ED-HMI3120-156C

User Manual

by EDA Technology Co., Ltd

built: 2026-05-29

1 Hardware Manual

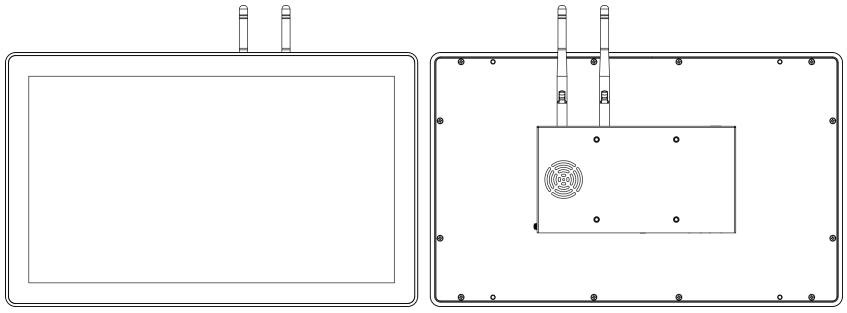
This chapter introduces the product overview, packing list, appearance, button, indicator and interface.

1.1 Overview

ED-HMI3120-156C is a 15.6-inch industrial HMI based on Raspberry Pi CM5. According to different application scenarios and user needs, different specifications of RAM and eMMC computer systems can be selected.

- Options for 2GB, 4GB, 8GB and 16GB RAM
- Options for 16GB, 32GB and 64GB eMMC storage

ED-HMI3120-156C provides common interfaces such as HDMI, USB 2.0, RS232, RS485, audio and Ethernet, and supports access to the network through Wi-Fi, Ethernet and 4G. ED-HMI3120-156C integrates supercapacitor (backup power supply, which is optional), RTC, EEPROM and encryption chip, improving the ease of use and reliability of the product. It is mainly used in industrial control and IOT.



1.2 Packing List

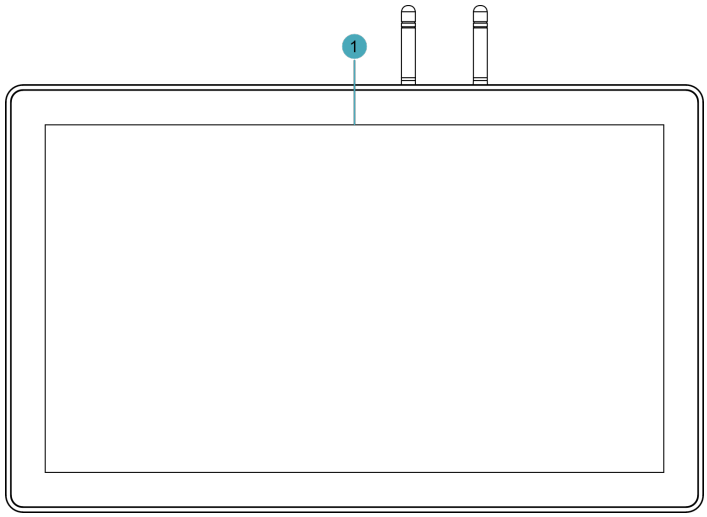
- 1 x ED-HMI3120-156C Unit
- 1 x Mounting Kit (including 4 x buckles, 4xM4*10 screws and 4xM4*16 screws)
- [Optional Wi-Fi/BT version] 1 x 2.4GHz/5GHz Wi-Fi/BT Antenna
- [Optional 4G version] 1 x 4G/LTE Antenna
- 1 x 2-Pin Phoenix Terminal with lock
- 2 x 6-Pin Phoenix Terminals

1.3 Appearance

Introducing the functions and definitions of interfaces on each panel.

1.3.1 Front Panel

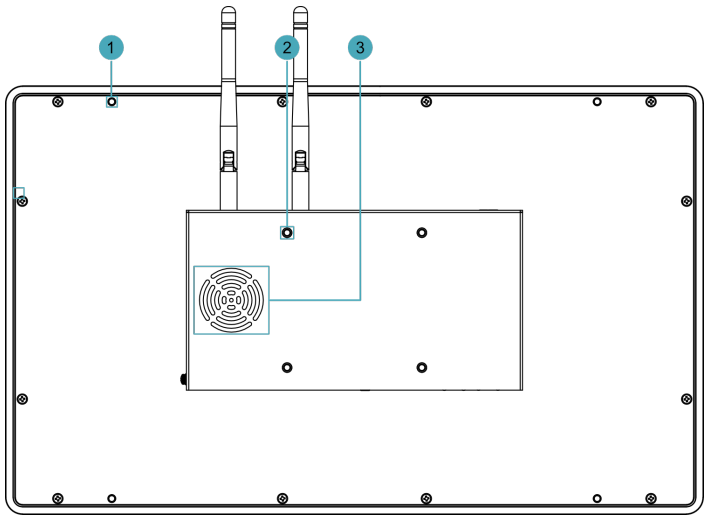
Introducing the front panel interface types and definitions.



NO.	Function Definition
1	1 x LCD screen, 15.6-inch touch screen with a resolution of 1920x1080, multi-touch capacitive touch screen.

1.3.2 Rear Panel

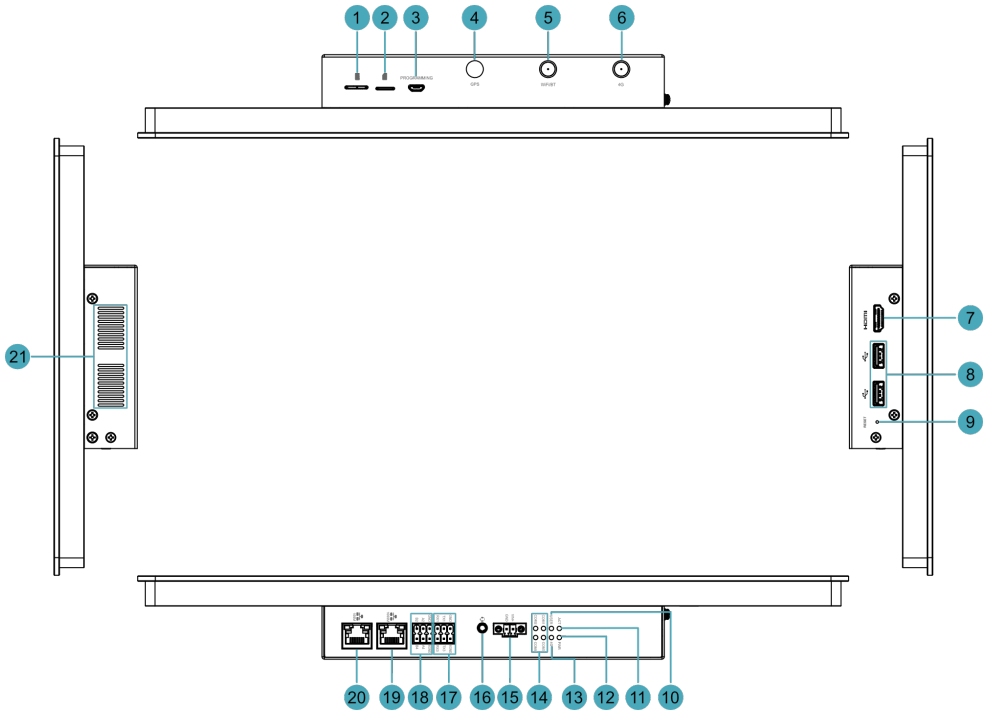
Introducing the types and definitions of the rear panel interface.



NO.	Function Definition
1	4 x installation holes of snap, which are used to fix the snaps to the device for Embedded installation.
2	4 x VESA mounting holes, reserved for VESA bracket installation.
3	1 x Speaker, built-in one 4Ω 5W speaker, single-channel stereo audio output.

1.3.3 Side Panel

Introducing the types and definitions of side panel interfaces.



NO.	Function Definition
1	1 x Micro SD card slot, which is used to install Micro SD card for storing user data.
2	1 x Nano SIM slot, which is used to install a Nano SIM card for getting 4G signal.
3	1 x Micro USB port, which supports to flash to eMMC for the system.
4	1 x rubber plug, here solely as a reserve hole.
5	1 x Wi-Fi/BT antenna port (optional), SMA connector, which can connect to Wi-Fi/BT antenna.
6	1 x 4G antenna port (optional), SMA connector, which can connect to 4G antenna.
7	1 x HDMI port, Type-A connector, which is compatible with HDMI 2.0 standard and supports 4K 60Hz. It supports to connect a displayer.
8	2 x USB 2.0 ports, Type-A connector, each channel supports up to 480Mbps transmission rate.
9	1 x Reset button, pressing the button will reset the device.
10	1 x green user indicator, user can customize a status according to actual application.
11	1 x green system status indicator, which is used to check the working status of device.
12	1 x red power indicator, which is used to check the status of device power-on and power-off.
13	1 x green 4G indicator, which is used to check the status of 4G signal.
14	4 x green UART indicators, using to check the communication status of UART port.
15	1 x DC input, 2-Pin 3.5mm pitch phoenix terminals with screw holes. It supports 12V~24V input, the signal is defined as VIN+/GND.
16	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.

NO.	Function Definition
	• When a headphone is not connected, the audio output is switched to the speaker.
17	2 x RS232 ports, 6-Pin 3.5mm pitch phoenix terminals, which is used to connect third-party control equipment.
18	2 x RS485 ports, 6-Pin 3.5mm pitch phoenix terminal, which is used to connect the third-party control equipment.
19	1 x 10/100/1000M adaptive ethernet port, RJ45 connector, with LED indicator. It can be used to access the network.
20	1 x 10/100M adaptive ethernet port, RJ45 connector, with LED indicator. It can be used to access the network.
21	Heat dissipation holes, which help improve cooling performance.

1.4 Button

ED-HMI3120-156C 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-HMI3120-156C.

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.
4G	On	The dial-up is successful and the connection is normal.
	Off	4G signal is not connected or the device is not powered on.
Yellow indicator of Ethernet port (100M)	On	The Ethernet connection is in the normal state.
	Blink	The Ethernet connection is abnormal.

Indicator	Status	Description
	Off	The Ethernet connection is not set up.
Green indicator of Ethernet port (100M)	On	The data transmission is abnormal.
	Blink	Data is being transmitted over the Ethernet port.
	Off	The Ethernet connection is not set up.
Yellow indicator of Ethernet port (1000M)	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 of Ethernet port (1000M)	On	The Ethernet connection is in the normal state.
	Blink	The Ethernet connection is abnormal.
	Off	The Ethernet connection is not set up.
COM1~COM4	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 Card Slot

ED-HMI3120-156C includes a Micro SD card slot and a Nano SIM card slot.

1.6.1.1 Micro SD Card Slot

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

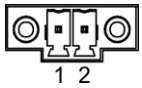
1.6.1.2 Nano SIM Card Slot (optional)

The silkscreen on the case of Nano SIM card slot is " ", which is used to install Nano SIM card for obtaining 4G signals.

1.6.2 Power Interface

The ED-HMI3120-156C includes one power input, 2-Pin 3.5mm pitch phoenix terminals with screw holes. The silkscreen of port is "VIN+/GND", and the pins are defined as follows.

	Pin ID	Pin Name

	1	GND
	2	12V~24V

1.6.3 Audio Interface

ED-HMI3120-156C includes one audio input, the connector is a 3.5mm 4-pole headphone jack. The silkscreen of port is " ", which supports OMTP stereo headphone output and mono microphone recording.

- When the headphone is connected, the audio output is switched to the headphone.
- When the headphone is not connected, the audio output is switched to the speaker.

1.6.4 Speaker

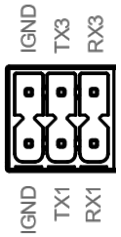
The ED-HMI3120-156C contains a power amplifier output, built-in a 4Ω 5W speaker, supporting single-channel stereo output. When playing audio, if the headphone is connected to the Audio interface, the speaker will have no audio output.

1.6.5 RS232 Interface

ED-HMI3120-156C include 2 RS232 ports, 6-Pin 3.5mm pitch phoenix terminals. The silkscreen of single RS232 is “IGND/TX/RX”.

Pin Definition

Terminal pins are defined as follows:

	Pin ID	Pin Name
	1	GND
	2	GND
	3	RS232-1_TX
	4	RS232-3_TX
	5	RS232-1_RX
	6	RS232-3_RX

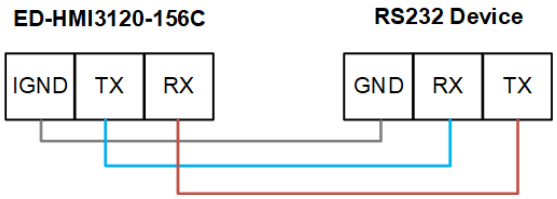
The pin names of CM5 corresponding to RS232 interface are as follows:

Signal	CM5 GPIO Name	CM5 Pin Out
RS232-1_TX	GPIO4	UART3_TXD
RS232-3_TX	GPIO0	UART2_TXD
RS232-1_RX	GPIO5	UART3_RXD

Signal	CM5 GPIO Name	CM5 Pin Out
RS232-3_RX	GPIO1	UART2_RXD

Connecting Cables

Schematic diagram of RS232 wires is as follows:

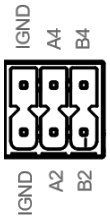


1.6.6 RS485

ED-HMI3120-156C include 2 RS485 ports, 6-Pin 3.5mm pitch phoenix terminals. The silkscreen of single RS485 is “IGND/A/B”.

Pin Definition

Terminal pins are defined as follows:



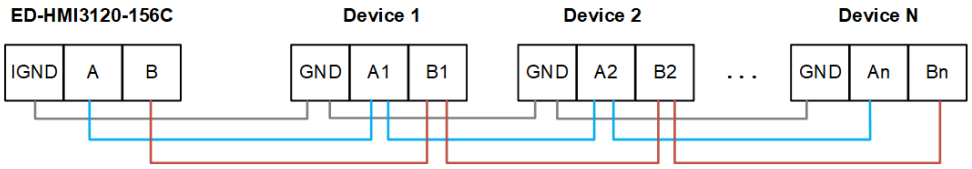
Pin ID	Pin Name
1	GND
2	GND
3	RS485-2_A
4	RS485-4_A
5	RS485-2_B
6	RS485-4_B

The pin names of CM5 corresponding to RS485 interface are as follows:

Signal	CM5 GPIO Name	CM5 Pin Out
RS485-2_A	GPIO12	UART5_TXD
RS485-4_A	GPIO8	UART4_TXD
RS485-2_B	GPIO13	UART5_RXD
RS485-4_B	GPIO9	UART4_RXD

Connecting Cables

Schematic diagram of RS485 wires is as follows:



RS485 terminal resistance configuration

ED-HMI3120-156C contain 2 RS485 ports. 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 are J24 and J22.

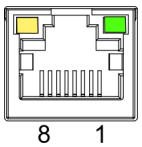
The relationship between the RS485 ports and corresponding COM ports are shown in the table below.

Location in PCBA	Corresponding COM port	The specific location of the corresponding COM
J24	COM4	
J22	COM2	

> TIP
>
> You need to open the device case to view the position of 120R jumper resistor.

1.6.7 1000M Ethernet Interface

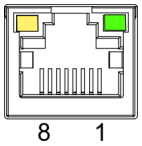
ED-HMI3120-156C includes one adaptive 10/100/1000M Ethernet port, and the silkscreen is "1000M". The connector is RJ45, and it is recommended to use the network cable of Cat6 and above. The pins corresponding to the terminal are defined as follows:



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

1.6.8 100M Ethernet Interface

ED-HMI3120-156C includes includes an adaptive 10/100M Ethernet port, and the silkscreen is "100M". The connector is RJ45, and it is recommended to use the network cable with Cat6 and above when accessing to network. The pins corresponding to the terminal are defined as follows:



Pin ID	Pin Name
1	TX+
2	TX-
3	Rx+
4	-
5	-
6	RX-
7	-
8	-

1.6.9 HDMI Interface

ED-HMI3120-156C 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.

1.6.10 USB 2.0 Interface

ED-HMI3120-156C includes 2 USB 2.0 ports, the silkscreen is "". The connector is Type-A USB, which can connect to standard USB 2.0 peripherals and supports up to 480Mbps transmission rate.

1.6.11 Micro USB Interface

ED-HMI3120-156C includes one Micro USB interface, the silkscreen is "PROGRAMMING" and it can be connected to a PC to flash to eMMC of the device.

1.6.12 Antenna Interface (optional)

The ED-HMI3120-156C includes 2 SMA antenna ports, the silkscreens are "4G" and "Wi-Fi/BT" and they can be connected to the 4G antenna and Wi-Fi/BT antenna.

> TIP
>
> The number of antenna interface is related to the purchasing product model. Here, we take two antenna interfaces as an example.

1.7 Supercapacitor (Optional)

The ED-HMI3120-156C supports an optional supercapacitor backup power module, featuring a comprehensive safe shutdown protection mechanism.

- In the event of an unexpected power failure when the supercapacitor is fully charged, the system will automatically turn off the screen backlight and reduce the CPU frequency to save power. The device continues to operate in a low-power state until the capacitor's charge is depleted, after which it automatically shuts down safely. This effectively prevents operational interruptions and data loss.
- The device provides user-customizable emergency scripts, allowing for the pre-configuration of critical data saving, backup, or other emergency procedures. At the moment of power loss, the system will automatically execute the preset scripts to ensure critical operations are completed, enabling a composed response to sudden power outages.

TIP

- For specific operations on customizing supercapacitor-related parameters, please refer to AN18 Supercapacitor Usage Guide.
- The supercapacitor requires the device to be powered on for at least 5 minutes to fully charge, and normal functionality is only guaranteed when it is fully charged.

2 Installing Components (optional)

This chapter describes how to install optional components.

2.1 Install Antenna

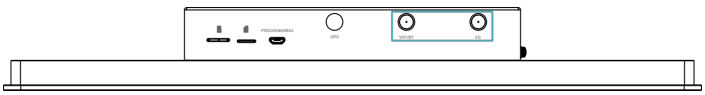
If the purchasing ED-HMI3120-156C includes 4G and Wi-Fi functions, the antenna need to be installed before using the device.

Preparation:

The corresponding antennas have been obtained from the packaging box. If there are multiple antennas, they can be distinguished by the labels on the antennas.

Steps:

1. Find the location of antenna port, as indicated in the figure below.



2. Align the connectors on both sides of the device and the antenna, and turn the antenna clockwise to secure it.

2.2 Install Micro SD Card

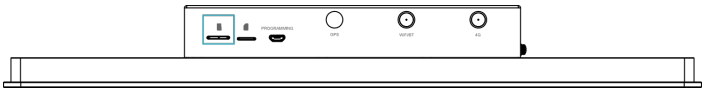
If you need to install the Micro SD card while using the product, you can refer to the following instructions.

Preparation:

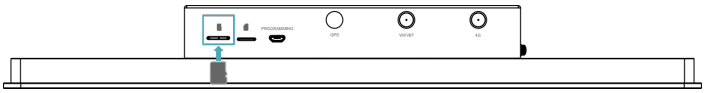
- Micro SD card is ready.

Steps:

1. Find the location of Micro SD card slot, as indicated in the figure below.



2. Insert the Micro SD card into the corresponding card slot with the contact side facing down, and hear a sound to indicate that the installation is completed.



2.3 Install Nano SIM Card

If the purchasing ED-HMI3120-156C device includes 4G function, the Nano SIM card need to be installed before using 4G.

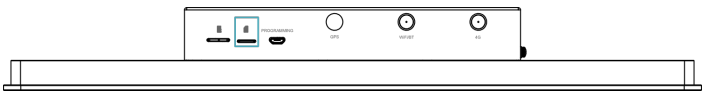
> WARNING
>
> Please turn off the power before inserting or removing the Nano SIM card.

Preparation:

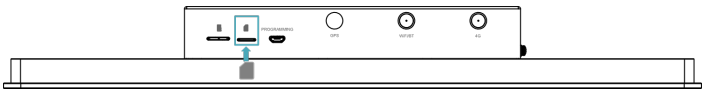
- The 4G Nano SIM card is ready.
- The device has been disconnected from power.

Steps:

1. Find the location of Nano SIM card slot, as indicated in the figure below.



2. Insert the Nano SIM card into the corresponding card slot with the contact side facing down, and hear a sound to indicate that the installation is completed.



3 Installing Device

ED-HMI3120-156C device supports front embedded installation. The standard packaging includes the embedded installation Mounting kit (ED-ACCHMI-Front).

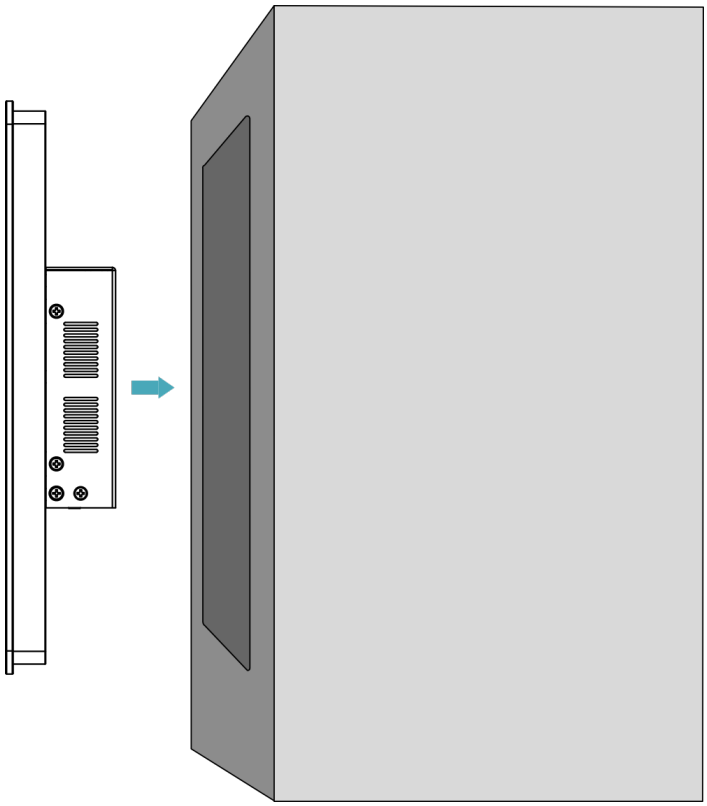
Preparation:

- The ED-ACCHMI-Front Mounting kit has been acquired (includes 4 × M4*10 screws, 4 × M4*16 screws, and 4 buckles).
- A cross screwdriver has been prepared.

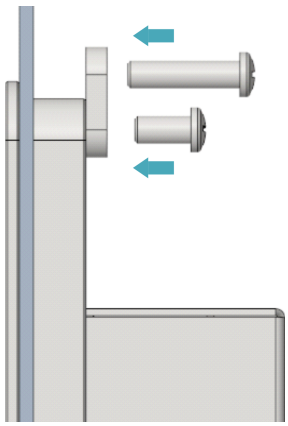
Steps:

1. Determine the cutout dimensions on the cabinet based on the ED-HMI3120-156C's size, as shown in the figure below.
   Unit: mm

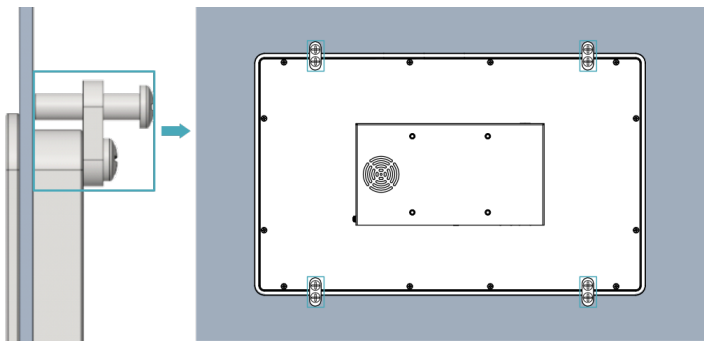
2. Drill holes on the cabinet according to the aperture size defined in Step 1.
3. Embed the ED-HMI3120-156C into the cabinet from the exterior side.



4. Align the screw holes (non-threaded) of the buckles with the buckle mounting holes on the device side.



5. Insert four M4*10 screws through the unthreaded holes of the buckle. Tighten clockwise with a screwdriver to secure the buckle to the device. Then, insert four M4*16 screws through the threaded holes of the buckle. Press them against the inner surface of the cabinet chassis and drive clockwise with a screwdriver until full thread engagement is achieved.



4 Booting the Device

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

4.1 Connecting Cables

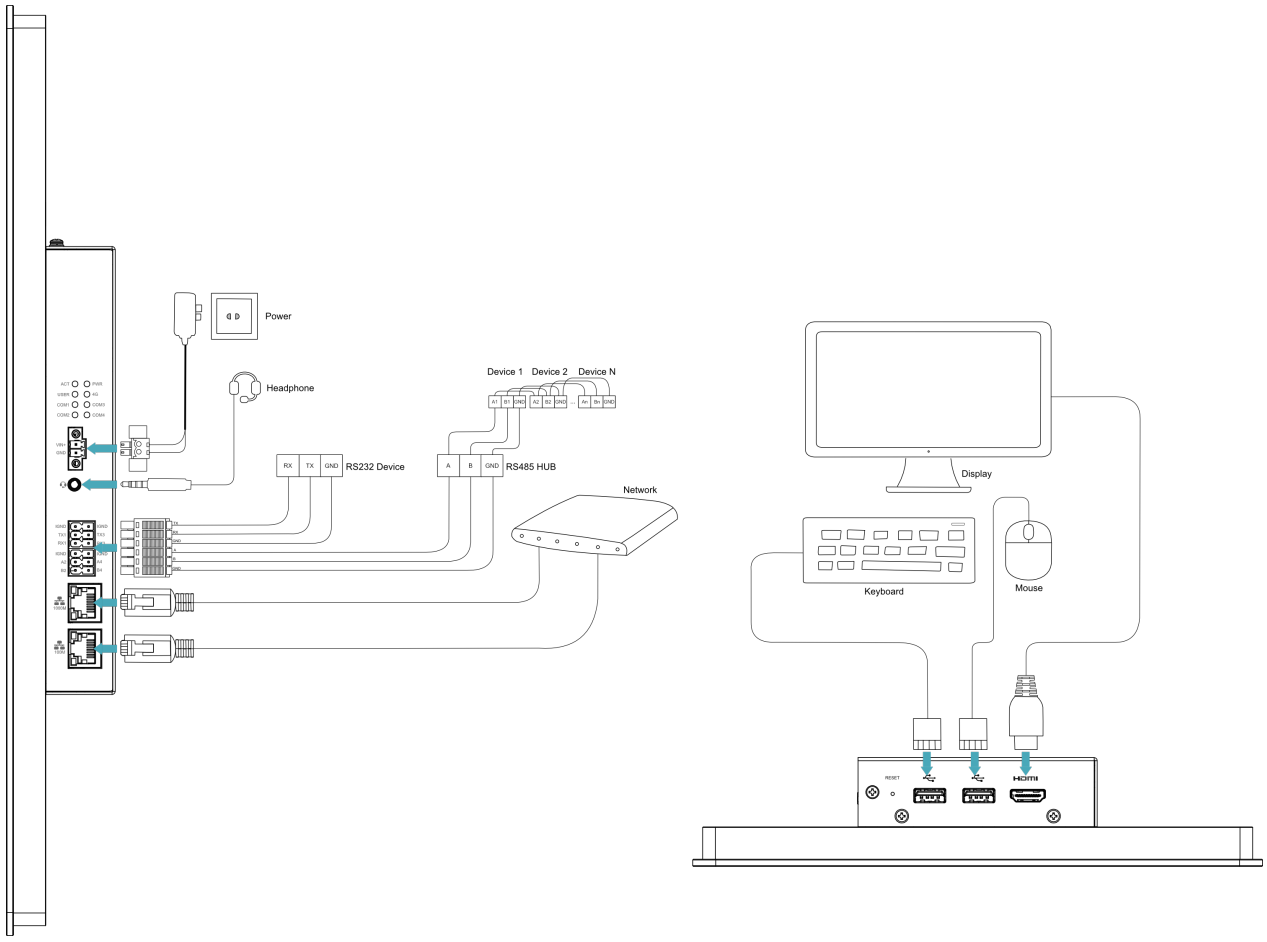
This section describes how to connect cables.

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

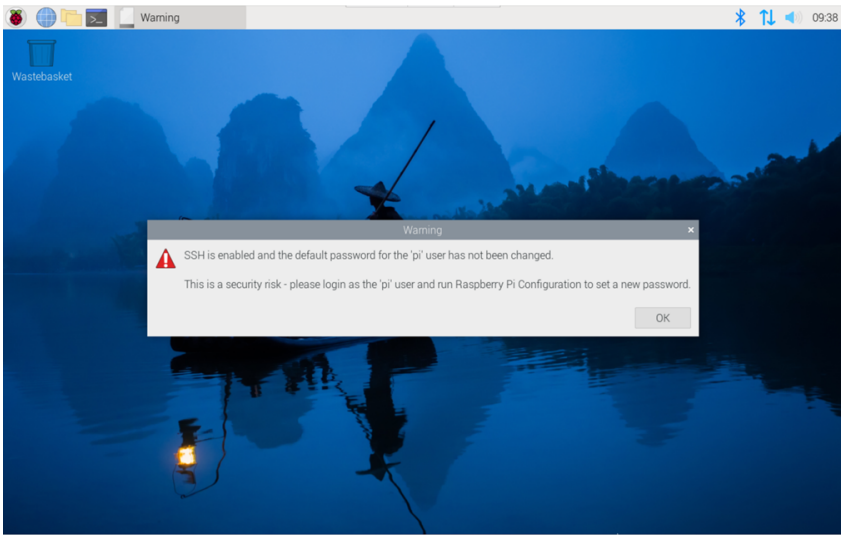
ED-HMI3120-156C has no switching power supply. After the power supply is connected, the system will start.

- 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` .

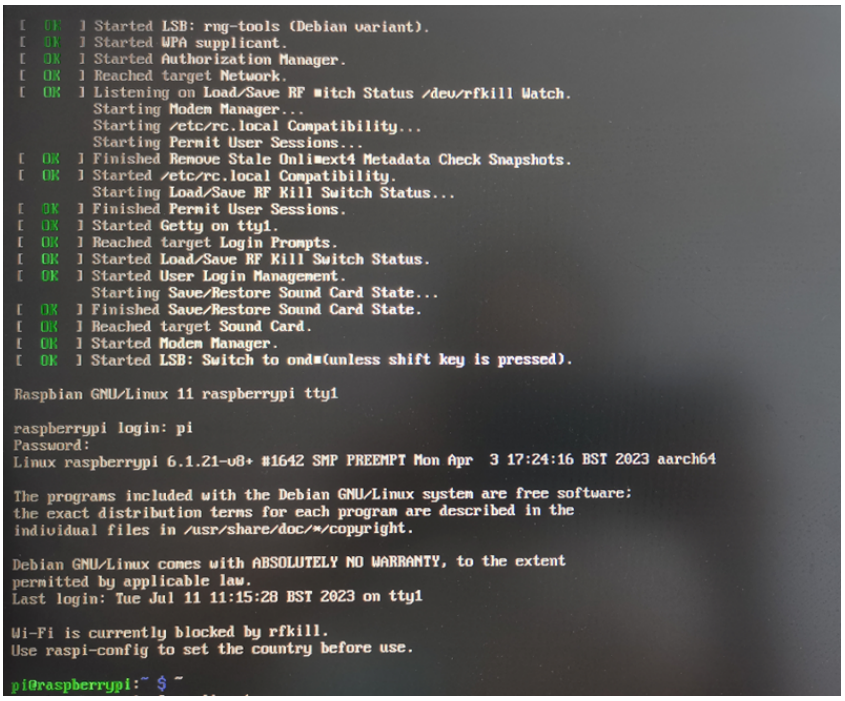
4.2.1 Raspberry Pi OS (Desktop)

If the device is factory-installed with the Desktop edition operating system, it will directly load the desktop environment upon completing the boot process, as shown in the figure below.



4.2.2 Raspberry Pi OS (Lite)

If the device is factory-installed with the Lite edition operating system, it will automatically log in using the default username `pi` upon completing the boot process, with the default password being `raspberry` . The figure below indicates successful system initialization.


[OK] Started LSB: rng-tools (Debian variant).
[OK] Started WPA supplicant.
[OK] Started Authorization Manager.
[OK] Reached target Network.
[OK] Listening on Load/Save RF Switch Status /dev/rfkill Watch.
Starting Modem Manager...
Starting /etc/rc.local Compatibility...
Starting Permit User Sessions...
[OK] Finished Remove Stale Online ext4 Metadata Check Snapshots.
[OK] Started /etc/rc.local Compatibility.
Starting Load/Save RF Kill Switch Status...
[OK] Finished Permit User Sessions.
[OK] Started Getty on tty1.
[OK] Reached target Login Prompts.
[OK] Started Load/Save RF Kill Switch Status.
[OK] Started User Login Management.
Starting Save/Restore Sound Card State...
[OK] Finished Save/Restore Sound Card State.
[OK] Reached target Sound Card.
[OK] Started Modem Manager.
[OK] Started LSB: Switch to ondemand (unless shift key is pressed).
Raspbian GNU/Linux 11 raspberrypi tty1
raspberrypi login: pi
Password:
Linux raspberrypi 6.1.21-v8+ #1642 SMP PREEMPT Mon Apr 3 17:24:16 BST 2023 aarch64
The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Tue Jul 11 11:15:28 BST 2023 on tty1
Wi-Fi is currently blocked by rfkill.
Use raspi-config to set the country before use.
pi@raspberrypi:~ $

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 4G (Optional)

Configuring 4G

5.8 Configuring Buzzer

Configuring Buzzer

5.9 Configuring RTC

Configuring RTC

5.10 Configuring Serial Port

This chapter introduces the configuration method of RS232 and RS485.

5.10.1 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
```

5.10.2 Configuring RS232

ED-HMI3120-156C includes 2 RS232 ports, and the corresponding COM ports and device files are as follows:

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

Preparation:

The RS232 port of ED-HMI3120-156C 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.

5.10.3 Configuring RS485

ED-HMI3120-156C includes 2 RS485 ports, and the corresponding COM ports and device files are as follows:

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

Preparation:

The RS485 port of ED-HMI3120-156C has been connected with external devices.

Steps:

1. Execute the following command to open the serial port com4, and configure the serial port baud rate to 115200.

```sh
picocom -b 115200 /dev/com4
```

2. Input commands as needed to control external devices.

5.11 Configuring Audio

Configuring Audio

5.12 Configuring USER Indicator

Configuring USER Indicator

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_arm64-2024-11-19/2024-11-19-raspios-bookworm-arm64.img.xz (https://downloads.raspberrypi.com/raspios_arm64/images/raspios_arm64-2024-11-19/2024-11-19-raspios-bookworm-arm64.img.xz)
Raspberry Pi OS (Lite) 64-bit-bookworm (Debian 12)	https://downloads.raspberrypi.com/raspios_lite_arm64/images/raspios_lite_arm64-2024-11-19/2024-11-19-raspios-bookworm-arm64-lite.img.xz (https://downloads.raspberrypi.com/raspios_lite_arm64/images/raspios_lite_arm64-2024-11-19/2024-11-19-raspios-bookworm-arm64-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 64-bit-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:

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

Steps:

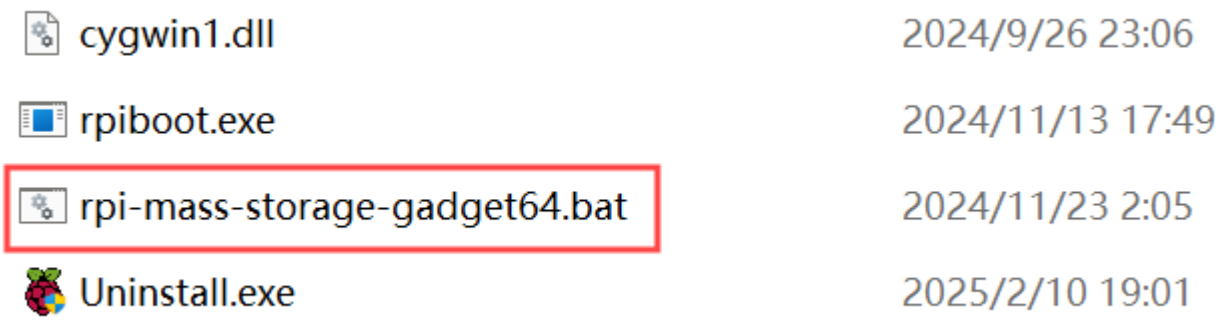
The steps are described using Windows system as an example.

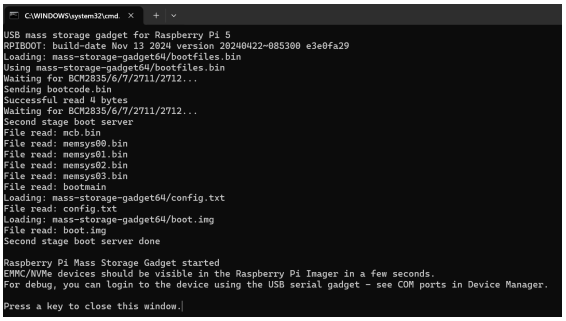
1. Connect the power cord and USB flashing cable (Micro-USB to USB-A).

   - Connecting to USB cable: One end is connected to the Micro USB port on the device side, and the other end is connected to the USB port on the PC.
   - Connecting to power cord: One end is connected to the DC 2-Pin Phoenix terminal on the device side, and the other end is connected to the external power supply.

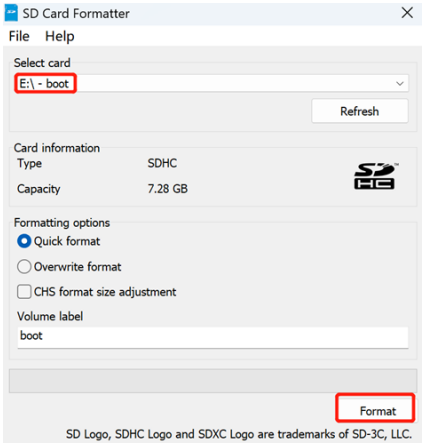
2. Disconnect the power supply of ED-HMI3120-156C and then power it on again.
3. Open the installed `rpi-mass-storage-gadget64.bat` tool (as shown in the red box in the picture below) to automate the disk tokenization.

> TIP
>
> The `rpi-mass-storage-gadget64.bat` tool is located in the installation directory of Rpiboot.

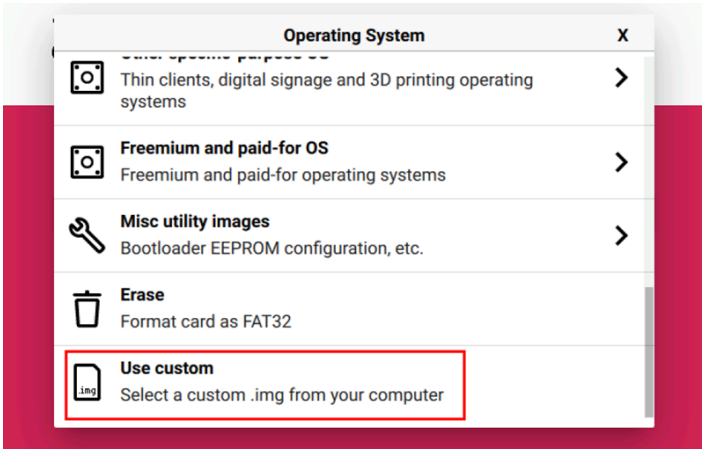




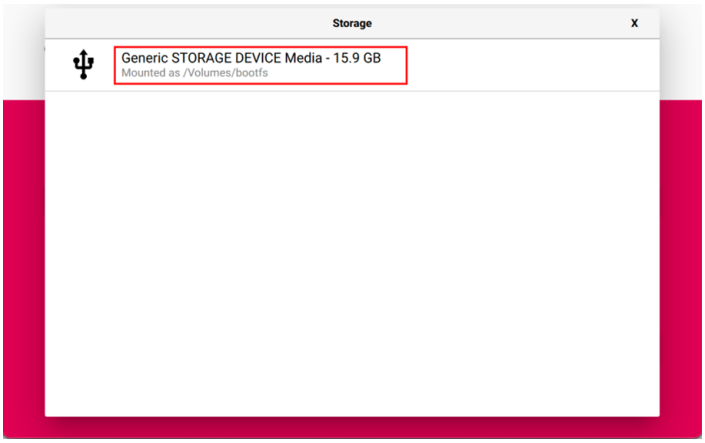
4. After the disk symbolization is completed, close the `rpi-mass-storage-gadget64.bat` tool, the disk symbol will pop up in the lower right corner of the computer.
5. Open `SD Card Formatter`, select the formatted drive letter, and click "Format" at the lower right to format.



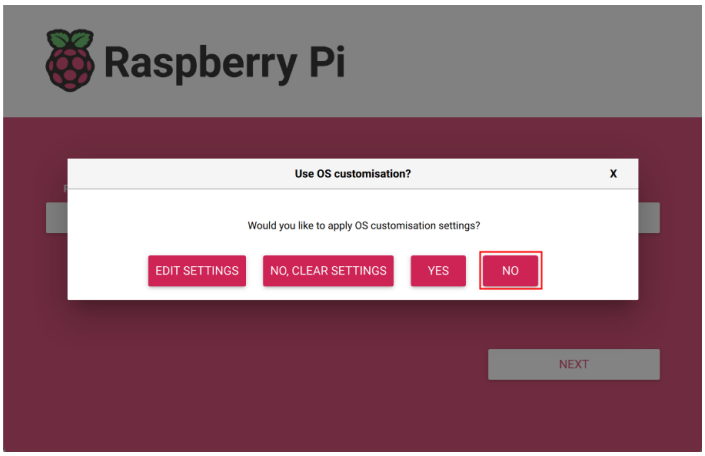
6. In the pop-up prompt box, select "Yes".
7. When the formatting is completed, click "OK" in the prompt box.
8. Close `SD Card Formatter` .
9. Open `Raspberry Pi Imager` , select "CHOOSE OS" and select "Use Custom " in the pop-up pane.



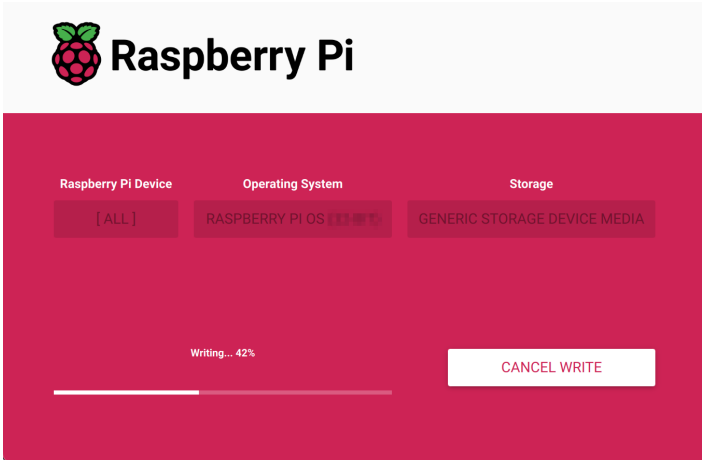
10. According to the prompt, select the OS file under the user-defined path and return to the main page.
11. Click "CHOOSE STORAGE", select the default device in the "Storage" interface, and return to the main page.



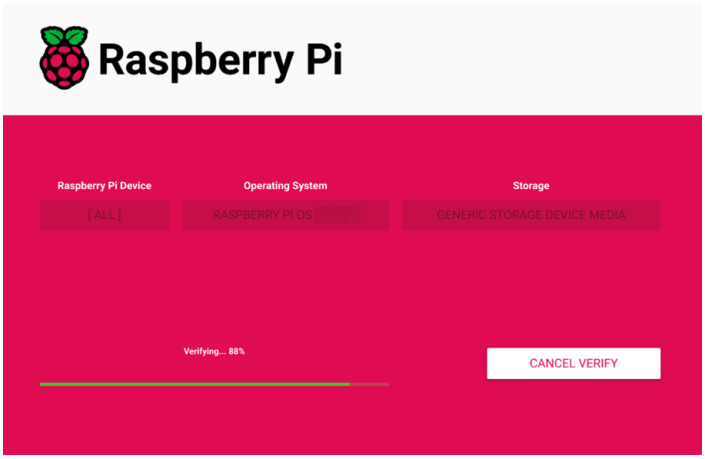
12. Click “NEXT”, select "NO " in the pop-up “Use OS customization?” pane.



13. Select “YES” in the pop-up “Warning” pane to start writing the image.



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



15. After the verification is completed, click “CONTINUE” in the pop-up “Write Successful” box.
16. 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-HMI3120-156C, 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 64-bit-bookworm (Debian 12) version of the operating system.

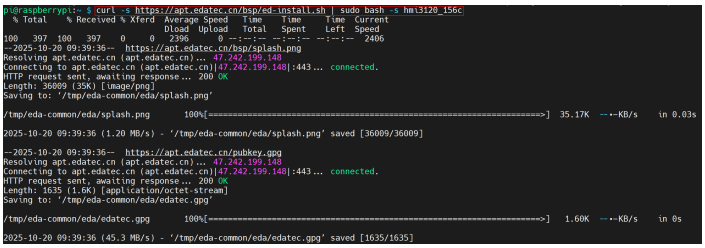
Preparation:

- 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.

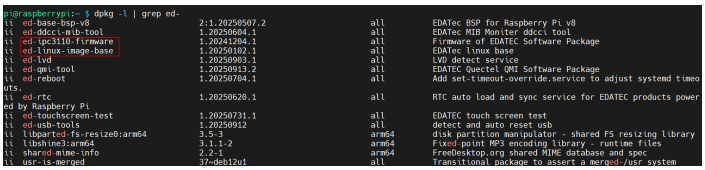
```sh
curl -s https://apt.edatec.cn/bsp/ed-install.sh | sudo bash -s hmi3120_156c
```



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.