Power Indicator, red, indicates device power status.
7	1 x Reset Button, recessed button. Press to reboot the device.
8	1 x USB 2.0, Type-A connector, supports up to 480Mbps data transfer rate.
9	2 x USB 3.0, Type-A connectors, each supports up to 5Gbps data transfer rate.
10	1 x Micro SD Card Slot, for installing an SD card to store user data. Note: The DIN rail bracket must be removed to access this slot.
11	1 x DIN Rail Bracket, used to mount the ED-IPC2000 series host onto a DIN rail.
12	1 x Wi-Fi/BT Antenna Connector, SMA connector, for connecting Wi-Fi/BT antenna.

1.5 Packing List

- 1x ED-IPC2000 Unit
- [Optional WiFi/BT Version] 1x WiFi/BT Antenna

1.6 Order Code



Example

P/N: **ED-IPC2010-1208**
Configuration: Industrial Computer Based on Raspberry Pi CM4, with Wi-Fi & Bluetooth, 2GB DDR and 8GB eMMC.

2 Quick Start

This chapter introduces the startup of IPC2000 series and some startup settings.

2.1 Equipment List

- 1x ED-IPC2000 Unit
- 1x WiFi/BT antenna
- 1x Mouse
- 1x Keyboard
- 1x HDMI display
- 1x Ethernet Cable
- 1x 12V@2A DC power supply

2.2 Hardware Connection

1. Install the antenna to the antenna connector at the top of the device.
2. Insert the network cable, keyboard and mouse.
3. Plug in HDMI cable and connect the other end to the monitor.
4. Power on the monitor.
5. ED-IPC2000 series have no power switch. Plug in the power cord, and the system will start.
6. Power the 12V@2A power adapter and plug it into the DC power input port of ED-IPC2000 series (marked with +12V DC).
7. The red LED lights up, which means the power supply is normal.
8. The green light starts flashing, indicating that the system starts normally, and then the logo of Raspberry will appear in the upper left corner of the screen.
9. After the system is started, enter Desktop. If prompted to log in, please enter the user name: pi and the default password: raspberry.

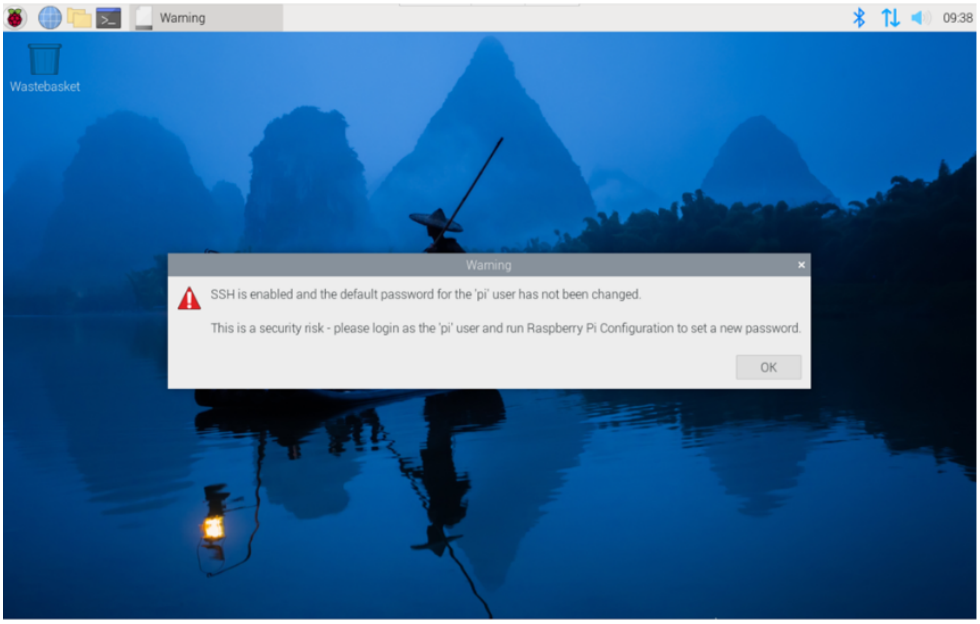
2.3 First Start

ED-IPC2000 series have no power switch. Plug in the power cord and the system will start.

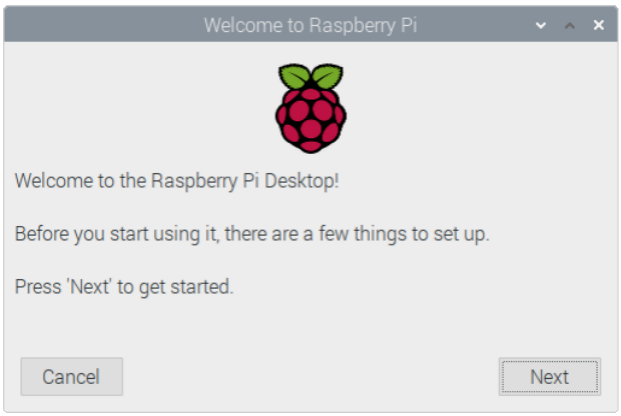
1. power the 12V@2A power adapter and plug it into the DC power input port of ED-IPC2000 series (marked with +12V DC).
2. The red LED lights up, which means the power supply is normal.
3. The green light starts flashing, indicating that the system starts normally, and then the logo of Raspberry will appear in the upper left corner of the screen.

2.3.1 Raspberry Pi OS(Desktop)

After the Desktop version of the system is started, directly enter the desktop.



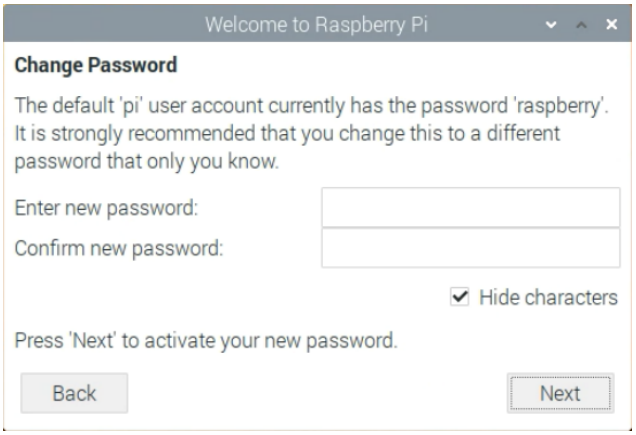
If you use the official system image, and the image is not configured before burning, the Welcome to Raspberry Pi application will pop up and guide you to complete the initialization setting when you start it for the first time.



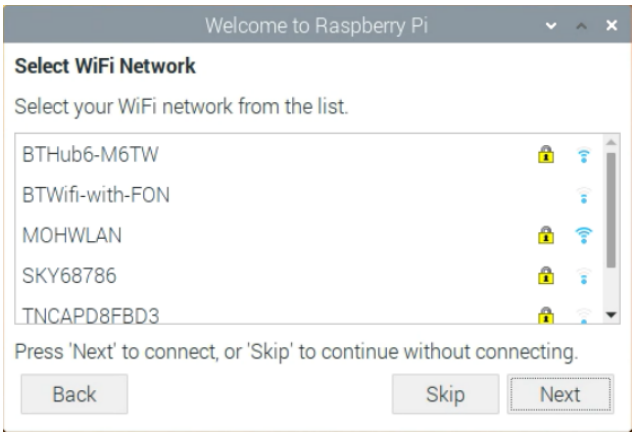
1. Click Next to start the setup.
2. Setting Country, Language and Timezone, click Next

> WARNING
>
> You need to select a country region, otherwise the default keyboard layout of the system is the English keyboard layoutand some special symbols may not be typed.

3. nput a new password for the default account pi, and click Next. Default password is raspberry.

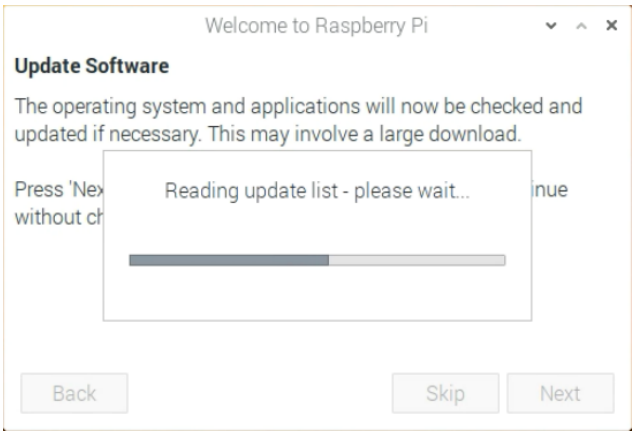


4. Select the wireless network you need to connect to, enter the password, and then click Next.



> WARNING
>
> If your CM4 module does not have a WIFI module, there will be no such step.Before upgrading the system, you need to wait for the wifi connection to be normal (the wifi icon appears in the upper right corner).

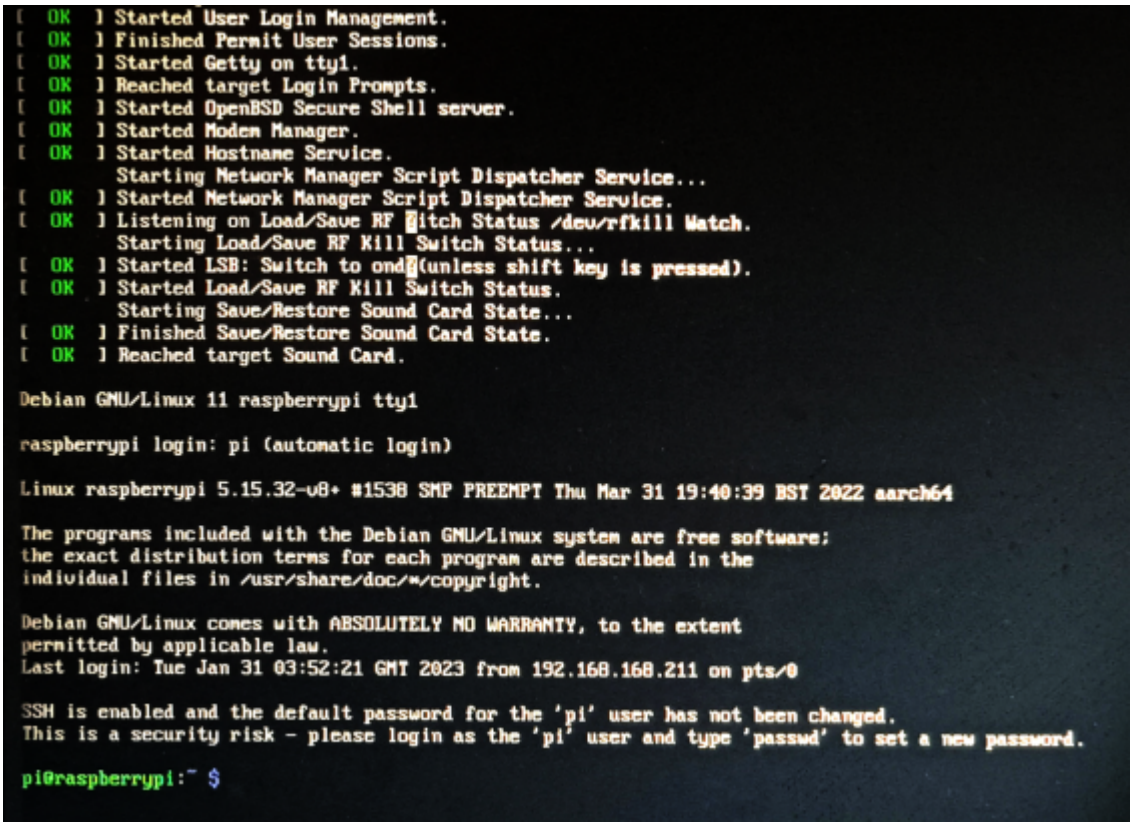
5. Click Next, and the wizard will automatically check and update Raspberry Pi OS.



6. Click Restart to complete the system update.

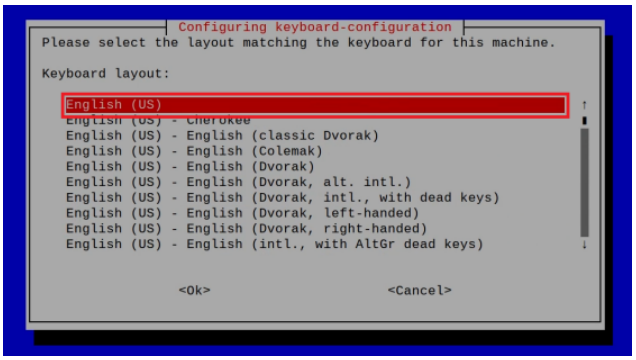
2.3.2 Raspberry Pi OS(Lite)

If you use the system image provided by us, after the system starts, you will automatically log in with the user name pi, and the default password is raspberry.

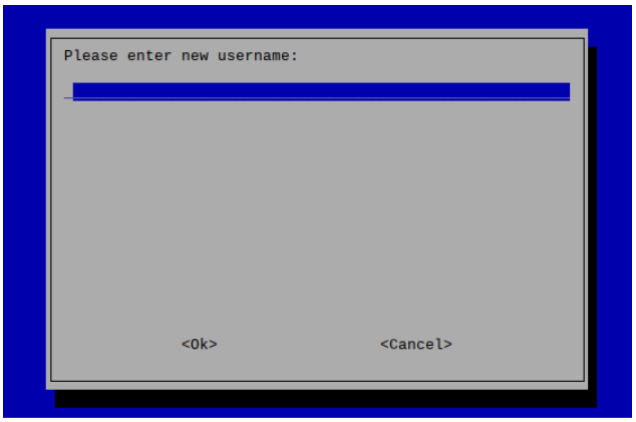


If you use the official system image, and the image is not configured before burning, the configuration window will appear when you start it for the first time. You need to configure the keyboard layout, set the user name and the corresponding password.

1. Set the configuration keyboard layout



2. Creat new user name



3. Then set the password corresponding to the user according to the prompt, and enter the password again for confirmation. At this point, you can log in with the user name and password you just set.

2.3.3 Use SSH

If you use the official image, you need to turn on the SSH function.

2.3.3.1 raspi-config

```sh
sudo raspi-config
```

1. Choose 3 Interface Options
2. Choose I2 SSH
3. Would you like the SSH server to be enabled? Select Yes
4. Choose Finish

2.3.3.2 Add Empty FileTo Enable SSH

Put an empty file named ssh in the boot partition, and the SSH function will be automatically enabled after the device is powered on.

2.3.4 Get The Device IP

- If the display screen is connected, you can use the ifconfig command to find the current device IP.
- If there is no display screen, you can view the assigned IP through the router.
- If there is no display screen, you can download the nmap tool to scan the IP under the current network.

Nmap supports Linux, macOS, Windows and other platforms. If you want to use nmap to scan the network segments from 192.168.3.0 to 255, you can use the following command：

```sh
nmap -sn 192.168.3.0/24
```

After waiting for a period of time, the result will be output.

```sh
Starting Nmap 7.92 ( https://nmap.org ) at 2022-12-30 21:19
Nmap scan report for 192.168.3.1 (192.168.3.1)
Host is up (0.0010s latency).
MAC Address: XX:XX:XX:XX:XX:XX (Phicomm (Shanghai))
Nmap scan report for DESKTOP-FGEOUUK.lan (192.168.3.33)
Host is up (0.0029s latency).
MAC Address: XX:XX:XX:XX:XX:XX (Dell)
Nmap scan report for 192.168.3.66 (192.168.3.66)
Host is up.
Nmap done: 256 IP addresses (3 hosts up) scanned in 11.36 seconds
```

3 Wiring Guide

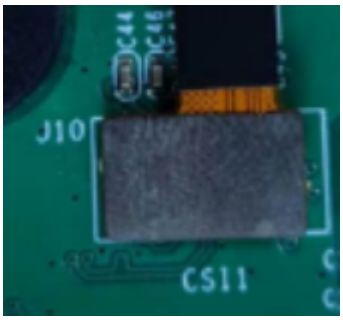
3.1 Panel I/O

3.1.1 MicroSD Card Slot

3.2 Internal I/O

3.2.1 CSI (optional)

J10 is a CSI interface, which can be installed directly with our camera.

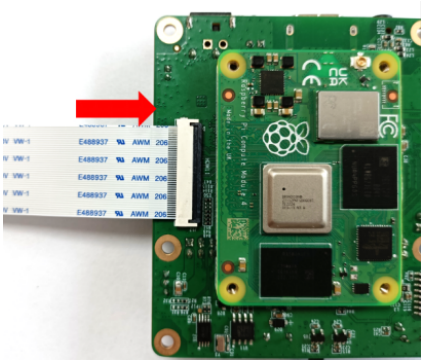


> TIP
>
> Only ED-IPC2020 includes this interface.

3.2.2 FPC DSI (optional)

J11 is the display interface.

The DSI interface should be connected with a single-sided FPC cable with a spacing of 15 pin 1mm, with the metal contact face up and inserted in the direction perpendicular to the FPC connector, as shown in the following figure.



4 Software Operation Guide

4.1 USB

4.1.1 Check USB Device Information

List USB device

```sh
lsusb
```

The information displayed is as follows:

```sh
Bus 002 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 001 Device 005: ID 1a2c:2d23 China Resource Semico Co., Ltd Keyboard
Bus 001 Device 004: ID 30fa:0300  USB OPTICAL MOUSE
Bus 001 Device 003: ID 0424:9e00 Microchip Technology, Inc. (formerly SMSC) LAN9500A/LAN9500Ai
Bus 001 Device 002: ID 1a40:0201 Terminus Technology Inc. FE 2.1 7-port Hub
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
```

4.1.2 USB Storage Device Mounting

You can connect an external hard disk, SSD or USB stick to any USB port on Raspberry Pi and mount the file system to access the data stored on it.

By default, your Raspberry Pi will automatically mount some popular file systems, such as FAT, NTFS and HFS+, in the location of /media/pi/HARD-DRIVE-LABEL.

In general, you can directly use the following commands to mount or unmount external storage devices.

```sh
lsblk

NAME        MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
sda           8:0    1 29.1G  0 disk
└─sda1        8:1    1 29.1G  0 part
mmcblk0     179:0    0 59.5G  0 disk
├─mmcblk0p1 179:1    0  256M  0 part /boot
└─mmcblk0p2 179:2    0 59.2G  0 part /
```

Use the mount command to mount sda1 to the /mnt directory. After the mount is completed, users can directly operate storage devices in the /mnt directory.

```sh
sudo mount /dev/sda1 /mnt
```

After using, use the command umount to uninstall the storage device.

```sh
sudo umount /mnt
```

4.1.2.1 Mount

You can install the storage device in a specific folder location. It is usually done in the /mnt folder, such as /mnt/mydisk. Please note that the folder must be empty.

1. Insert the storage device into the USB port on the device.
2. Use the following command to list all disk partitions on Raspberry Pi:

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

Raspberry Pi uses mount points/and /boot. Your storage device will appear in this list, along with any other connected storage devices.

3. Use the Size, Label and Model columns to identify the name of the disk partition that points to your storage device. For example, sda1.
4. The FSTYPE column contains file system types. If your storage device uses the exFAT file system, please install the exFAT driver:

```sh
sudo apt update
sudo apt install exfat-fuse
```

5. If your storage device uses NTFS file system, you will have read-only access to it. If you want to write to the device, you can install the ntfs-3g driver:

```sh
sudo apt update
sudo apt install ntfs-3g
```

6. Run the following command to get the location of the disk partition:

```sh
sudo blkid
```

like, /dev/sda1

7. Create a target folder as the mount point of the storage device. The mount point name used in this example is mydisk. You can specify a name of your choice:

```sh
sudo mkdir /mnt/mydisk
```

8. Mount the storage device at the mount point you created:

```sh
sudo mount /dev/sda1 /mnt/mydisk
```

9. Verify that the storage device has been successfully mounted by listing the following:

```sh
ls /mnt/mydisk
```

> WARNING
>
> If there is no desktop system, external storage devices will not be automatically mounted.

4.1.2.2 Unmount

When the device is turned off, the system will unmount the storage device so that it can be pulled out safely. If you want to uninstall the device manually, you can use the following command:

```sh
sudo umount /mnt/mydisk
```

If you receive a "destination busy" error, it means that the storage device has not been unmounted. If no error is displayed, you can safely unplug the device now.

4.1.2.3 Set Up Automatic Mount InThe Command Line

You can modify the fstab setting to mount automatically.

1. First, you need to get the disk UUID.

```sh
sudo blkid
```

2. Find the UUID of the mounted device, such as 5C24-1453.
3. Open the fstab file

```sh
sudo nano /etc/fstab
```

4. Add the following to the fstab file

```sh
UUID=5C24-1453 /mnt/mydisk fstype defaults,auto,users,rw,nofail 0 0
```

Replace fstype with the type of your file system, which you can find in step 2 of "Mounting storage devices" above, for example, ntfs.

5. If the file system type is FAT or NTFS, add umask = 000 immediately after nofail, which will allow all users to have full read/write access to every file on the storage device.

Information about more fstab commands can be viewed using man fstab.

4.2 Ethernet Configuration

4.2.1 Gigabit Ethernrt

There is an adaptive 10/100/1000Mbsp Ethernet interface on CM4 Sensing, which is adjacent to the DC power socket. It is recommended to use Cat6 (Category 6) network cable to cooperate with it. By default, the system uses DHCP to automatically obtain IP.

4.2.2 Using The NetworkManager To Configure

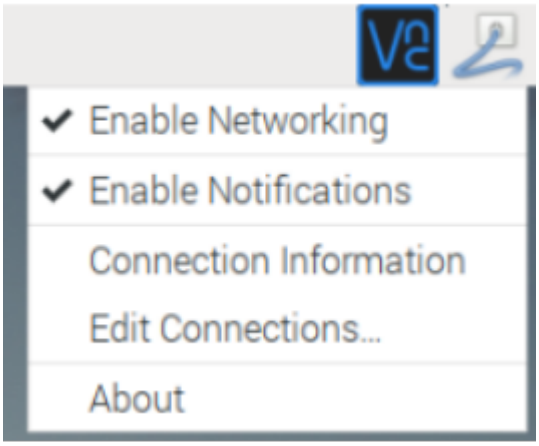
If you use the desktop image, it is recommended to install the NetworkManager plug-in network-manager-gnome. After installation, you can directly configure the network through the desktop icon.

```sh
sudo apt update
sudo apt install network-manager-gnome
sudo reboot
```

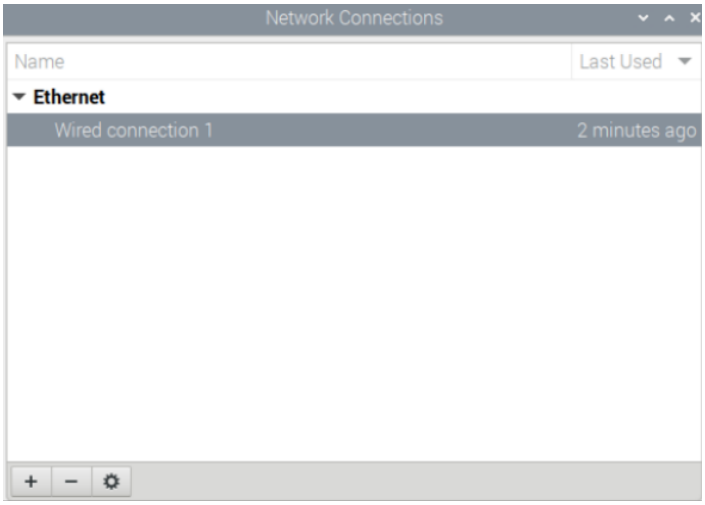
> TIP
>
> If we use our factory image, the network-manager tool and the network-manager-gnome plug-in are installed by default，If we use our factory image, the NetworkManager service is automatically started and the dhcpcd service is disabled by default.

After the installation is completed, you will see the NetworkManager icon in the status bar of the system desktop.

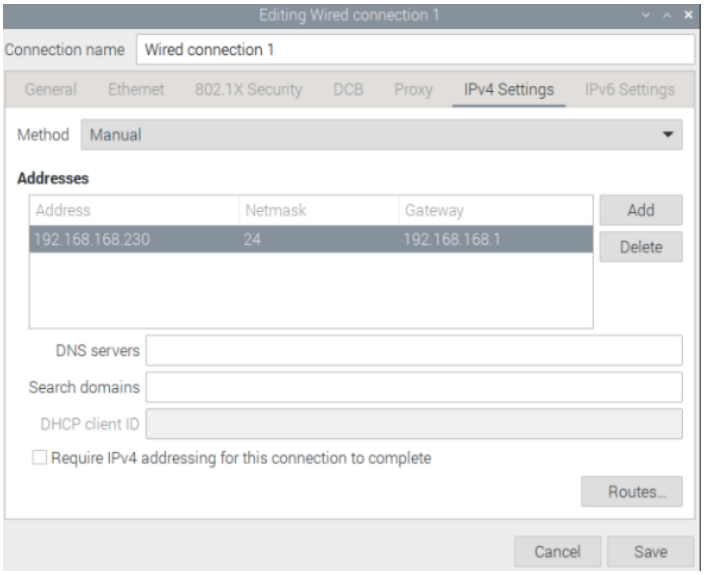
Right-click the NetworkManager icon and select Edit Connections.



Select the connection name to modify, and then click the gear below.



Switch to the configuration page of IPv4 Settings. If you want to set static IP, the Method selects Manual, and Addresses the IP you want to configure. If you want to set it as dynamic IP acquisition, just configure the Method as Automatic(DHCP) and restart the device.



If you use the Lite version of the system, you can configure it through the command line.

If you want to use the command to set the static IP for the device, you can refer to the following methods.

Set the static IP

```sh
sudo nmcli connection modify <name> ipv4.addresses 192.168.1.101/24 ipv4.method manual
```

Set the gateway

```sh
sudo nmcli connection modify <name> ipv4.gateway 192.168.1.1
```

Set dynamic IP acquisition

```sh
sudo nmcli connection modify <name> ipv4.method auto
```

4.2.3 Configuration With dhcpcd Tool

The official system of Raspberry Pi uses dhcpcd as the network management tool by default.

If you use the factory image provided by us and want to switch from NetworkManager to dhcpcd network management tool, you need to stop and disable NetworkManager service and enable dhcpcd service first.

```sh
sudo systemctl stop NetworkManager
sudo systemctl disable NetworkManager
sudo systemctl enable dhcpcd
sudo reboot
```

The dhcpcd tool can be used after the system is restarted.

Static IP can be set by modifying/etc/dhcpcd.conf. For example, eth0 can be set, and users can set wlan0 and other network interfaces according to their different needs.

```sh
interface eth0
static ip_address=192.168.0.10/24
static routers=192.168.0.1
static domain_name_servers=192.168.0.1 8.8.8.8 fd51:42f8:caae:d92e::1
```

4.3 WiFi (optional)

Customers can purchase ED-IPC2000 series with WiFi version, which supports 2.4 GHz and 5.0 GHz IEEE 802.11 b/g/n/ac dual-band WiFi. We provide dual-band external antenna, which has passed wireless authentication together with Raspberry Pi CM4.

4.3.1 Enable WiFi

The WiFi function is blocked by default, so you need to set the country region before you can use it. If you use the desktop version of the system, please refer to the chapter: Initialization Settings Configure WiFi. If you use the Lite version of the system, please use raspi-config to set the WiFi country area. Please refer to the documentation. : "Raspberry Pi official documents - Using the Command Line"

4.3.1.1 Configure Using The Network Manager Tool

After installing the desktop plug-in, you can directly connect to the WIFI network through the desktop icon.

You can also use the command line to execute the following commands:

Scan WIFI

```sh
sudo nmcli device wifi
```

Connect WIFI with password

```sh
sudo nmcli device wifi connect <SSID> password <password>
```

Set up WIFI automatic connection

```sh
sudo nmcli connection modify <name> connection.autoconnect yes
```

4.3.1.2 Configure Using The dhcpcd Tool

The official system of Raspberry Pi uses dhcpcd as the network management tool by default.

```sh
sudo raspi-config
```

1. Choose 1 System Options
2. Choose S1 Wireless LAN
3. Choose your country in Select the country in which the Pi is to be used ，than choose OK，This prompt only appears when setting up WIFI for the first time.
4. Please enter SSID，input WIFI SSID
5. Please enter passphrase. Leave it empty if none，input password than restart the device

4.3.2 External Antenna and Internal PCB Antenna

You can switch whether to use an external antenna or a built-in PCB antenna through software configuration. Considering compatibility and widest support, the factory default system is the built-in PCB antenna. If the customer chooses a complete machine with a case and equipped with an external antenna, you can switch by the following operations:

Edit /boot/config.txt

```sh
sudo nano /boot/config.txt
```

Choose external antenna add

```sh
dtparam=ant2
```

Then reboot the device.

4.3.3 AP and Bridge Mode

WiFi on ED-IPC2000 series also supports configuration in AP router mode, bridge mode or mixed mode.

Please refer to the open source project github: garywill/linux-router (https://github.com/garywill/linux-router) to learn how to configure it.

4.4 Bluetooth (optional)

ED-IPC2000 series can be selected whether the Bluetooth function is integrated or not. If it is equipped with Bluetooth, this function is turned on by default.

Bluetoothctl can be used to scan, pair and connect Bluetooth devices. Please refer to the ArchLinux-Wiki-Bluetooth (https://wiki.archlinux.org/title/bluetooth) guide to configure and use Bluetooth.

4.4.1 Usage

Scan：

```sh
bluetoothctl scan on/off
```

Find：

```sh
bluetoothctl discoverable on/off
```

Trust device：

```sh
bluetoothctl trust [MAC]
```

Connect device：

```sh
bluetoothctl connect [MAC]
```

Disconnect device：

```sh
bluetoothctl disconnect [MAC]
```

4.4.2 Example

Into bluetootch shell

```sh
sudo bluetoothctl
```

Enable Bluetooth

```sh
power on
```

Scan device

```sh
scan on

Discovery started
[CHG] Controller B8:27:EB:85:04:8B Discovering: yes
[NEW] Device 4A:39:CF:30:B3:11 4A-39-CF-30-B3-11
```

Find the name of the turned-on Bluetooth device, where the name of the turned-on Bluetooth device is test.

```sh
devices

Device 6A:7F:60:69:8B:79 6A-7F-60-69-8B-79
Device 67:64:5A:A3:2C:A2 67-64-5A-A3-2C-A2
```

```
Device 56:6A:59:B0:1C:D1 Lefun
Device 34:12:F9:91:FF:68 test
```

Pair device

```sh
pair 34:12:F9:91:FF:68
Attempting to pair with 34:12:F9:91:FF:68
[CHG] Device 34:12:F9:91:FF:68 ServicesResolved: yes
[CHG] Device 34:12:F9:91:FF:68 Paired: yes
Pairing successful
```

Add as trusted device

```sh
trust 34:12:F9:91:FF:68
[CHG] Device 34:12:F9:91:FF:68 Trusted: yes
Changing 34:12:F9:91:FF:68 trust succeeded
```

4.5 RTC

ED-IPC2000 series are integrated with RTC. For the version sold in China, we will install CR1220 button cell (RTC backup power supply) by default when shipping. In this way, the system can be guaranteed to have an uninterrupted and reliable clock, which is not affected by factors such as equipment power down.

The default shipping system image will integrate the RTC automatic synchronization service we wrote, so guests can automatically synchronize the clock without setting it, and can use RTC without feeling. The general principle is:

- When the system is turned on, the service automatically reads the saved time from RTC and synchronizes it to the system time.
- If there is an Internet connection, the system will automatically synchronize the time from the NTP server and update the local system time with Internet time.
- When the system is shut down, the service automatically writes the system time into RTC and updates the RTC time.
- Because of the installation of button cell, although CM4 Sensing is powered off, RTC is still working and timing.

In this way, we can ensure that our time is accurate and reliable.

> WARNING
>
> If it is the first time to boot, because there is no effective time in RTC, synchronization may fail, so just restart it directly. When rebooting, the system time will be written into RTC for normal use.

If you don't want to use this service, you can turn it off manually:

```sh
sudo systemctl disable rtc
sudo reboot
```

Re-enable this service：

```sh
sudo systemctl enable rtc
sudo reboot
```

Read RTC manually：

```sh
sudo hwclock -r2022-11-09 07:07:30.478488+00:00
```

Manually synchronize RTC time to the system:

```sh
sudo hwclock -s
```

Write the system time into RTC

```sh
sudo hwclock -w
```

Trouble Shooting

Please first check whether there is an rtc device (/dev/rtc0) mount:

```sh
ls /dev/rtc0
```

if not, maybe you used the official standard system, but didn't install our BSP package. Please refer to the chapter Install BSP Online Based On The Original Raspberry Pi OS. In addition, you also need to install ed-rtc package to enable RTC automatic synchronization.

Other possible checkpoints:

- l Is CR1220 button cell installed?
- l NTP network time protocol, you need to connect to the Internet to synchronize the time automatically, and you need to open the port (UDP, 123), otherwise the synchronization will fail.

4.6 LED Indicatior

ED-IPC2000 series have two indicators, the red LED is connected with the LED_PI_nPWR pin of CM4, which is the power indicator light, and the green LED is connected with the LED_PI_nACTIVITY pin of CM4, which is the running status indicator light.

4.7 Buzzer

The buzzer is controlled by GPIO6.

Open buzzer:

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

Close buzzer

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

4.8 Encryption Chip

Install atecc tool: atecc-util (https://github.com/wirenboard/atecc-util)

For more encryption chip usage, please refer to the README document in the link.

4.9 Camera (optional)

If the device is equipped with a camera, you can use the command:

Check camera

```sh
libcamera-hello
```

Camera shots

```sh
libcamera-jpeg -o test.jpg
```

Record 10 seconds of video

```sh
libcamera-vid -t 10000 -o test.h264
```

Play the video you just recorded

```sh
vlc test.h264
```

> TIP
>
> Only ED-IPC2020 includes this interface

4.10 Audio (optional)

> TIP
>
> Only ED-IPC2020 includes this interface.

4.10.1 Check Sound Card

Users can use the following commands to view sound card devices:

```sh
aplay -l
```

4.10.2 Recording

Users can record with the following commands:

```sh
arecord -fcd test.mp3
```

It also supports users to specify sound card devices for recording:

```sh
arecord -fcd -Dhw:<sound card number> test.mp3
```

For more usage of arecord, users can view it with the following commands:

```sh
man arecord
```

4.10.3 Playback

Users can use the following commands to play sounds:

```sh
aplay test.mp3
```

It also supports users to specify sound card devices for recording:

```sh
aplay -Dhw:<sound card number> test.mp3
```

For more usage of aplay, users can check it with the following command:

```sh
man aplay
```

4.11 Serial Communication

4.11. 1 Install picocom Tool

Picocom serial terminal can be debugged conveniently in Linux environment.

First install picocom

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

You can type Ctrl+a first, and then Ctrl+h to see the available commands.

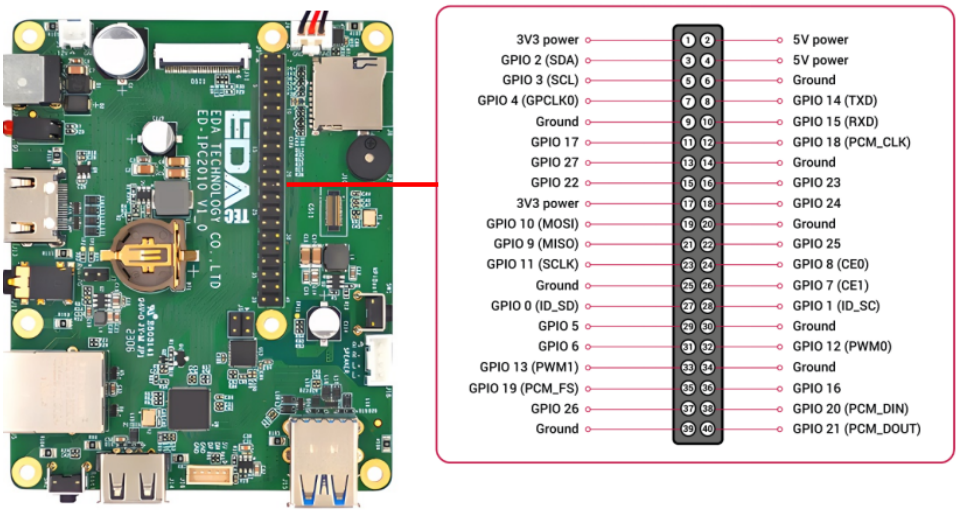
```sh
*** Picocom commands (all prefixed by [C-a])

*** [C-x] : Exit picocom
*** [C-q] : Exit without reseting serial port
*** [C-b] : Set baudrate
*** [C-u] : Increase baudrate (baud-up)
*** [C-d] : Decrease baudrate (baud-down)
*** [C-i] : Change number of databits
*** [C-j] : Change number of stopbits
*** [C-f] : Change flow-control mode
*** [C-y] : Change parity mode
*** [C-p] : Pulse DTR
*** [C-t] : Toggle DTR
*** [C-g] : Toggle RTS
*** [C-|] : Send break
*** [C-c] : Toggle local echo
*** [C-w] : Write hex
*** [C-s] : Send file
*** [C-r] : Receive file
```

```
*** [C-v] : Show port settings
*** [C-h] : Show this message
```

Type Ctrl+a first, then Ctrl+c to switch the local echo mode.

Type Ctrl+a first, then Ctrl+q to exit picocom.

4.11.2 Debug UART



There is a debugging serial port in ED-IPC2000 series 40Pin, and GPIO14 GPIO15 are read and write pins respectively.

In addition, users need to use the raspi-config tool to set it to.

1. Open raspi-config: sudo raspi-config.
2. Choose option 3 - Interface Options.
3. Choose option P6 - Serial Port.
4. Prompt Would you like a login shell to be accessible over serial? 回答 'Yes'
5. Exit raspi-config
6. Restart device: sudo reboot

To enable debugging serial port, you need to modify the config.txt configuration file.

```sh
sudo nano /boot/config.txt
```

Add at the end

```sh
[all]enable_uart=1
```

The default baud rate of debugging serial port is 115200. You can check the current baud rate of debugging serial port through cmdline.txt file.

```sh
sudo nano /boot/cmdline.tx
```

4.12 Error Message

Error Message	explanation
GPIO-x occupied	GPIOx is occupied, please confirm whether there is a GPIO conflict.
Reuse i2c:x failed	The i2c pin has been used, so the corresponding pin cannot be reused as I2C.
Unable to reuse i2c x – addr x	The I2C address has been occupied, and the device can no longer be set to the X address.
Not found i2c x	/dev/i2c-x cannot be found. The I2C function may not be turned on or the I2C pin is occupied and cannot be set to I2C.
Uart x cannot reuse	Uart x cannot be reused, and the pin may have been occupied.
GPIO x has already been configured	GPIO x has already been configured, so GPIO x can no longer be configured.
i2c-y 0x{:x} not exist	The specified device with address x mounted on I2c-y bus does not exist. Please check whether the device exists.
Not found x.dtbo file	This problem is that the dtbo file is missing. If you find this problem, please contact our after-sales colleagues.
x not contain uuid information	This problem is that the configuration information is lost and the automatic configuration of BSP cannot be completed. If you find this problem, please contact our after-sales colleagues.
x not contain product information	This problem is that the configuration information is lost and the automatic configuration of BSP cannot be completed. If you find this problem, please contact our after-sales colleagues.

5 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.

5.1 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.

5.2 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.

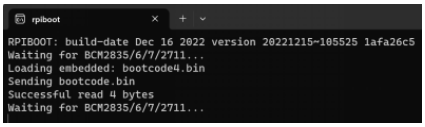
Steps:

The steps are described using Windows system as an example.

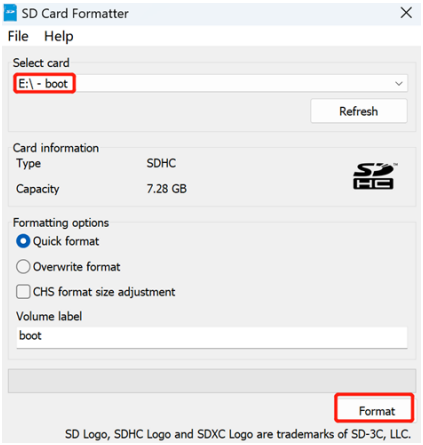
1. When the device is not powered on, press and hold the rpiboot button while connecting the power cord and USB flashing cable (USB-A to USB-A cable). Then, power up the device (release the rpiboot button after powering up).

   - 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.

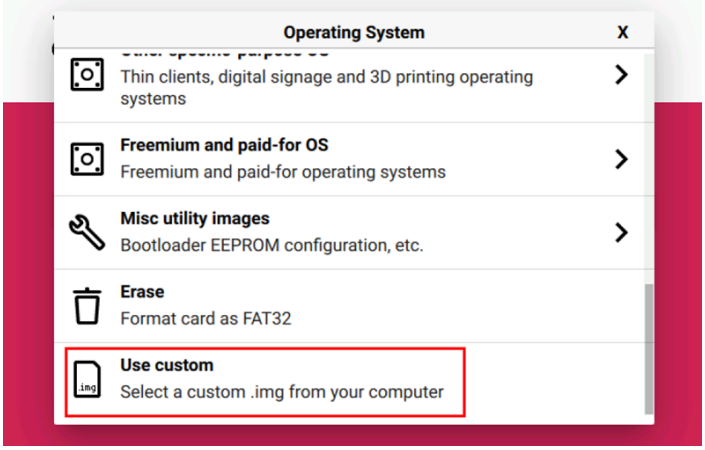
2. Open rpiboot tool to automatically convert the drive to a letter



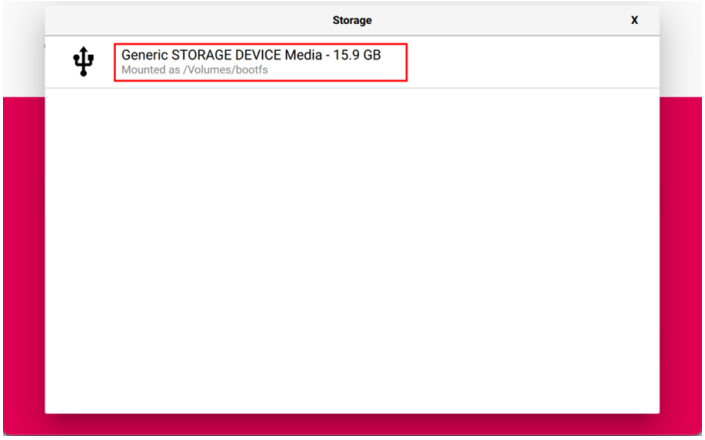
3. After the completion of the drive letter, the drive letter will pop up in the lower right corner of the computer.
4. Open SD Card Formatter, select the formatted drive letter, and click "Format" at the lower right to format.



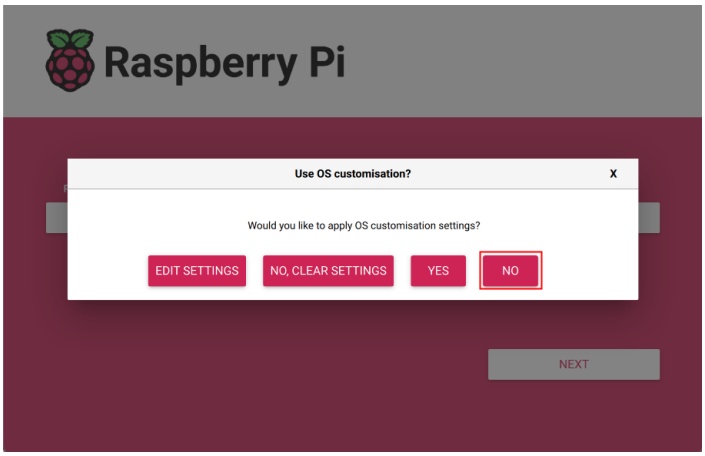
5. In the pop-up prompt box, select "Yes".
6. When the formatting is completed, click "OK" in the prompt box.
7. Close SD Card Formatter.
8. Open Raspberry Pi Imager, select "CHOOSE OS" and select "Use Custom " in the pop-up pane.



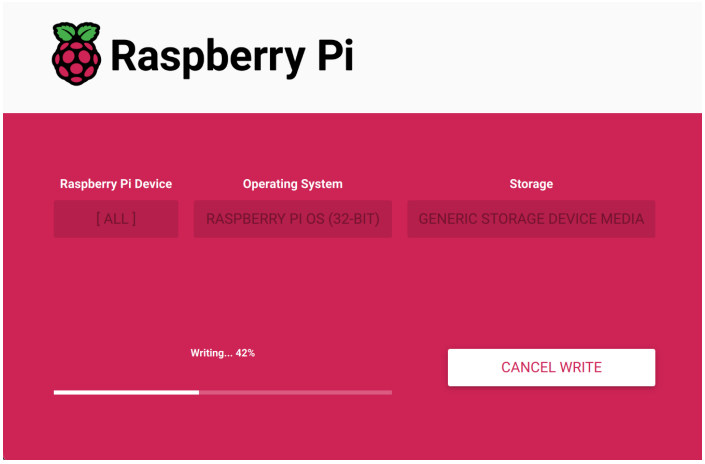
9. According to the prompt, select the OS file under the user-defined path and return to the main page.
10. Click "CHOOSE STORAGE", select the default device in the "Storage" interface, and return to the main page.



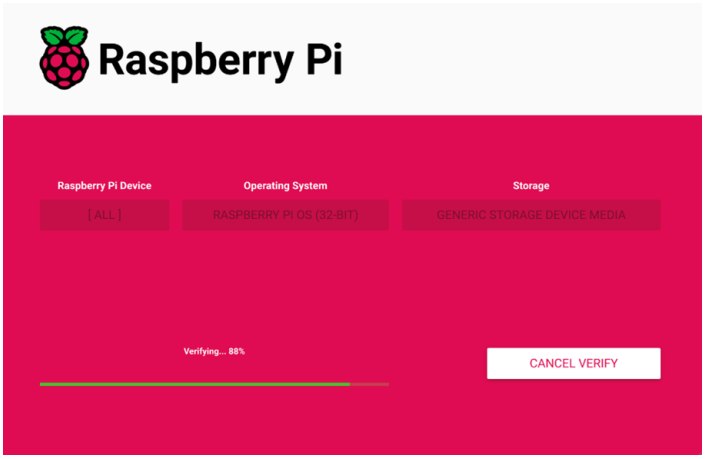
11. Click “NEXT”, select "NO " in the pop-up “Use OS customization?” pane.



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.

5.3 Installing Firmware Package

After you have finished flashing to eMMC on ED-IPC2000 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.

> 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.

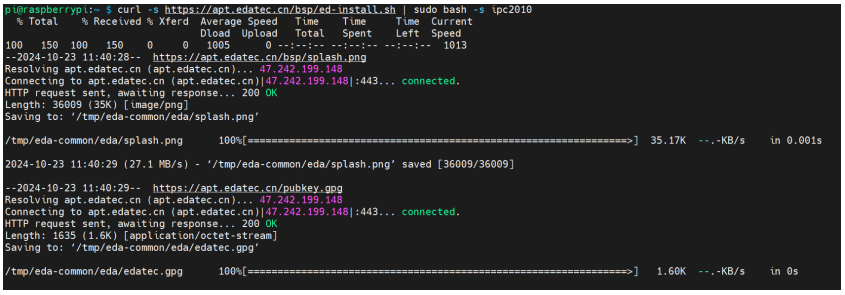
Preparation:

- 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.

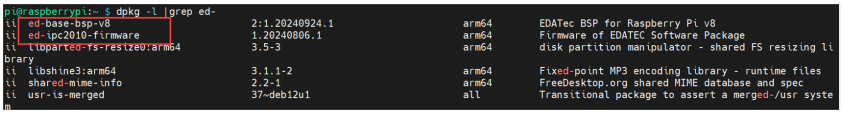
```sh
curl -s https://apt.edatec.cn/bsp/ed-install.sh | sudo bash -s ipc2010
```



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.