

RaspberryPi Compute Module Zero

User Manual

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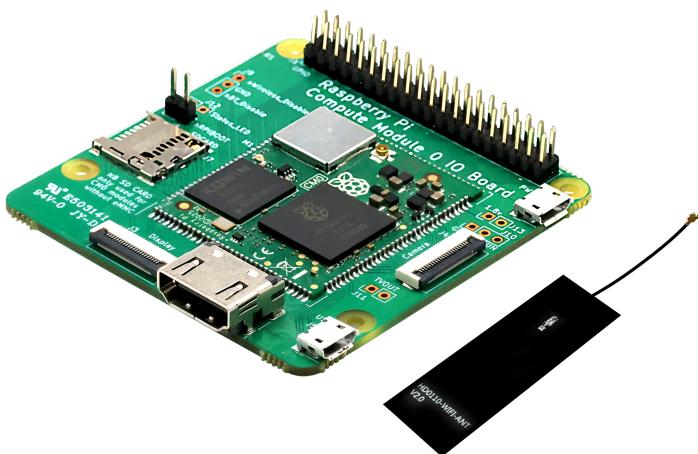
EN translation by DeepL.com 2025-11-16

1 Hardware Manual

This chapter introduces the product overview, package contents, appearance, and interfaces.

1.1 Product Overview

The Raspberry Pi Compute Module Zero Development Board (CM0 Dev Board) is a single-board computer based on the Raspberry Pi CM0. It features a default configuration of 512MB RAM + 8GB eMMC storage, providing HDMI, USB, MIPI DSI, MIPI CSI, and Raspberry Pi 40-pin interfaces. It supports network connectivity via Wi-Fi (with an external antenna) and is primarily designed for industrial control and IoT applications.



1.2 Package Contents

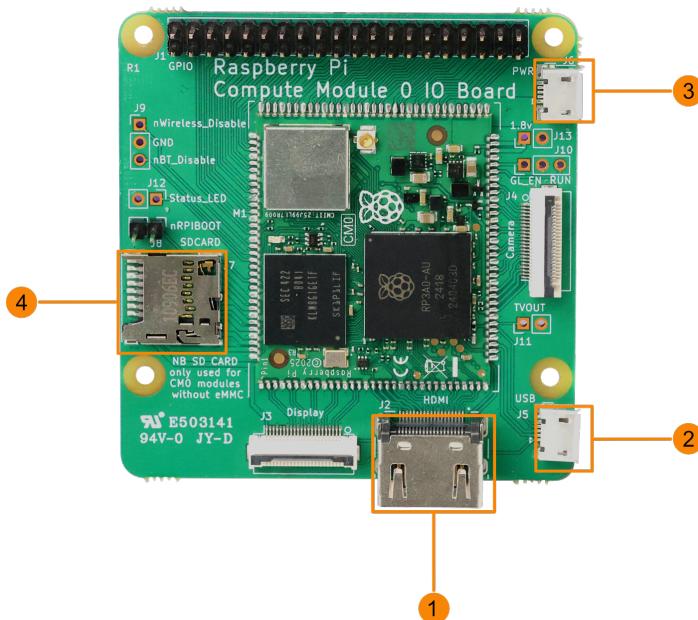
- 1 x CM0IO Board (includes CM0)
- 1 x 2.4GHz Wi-Fi/BT FPC antenna
- 1 x 2-Pin Jumper Cap

1.3 Product Appearance

Introduction to the functions and definitions of the interfaces on the CM0IO board.

1.3.1 Panel Interfaces

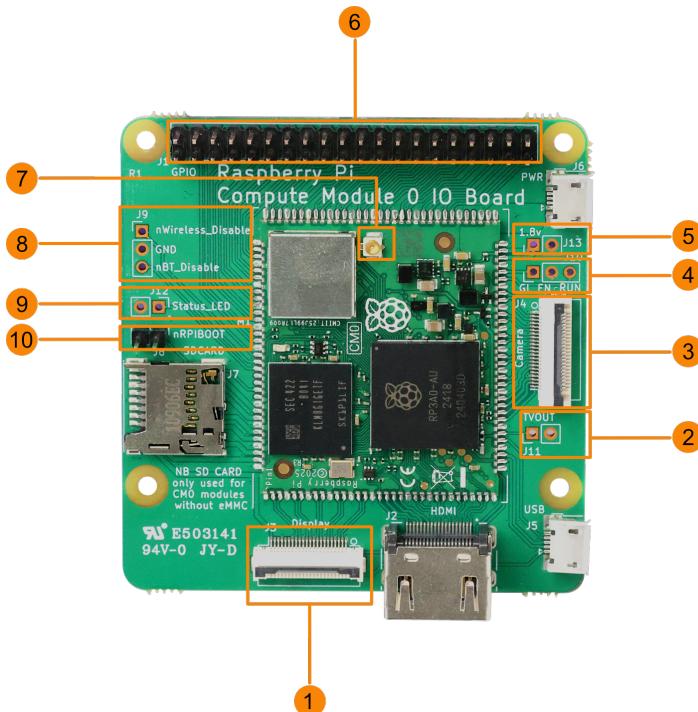
Introduces the types and definitions of front panel interfaces.



Number	Function Definitions
1	1 x HDMI, Type-A port, compatible with HDMI 1.3a, supports 1080p at 30Hz resolution, supports connection to a monitor.
2	1 x USB 2.0 port, Micro USB connector, supports standard USB 2.0 peripherals with a maximum transfer rate of 480Mbps.
3	1 x DC input, Micro USB connector, supports external 5V power adapter for CM0 development board.
4	1 x Micro SD card slot. Note: The Micro SD card slot is only applicable to the CM0 Lite. The CM0 Dev Board comes standard with an 8GB eMMC storage solution, rendering the Micro SD card slot inactive on the CM0 Dev Board.

1.3.2 Expansion Interfaces

Introduction to expansion interface types and definitions.



Number	Function Definition
1	1 x MIPI DSI interface, 22-pin 0.5mm pitch FPC connector, supports connection to Raspberry Pi Display via 22-pin FPC cable.
2	1 x 2-pin TV_OUT pin, supporting expansion of 1 composite video signal.
3	1 x MIPI CSI interface, 22-pin 0.5mm pitch FPC connector, supports connection to Raspberry Pi Camera via 22-pin FPC cable.
4	1 x 3-Pin GLOBAL_EN & RUN_PG pin, supporting expansion of power button and reset button.
5	1 x 2-pin 1.8V power pin, supporting expansion of one 1.8V power output.
6	1 x Raspberry Pi 40-Pin Header, supporting expansion of Raspberry Pi HAT modules.
7	1 x IPEX-1 connector for connecting an external antenna.
8	1 x 3-Pin Wi-Fi & BT Pins, supporting enable/disable settings for Wi-Fi and Bluetooth expansion.
9	1 x 2-pin Status_LED pin, supporting extended CM0 LED status query port.
10	1 x 2-Pin nRPIBOOT Pin, supporting CM0 entry into boot mode via jumper connection.

1.4 Interfaces

Describes the definitions and functions of each interface in the product.

1.4.1 HDMI

The CM0IO board includes one standard Type-A HDMI port, compatible with the HDMI 1.3a standard. It supports resolutions up to 1080p at 30Hz and can connect to HDMI displays.

1.4.2 DSI (MIPI Display)

The CM0IO board features one MIPI DSI interface with a 22-pin, 0.5mm pitch FPC connector, enabling connection to a Raspberry Pi Display via a 22-pin FPC cable.

Note

After connecting the Raspberry Pi Display, relevant configuration is required for normal operation.

1.4.3 CSI (MIPI Camera)

The CM0IO board features one MIPI CSI interface with a 22-pin, 0.5mm pitch FPC connector, supporting connection to the Raspberry Pi Camera via a 22-pin FPC cable.

Note

After connecting the Raspberry Pi Camera, relevant configuration is required for normal operation.

1.4.4 Micro-USB (Data)

The CM0IO board features one Micro-USB (data) port located at J5. It is compatible with the USB 2.0 standard and supports connection to standard USB 2.0 peripherals, with a maximum transfer rate of 480Mbps.

Disconnect power from the CM0IO board, short the 2-pin connector on nRPIBOOT (J8), then connect to a PC via this port. This will enter the CM0 into programming mode for eMMC programming.

Warning

Simultaneous power supply through both the Micro-USB (Data) and Micro-USB (Power) ports may damage the CM0 or USB peripherals. Therefore, never supply power to both ports simultaneously.

1.4.5 Micro-USB (Power)

The CM0IO board includes one Micro-USB (power) port, located at J6 on the board, which supports external 5V power adapters for supplying power to the CM0IO board.

Warning

If both the Micro-USB (data) port and Micro-USB (power) port supply power simultaneously, it may burn out the CM0 or USB peripherals; therefore, simultaneous power supply through both ports is strictly prohibited.

1.4.6 Micro SD Card Slot

The CM0IO board includes one Micro SD card slot. However, since the Micro SD card slot is only compatible with the CM0 Lite, and the CM0 Dev Board comes standard with an 8GB eMMC CM0, the Micro SD card slot is an inactive interface on the CM0 Dev Board.

1.4.7 nRPIBOOT Pin Header

The CM0IO board includes a 2-pin nRPIBOOT header (J8) with pin definitions: nRPIBOOT/GND.

- Shorting nRPIBOOT and GND with a jumper cap: Rebooting will enter the CM0 module into programming mode.
- Unshortened: Normal operating mode

1.4.8 Raspberry Pi 40-Pin Header

The CM0IO board features one standard Raspberry Pi 40-pin interface, located at J1 on the board. The specific pin definitions are listed in the table below.

	Pin ID	Pin Name	Pin ID	Pin Name



1	+3.3V	2	+5V
3	GPIO2	4	+5V
5	GPIO3	6	GND
7	GPIO4	8	GPIO14
9	GND	10	GPIO15
11	GPIO17	12	GPIO18
13	GPIO27	14	GND
15	GPIO22	16	GPIO23
17	+3.3V	18	GPIO24
19	GPIO10	20	GND
21	GPIO9	22	GPIO25
23	GPIO11	24	GPIO8
25	GND	26	GPIO7
27	ID_SD	28	ID_SC
29	GPIO5	30	GND
31	GPIO6	32	GPIO12
33	GPIO13	34	GND
35	GPIO19	36	GPIO16
37	GPIO26	38	GPIO20
39	GND	40	GPIO21

1.4.9 Reserved Pins

The CM0IO board includes multiple available pins to support user-defined external expansion.

1.4.9.1 Wi-Fi & BT Pins

The CM0IO board includes a 3-pin Wi-Fi & BT connector (J9) with the following pin definitions: nWireless_Disable/GND/nBT_Disable. Functions are as follows:

- Short nWireless_Disable to GND: Disables Wi-Fi functionality
- Short nBT_Disable to GND: Disables Bluetooth functionality

1.4.9.2 GLOBAL_EN & RUN_PG Pins

The CM0IO board includes a 3-pin GLOBAL_EN & RUN_PG connector located at J10 on the board. The pins are defined as GLOBAL_EN/GND/RUN_PG, with the following specific functions:

- Short GLOBAL_EN to GND: A short duration exceeding 1ms will power-cycle the CM0 module.
- Short-circuit RUN_PG and GND: Reset the CM0 module

1.4.9.3 TV_OUT Pin

The CM0IO board includes a 2-pin TV_OUT connector located at J11. The pins are defined as TV_OUT/GND and support expansion of 1 composite video signal.

1.4.9.4 Status_LED Pin

The CM0IO board includes a 2-pin Status_LED pin located at J12 on the board. The pin is defined as Status_LED/GND and supports expansion of the CM0 LED status query port.

1.4.9.5 1.8V Power Pin

The CM0IO board includes a 2-pin 1.8V power supply pin located at J13 on the board. The pin is defined as 1.8V/GND and supports the expansion of one 1.8V power output.

1.4.10 Wireless

The CM0IO board has Wi-Fi and Bluetooth functionality enabled by default. These features function normally after installing the FPC antenna.

- 2.4 GHz Band IEEE 802.11 b/g/n Wireless Local Area Network
- Bluetooth 4.2 standard (supports BLE low-power mode)

If users need to disable Wi-Fi or Bluetooth, they can achieve this by shorting the reserved pins on the IO board.

- Short nWireless_Disable and GND: Disable Wi-Fi functionality
- Short nBT_Disable and GND: Disable Bluetooth functionality

2 Installation Components

This chapter details the specific procedures for installing components.

2.1 Antenna Installation

The CM0IO board includes Wi-Fi functionality by default and comes standard with an FPC antenna. The antenna must be installed before using the CM0IO board. Prerequisites:

The antenna has been

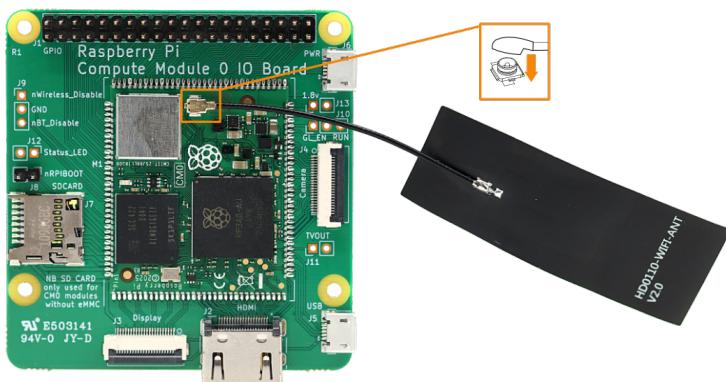
removed from the

packaging. Procedure:

1. Locate the antenna connector on the CM0IO board as indicated in the diagram below.



2. Align the connectors on both sides of the CM0IO board and the FPC antenna. Snap the FPC antenna onto the CM0IO board in the downward direction indicated by the arrow, ensuring the antenna remains securely attached.



3 Powering Up the CM0 Dev Board

This chapter details the specific steps for installing the operating system, connecting cables, and performing initial configuration.

3.1 Installing the Operating System

The CM0 Dev Board ships without an operating system pre-installed. Users must install an OS before use. This requires downloading the image and then flashing it to the eMMC. The following sections detail the image download and eMMC flashing procedures.

3.1.1 Image Download

Download the corresponding official Raspberry Pi system image based on your actual needs. The download paths are listed in the table below:

OS	Download Path
Raspberry Pi OS (Desktop) 64-bit - trixie (Debian 13)	https://downloads.raspberrypi.com/raspios_arm64/images/raspios_arm64-2025-10-02/2025-10-01-raspios-trixie-arm64.img.xz (https://downloads.raspberrypi.com/raspios_arm64/images/raspios_arm64-2025-10-02/2025-10-01-raspios-trixie-arm64.img.xz)
Raspberry Pi OS (Lite) 64-bit - Trixie (Debian 13)	https://downloads.raspberrypi.com/raspios_lite_arm64/images/raspios_lite_arm64-2025-10-02/2025-10-01-raspios-trixie-arm64-lite.img.xz (https://downloads.raspberrypi.com/raspios_lite_arm64/images/raspios_lite_arm64-2025-10-02/2025-10-01-raspios-trixie-arm64-lite.img.xz)
Raspberry Pi OS (Desktop) 32-bit - trixie (Debian 13)	https://downloads.raspberrypi.com/raspios_armhf/images/raspios_armhf-2025-10-02/2025-10-01-raspios-trixie-armhf.img.xz (https://downloads.raspberrypi.com/raspios_armhf/images/raspios_armhf-2025-10-02/2025-10-01-raspios-trixie-armhf.img.xz)
Raspberry Pi OS (Lite) 32-bit - trixie (Debian 13)	https://downloads.raspberrypi.com/raspios_lite_armhf/images/raspios_lite_armhf-2025-10-02/2025-10-01-raspios-trixie-armhf-lite.img.xz (https://downloads.raspberrypi.com/raspios_lite_armhf/images/raspios_lite_armhf-2025-10-02/2025-10-01-raspios-trixie-armhf-lite.img.xz)

Note

We recommend using the Lite version image. For the latest image, refer to the Raspberry Pi official website: [Raspberry Pi OS](https://www.raspberrypi.com/software/operating-systems/) (<https://www.raspberrypi.com/software/operating-systems/>).

3.1.2 eMMC Flashing

We recommend using the official Raspberry Pi Imager tool. Download link:

- 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)

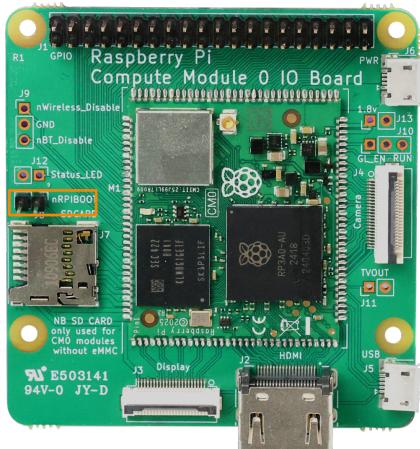
Prerequisites:

- The flashing tool has been downloaded and installed on your computer.
- A Micro USB to USB-A cable (USB programming cable) is prepared.
- The image file to be flashed has been obtained.

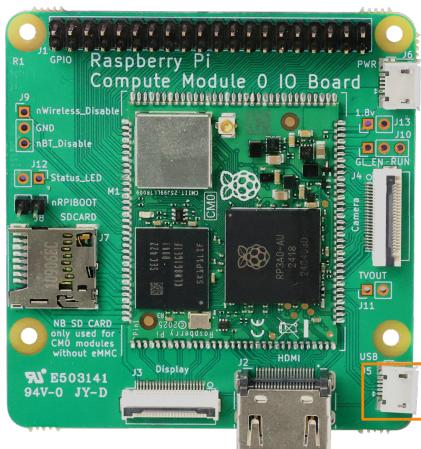
Procedure:

The following steps are described for the Windows operating system.

1. Locate the RPIBOOT pins on the CM0 Dev Board (as marked in the figure below) and short-circuit the two pins using a jumper cap.



2. Locate the Micro USB port on the CM0 Dev Board, as indicated in the figure below.



3 Connect the USB programming cable (Micro USB to USB-A).

- Connect the USB programming cable: one end to the device's Micro USB port, the other end to a USB port on your PC.

Note

Since the CM0IO board only requires a 5V power supply, the USB programming cable can simultaneously provide power, eliminating the need for an additional power source.

Warning

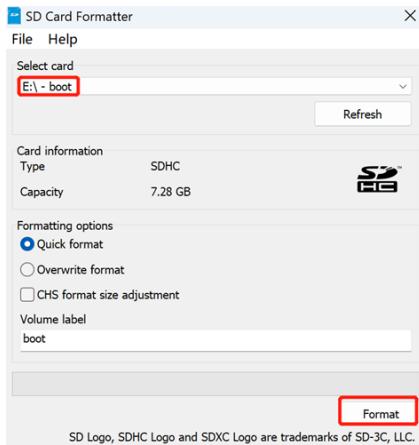
Do not connect a 5V power supply to the CM0 development board's power port during eMMC programming. Connecting both the power port and USB port simultaneously may damage the CM0IO board.

4. Launch the installed rpiboot tool to automatically assign a drive letter.

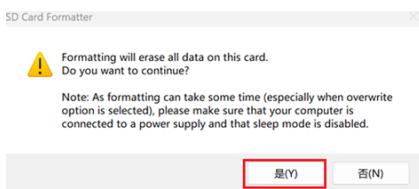
```
gpiboot:gpiboot:1 x -v
Please fit the PIM-JTAG cable / esp320000 please before connecting the power and GND cables to the target device.
If the device fails to connect then please see https://github.com/raspberrypi/gpiboot for debugging tips!
Loading: mass-storage-pagedsd-bootfiles.bin
Using mass-storage-pagedsd-bootfiles.bin
Mass storage boot code loaded
Waiting for BCM2835:6/7/21/212...
Loading embedded bootcode bin
Sending bootcode bin
Received 100% of data
Waiting for BCM2835:6/7/21/212...
Loading embedded bootcode bin
Loading embedded bootcode bin
Second stage boot servoing...
Cannot open file autoboot.txt
Loading embedded bootcode bin
File read: config.txt
Cannot open file config.txt
Loading embedded start.elf
File read: config.txt
Cannot open file fipup.dat
Device configuration done
Raspberry Pi Mass Storage Gadget started
EMC/NVME devices should be visible in the Raspberry PI Imager in a few seconds
For debug, you can log in to the device using the USB serial gadget - see COM ports in Device Manager.
Press a key to close this window.
```

5. Once partitioning is complete, a drive letter will appear in the lower-right corner of your computer.

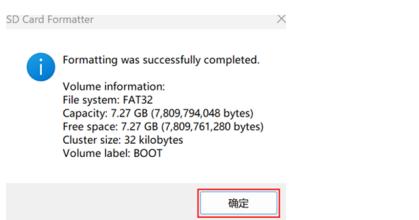
6. Open SD Card Formatter, select the formatted drive letter, and click "Format" in the lower-right corner to format the drive.



7. In the prompt dialog box that appears, click "Yes."

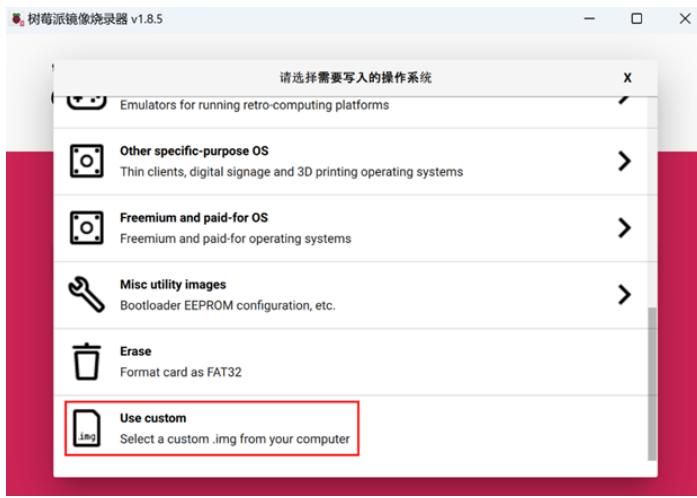


8. After formatting completes, click "OK" in the confirmation dialog.

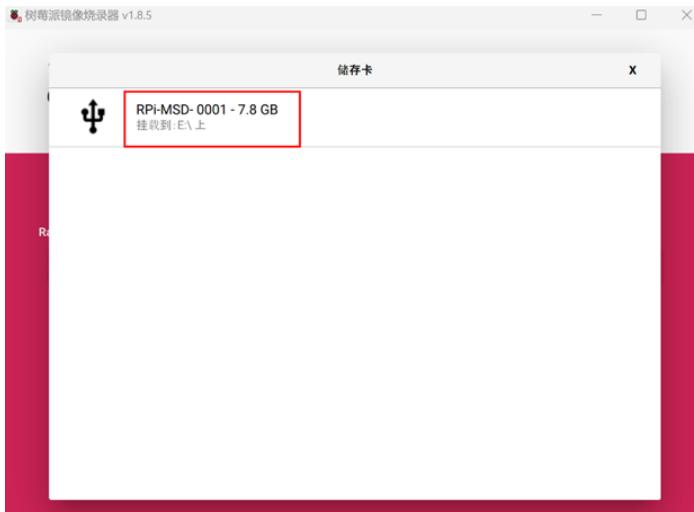


9. Close SD Card Formatter.

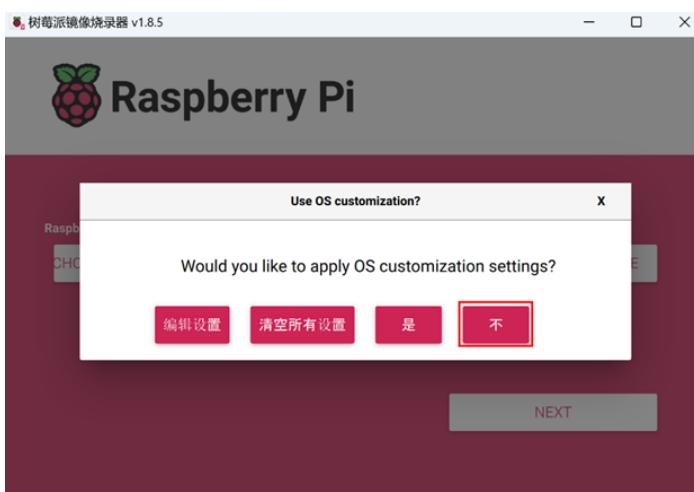
10. Open Raspberry Pi Imager, click "Select OS," and choose "Use custom" in the pop-up pane.



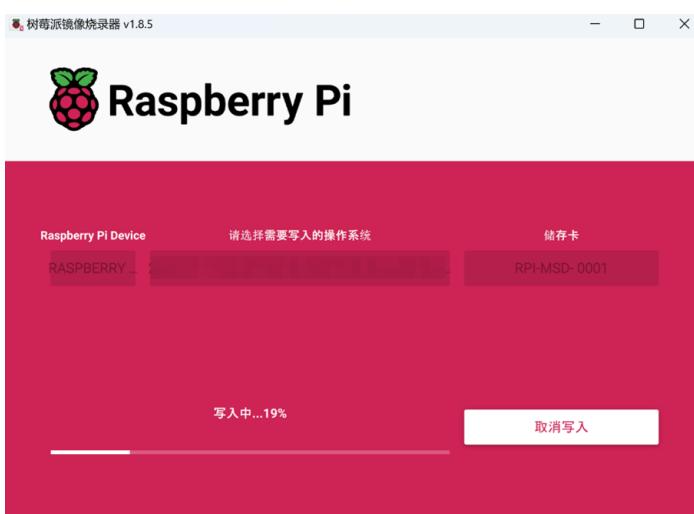
11. Follow the prompts to select the image file you obtained from the custom path, then return to the main burning interface.
12. Click "Select SD Card," choose the default SD card in the "Storage Card" interface, and return to the main image writing interface.



13. Click "NEXT". In the "Use OS customization?" prompt that appears, select "No" to begin writing the image.



14. In the pop-up "Warning" prompt, select "Yes" to begin writing the image.



15. After the image is written, the files will be verified.



16. Upon successful verification, a "Burning Successful" prompt will appear. Click "Continue" to complete the burning process.



17. Close Raspberry Pi Imager, remove the USB programming cable and jumper caps from the RPIBOOT pins, then power the device back on.

3.2 Connecting Cables

Introduction to cable

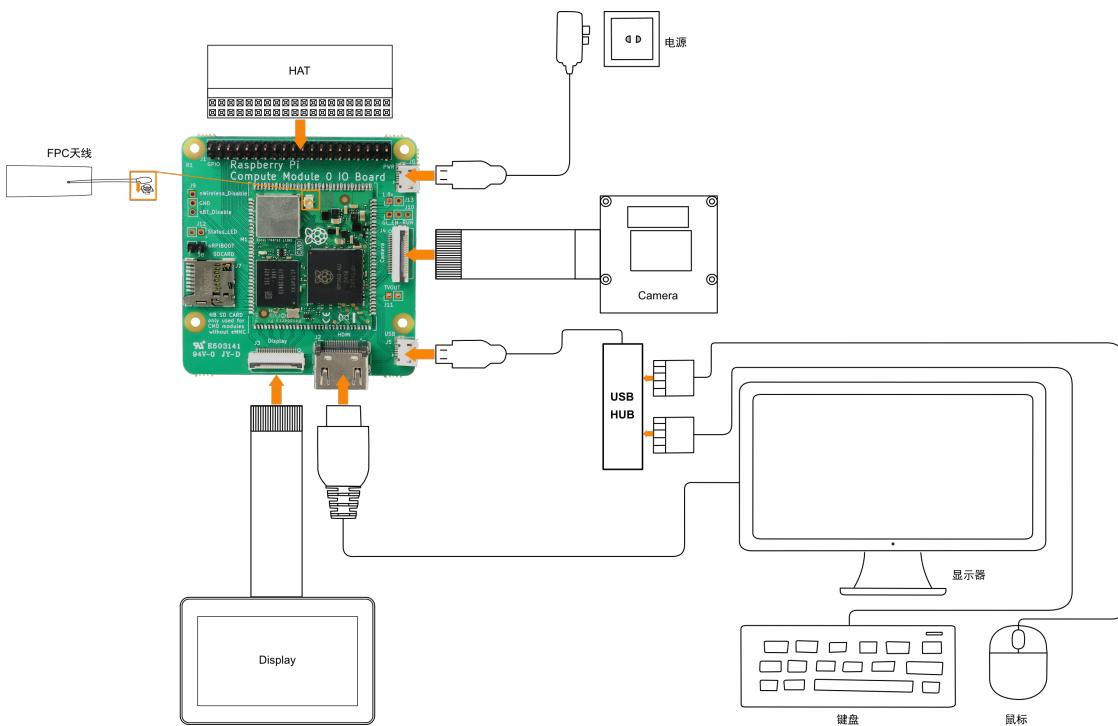
connection methods.

Preparation:

- Ensure you have functional accessories such as a USB hub, monitor, mouse, keyboard, and power adapter.
- A functional network connection is available.
- A functional HDMI cable is available.

Cable Connection Diagram:

For pin definitions of each interface and specific connection methods, refer to [Section 1.4 Interfaces](#).



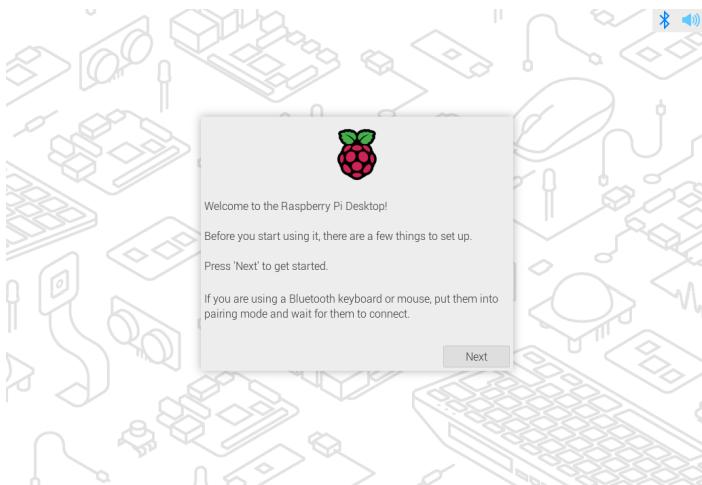
3.3 Initial System Boot

The CM0 Dev Board lacks a power switch. Upon connecting power, the system will begin booting.

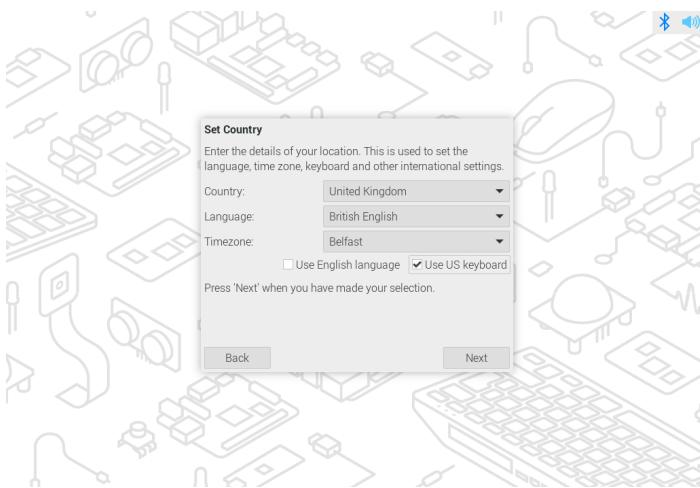
- The green ACT LED flashes, indicating normal system startup.

3.3.1 Raspberry Pi OS (Desktop)

If the product shipped with the Desktop edition pre-installed, the CM0 Dev Board will boot directly into the initial configuration desktop (as shown below). Follow the steps below to complete the initial setup.



1. Click "Next" to enter the "Set Country" interface. Configure parameters such as "Country," "Language," and "Timezone" as needed.



Note

It is recommended to check "Use US keyboard".

2. Click "Next" to proceed to the "Create User" screen. Create a "username" and "password" as needed.



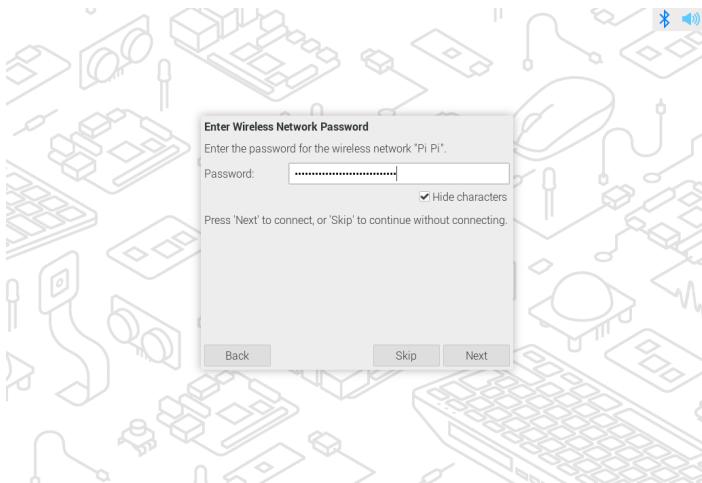
3. Click "Next" to proceed to the "Select Wireless Network" screen, then choose the Wi-Fi network name you wish to connect to.



Note

You may also click "Skip" here to bypass the Wi-Fi connection.

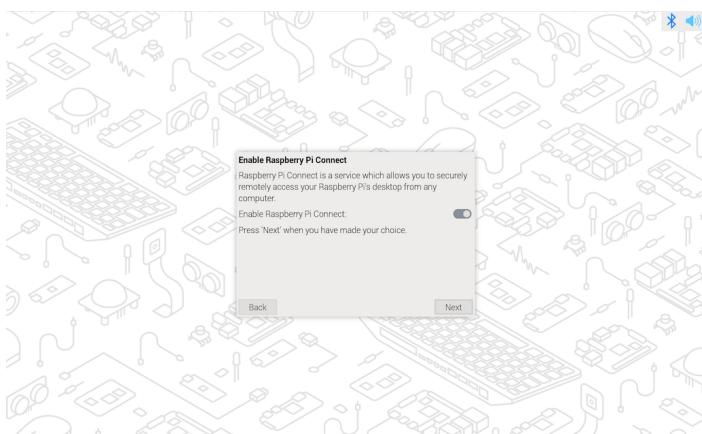
4. Click "Next" to proceed to the "Enter Wireless Password" screen and enter the Wi-Fi password.



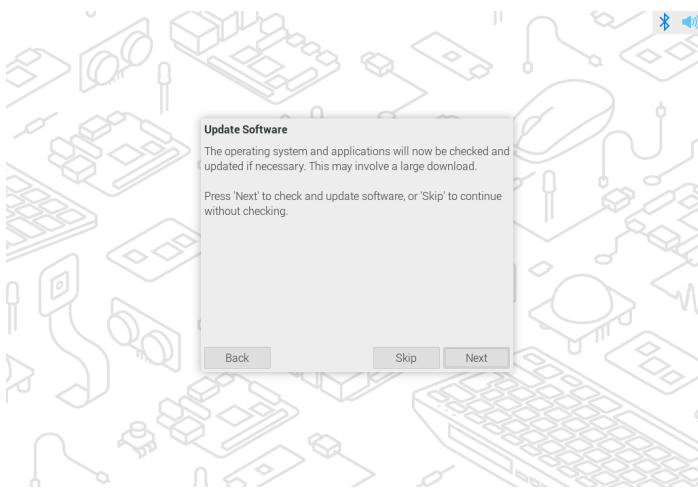
5. Click "Next" to proceed to the "Choose Browser" screen. Select your preferred default browser as needed.



6. Click "Next" to proceed to the "Enable Raspberry Pi Connect" screen. Set the enable switch as needed.



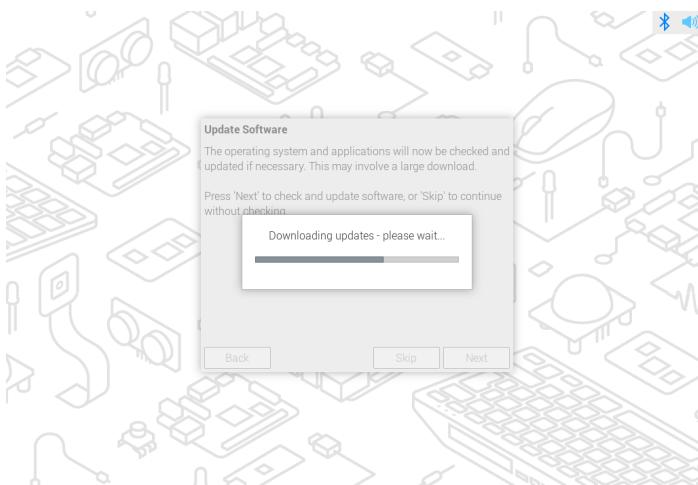
7. Click "Next" to proceed to the "Update Software" screen.



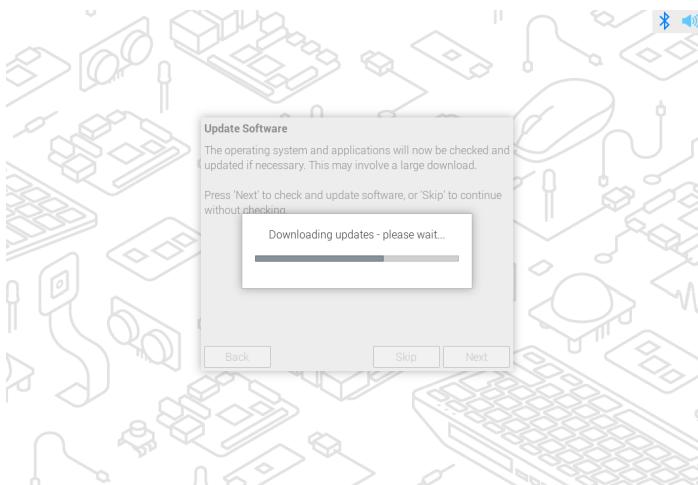
Note

You may also click "Skip" here to bypass the software update.

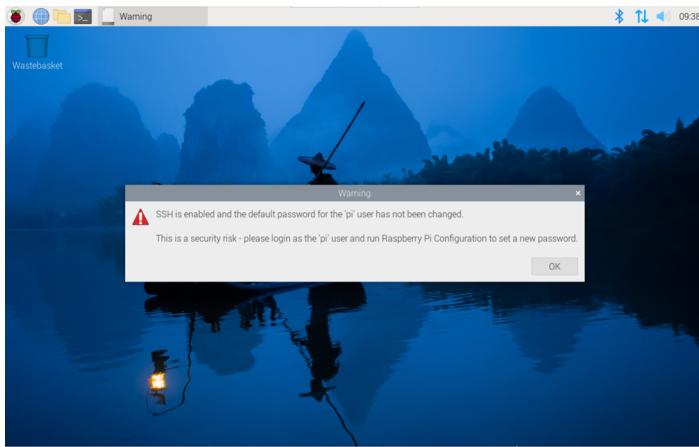
8. Click "Next" to proceed with the software update.



9. After the software update completes, the "Setup Complete" screen appears.



10. Click "Restart" to enter the system desktop.

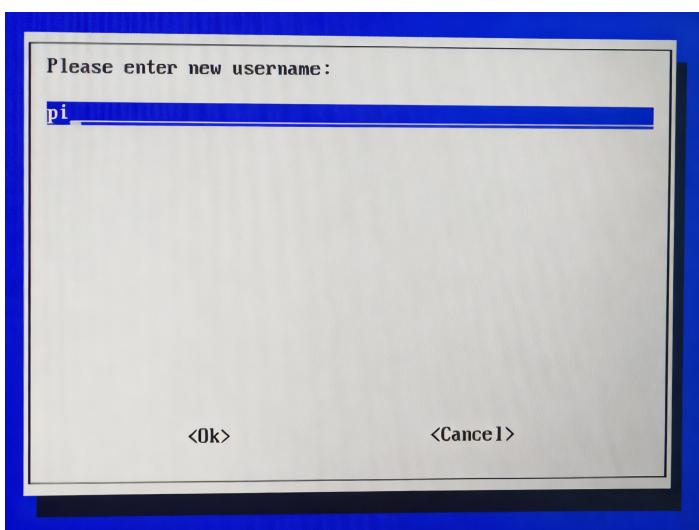


3.3.2 Raspberry Pi OS (Lite)

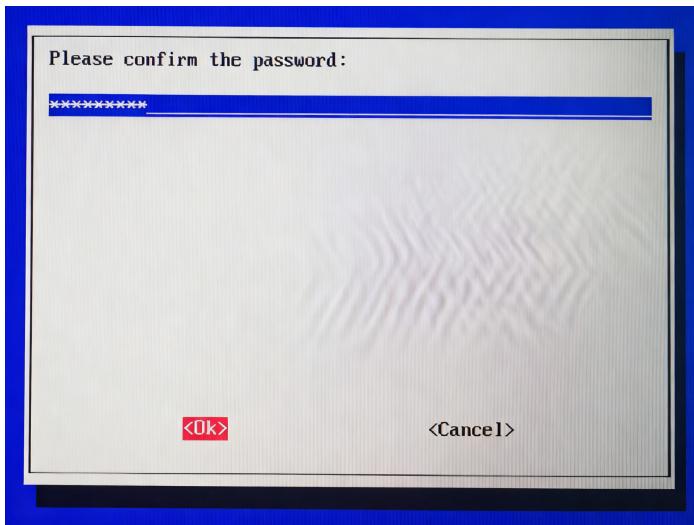
If the product shipped with the Lite edition installed, the CM0 Dev Board will display the "Configuring keyboard-configuration" screen upon startup (as shown below). Follow the steps below to complete the initial configuration.



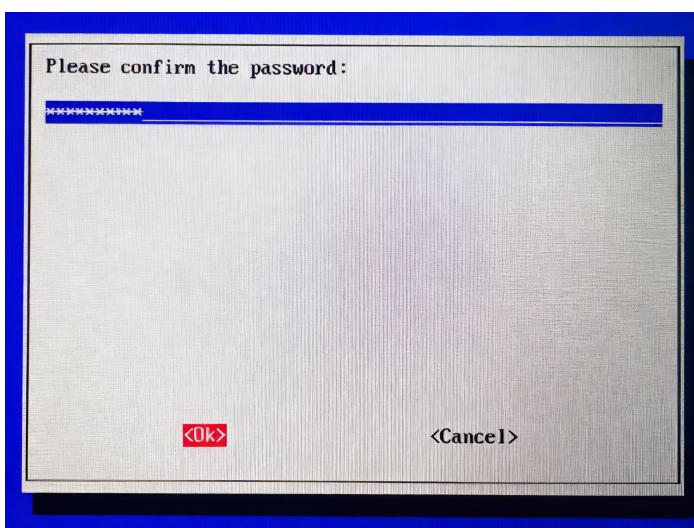
1. Configure the keyboard type as needed, then select "OK" and press "Enter" to proceed to the user creation interface.



2. Create a username as needed, then select "OK" and press "Enter" to enter the user password setup screen.



- Enter the password as needed, then select "OK" and press "Enter" to proceed to the password confirmation screen.



- Re-enter the password, select "OK," and press "Enter" to complete the initial setup and proceed to the login screen.
- Follow the prompts to enter your username and password to log in to the system. The screen below indicates a successful login.

```

[ 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 Kill Status /dev/rfkill Watch.
Starting Modem Manager...
Starting Vecx Local Compatibility...
Starting Permit User Sessions...
[ OK ] Finished Permit User Sessions.
[ OK ] Started /etc/rc.local Compatibility.
Starting Load/Save RF Kill Switch Status...
[ OK ] Finished Load/Save RF Kill Switch Status...
[ 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 ttys000

Wi-Fi is currently blocked by rfkill.
Use raspi-config to set the country before use.

pi@raspberrypi:~ $ "

```

4 System Configuration

This chapter describes the specific steps for system configuration.

4.1 Finding Device IP

Finding the Device IP Address

4.2 Remote Login

Remote Login

4.3 Configure Storage Devices

Configure Storage Device

4.4 Configure Ethernet IP

Note

Supports wired network connections via USB-to-Ethernet adapters.

Configure Ethernet IP

4.5 Configure Wi-Fi

Configure Wi-Fi

4.6 Configure Bluetooth

Configure Bluetooth

4.7 Configure Camera

The CM0 development board's Camera interface supports connecting a Raspberry Pi Camera. Before using the Camera, please refer to the [Raspberry Pi Camera Module documentation](https://www.raspberrypi.com/documentation/accessories/camera.html) (<https://www.raspberrypi.com/documentation/accessories/camera.html>) for relevant configuration.

4.8 Configure Display

The CM0 development board's Display interface supports connecting to the Raspberry Pi Display. Before using the Display, please refer to [the Raspberry Pi Touch Display 2 documentation](https://www.raspberrypi.com/documentation/accessories/touch-display-2.html#connect-to-raspberry-pi) (<https://www.raspberrypi.com/documentation/accessories/touch-display-2.html#connect-to-raspberry-pi>) for relevant configuration.

5 Raspberry Pi Official Documentation

For more detailed configuration and operating system usage, refer to the Raspberry Pi official documentation.

- Raspberry Pi OS: The official Raspberry Pi operating system (<https://www.raspberrypi.com/documentation/computers/os.html>).
- Configuration: Configuring your Raspberry's settings (<https://www.raspberrypi.com/documentation/computers/configuration.html>).
- config.txt: Low-level settings control (https://www.raspberrypi.com/documentation/computers/config_txt.html).
- The Linux kernel: How to configure and build a custom kernel for your Raspberry Pi (https://www.raspberrypi.com/documentation/computers/linux_kernel.html).
- Remote access: Accessing your Raspberry Pi remotely (<https://www.raspberrypi.com/documentation/computers/remote-access.html>).