# CM4MEDIA USER MANUAL

Shanghai EDA Technology Co.,Ltd
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EDA Technology Co.,LTD– Electronics Development Accelerator

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# Contents

EDA Technology Co.,LTD– Electronics Development Accelerator

# 1 Product Overview

ED-CM4MEDIA is a multimedia computer based on Raspberry Pi Compute Module 4 (CM4 for short). It makes full use of CM4's structural flexibility to solve the heat dissipation problem of CPU, wireless module and PMU, improves the reliability of wireless communication through external WIFI/BT antenna, adds WM8960 chip, supports dual speaker playback, has microphone, 3.5mm headphone jack and is equipped with SONY IMX219 eight-megapixel sensor to meet the daily photo requirements.

## 1.1 Target Application

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

## 1.2 Specifications and Parameters

| Function | Parameters |
|---|---|
| CPU | BCM2711 4 core, ARM Cortex-A72(ARM v8), 1.5GHz, 64bit CPU |
| Memory | 1GB / 2GB / 4GB / 8GB option |
| eMMC flash | 8GB / 16GB / 32GB option |
| SD card | 8GB / 16GB / 32GB option |
| SSD | 128GB / 256GB option |
| Ethernet | 1x Gigabit Ethernet |
| WiFi / Bluetooth | 2.4G / 5.8G Dual band WiFi, bluetooth5.0 |
| HDMI | 1x standard HDMI |
| Micro-HDMI | 1x Micro-HDMI |
| USB Host | 2x USB 3.0 Type A, 1x USB 2.0 |
| Mini PCIe | 1-lane PCIe 2.0, Highest support 5Gbps（default use SSD） |
| Real time clock | 1x RTC |
| Speaker | 2x Speaker |
| Microphone | 1x Microphone |
| LED indicator | Blue LED as power indicator and status indicator. |
| Power input | 5V@3A |
| Dimensions | 100(length) x 100(wide) x 19(high) mm |
| Case | CNC cutting aluminum alloy shell |

| Function | Parameters |
|---|---|
| Antenna accessory | Support optional WiFi/BT external antenna, which has passed wireless authentication together with Raspberry Pi CM4, and optional 4G external antenna. |
| Working environment temperature | Run at full speed at 0 ~ 60 ℃ ambient temperature. |
| Operation system | compatible with official Raspberry Pi OS, provides BSP software support package, and supports online installation and update of APT. |

## 1.3 System Diagram
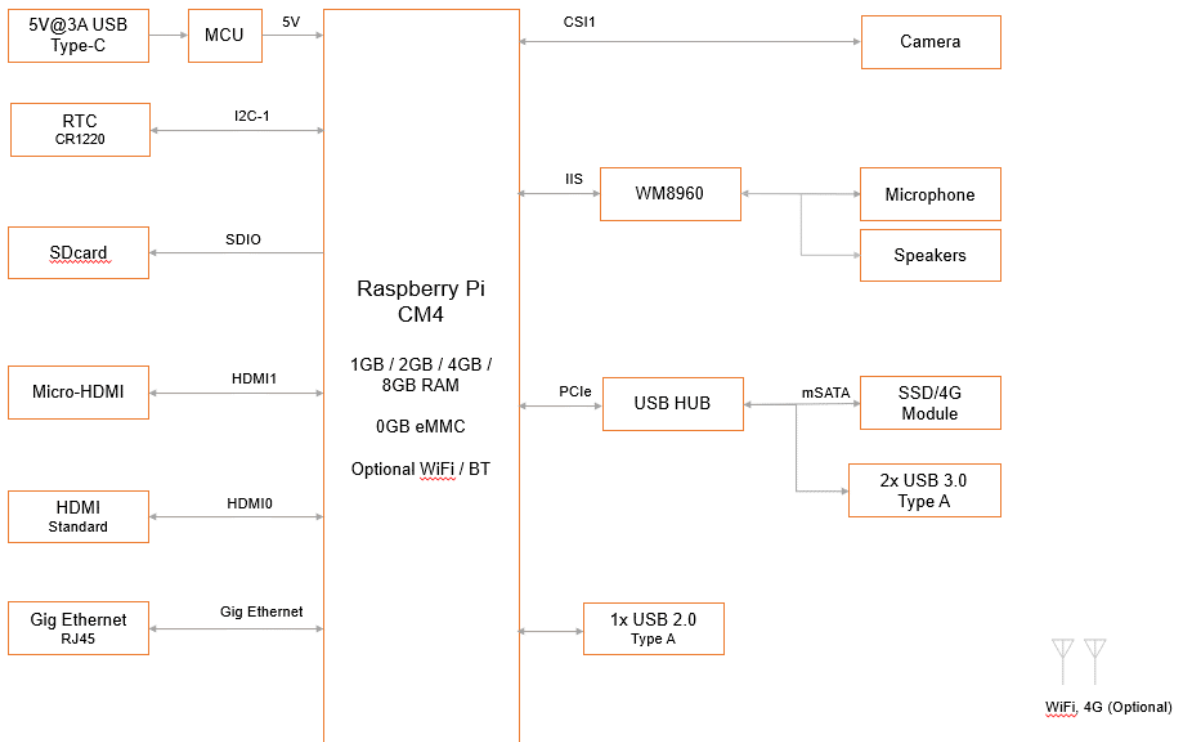
## 1.4 Functional Layout
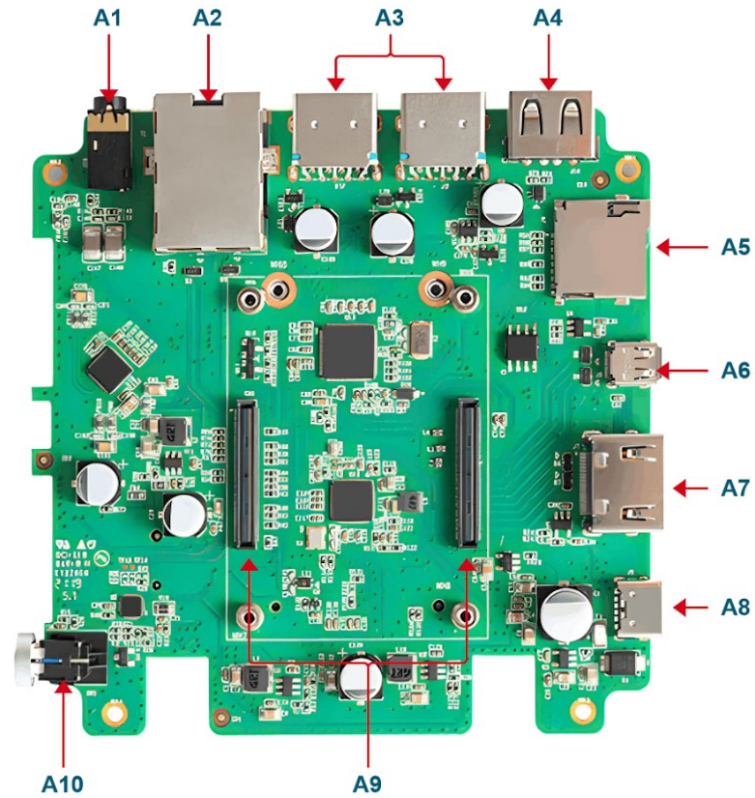


| Item | Function Description | Item | Function Description |
|------|---------------------|------|---------------------|
| A1 | Standard 3.5mm headphone jack | A2 | RJ45 Gigabit network port |
| A3 | USB 3.0 | A4 | USB 2.0 |
| A5 | Micro-SD card slot | A6 | Micro-HDMI port |
| A7 | Standard HDMI port | A8 | Type-C power port |
| A9 | CM4 slot | A10 | Power button |

| Item | Function Description | Item | Function Description |
|------|--------------------|------|--------------------|
| B1 | Onboard microphone | B2 | 5W speaker |
| B3 | 5W speaker | B4 | CR1220 button cell, powered for RTC. |
| B5 | Mini PCIe | B6 | Micro SIM card slot |
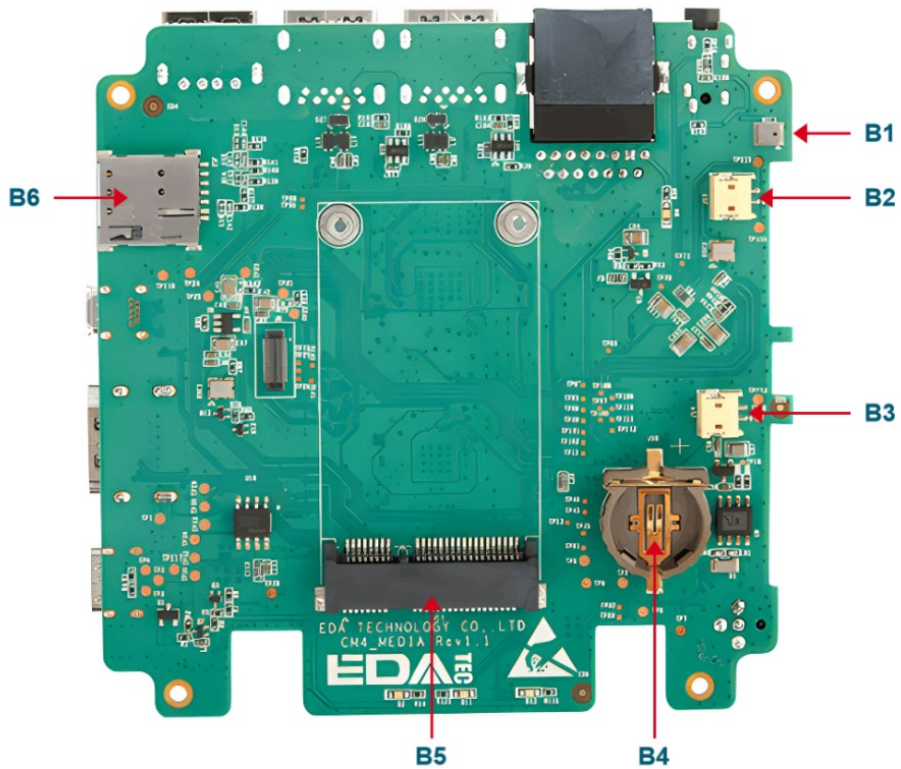
## 1.5 Packing List

- 1x CM4 Media
- 1x WIFI/BT antenna
- [option] 1x 4G antenna

## 1.6 Order Code

EDA Technology Co.,LTD– Electronics Development Accelerator

| ED | - | CM4MED | 10 | - | 1 | 8 | 20 | - | 4 | C | S |

EDATEC

CM4 Media

10 = V1.0 Version

0 = Without WiFi & BT
1 = With WiFi & BT

1 = 1GB DDR
2 = 2GB DDR
4 = 4GB DDR
8 = 8GB DDR

S = Silver Aluminum Case
P = Pink Aluminum Case

Blank = Without Camera
C = With Camera

Blank = No 4G/LTE Module
4 = With 4G/LTE Module

SD = 32GB SD Card
10 = 120/128GB SSD
20 = 240/256GB SSD
50 = 500/512GB SSD
1T = 1TB SSD

**Example**

**Part# : ED-CM4MED10-1820-4CS**

**Configuration :** CM4 Media Computer V1.0 Version
1pcs Raspberry Pi certified WiFi/Bluetooth Antenna 8GB DDR,
240/256GB SSD, 4G/LTE, camera and Sliver Aluminum Case.

# 2 Quick Start

This chapter introduces the startup of CM4 Media and some startup settings.

## 2.1 Equipment List

- 1x CM4 Media
- 1x WIFI/BT antenna
- 1x mouse
- 1x keyboard
- 1x HDMI display
- 1x HDMI connect cable
- 1x Network cable
- 1x 5V@3A Type-C power supply

## 2.2 Hardware Connection

1. Install the antenna to the antenna connector at the top of the equipment.
2. Insert the network cable, keyboard and mouse.
3. Plug in HDMI and connect the other end to the monitor.
4. Power on the monitor
5. Plug in the power cord, press the power switch button, and the system will start.
6. The power switch LED lights up, which means that the power supply is normal.

7.  Wait for the Raspberry logo to appear in the upper left corner of the screen.
8.  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

CM4 Media plugs into the power cord and presses the power switch, and the system will start up.

### 2.3.1 Raspberry Pi OS (Desktop)

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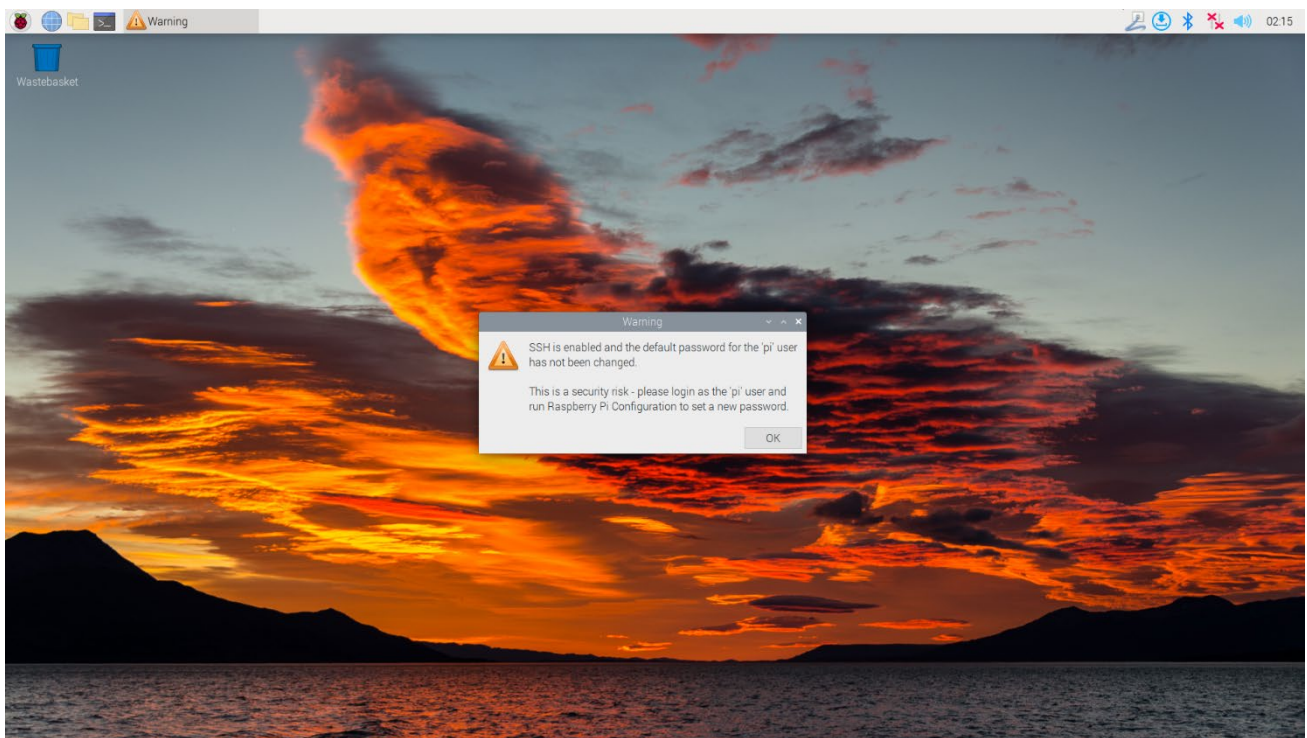


If you use the official system image, and the image is not configured before burning, the Welcome to Raspberry Pi application will pop up and guide you to complete the initialization setting when you start it for the first time.

- Click Next to start the setup.
- Setting Country, Language and Timezone, click Next。

**NOTE: You need to select a country region, otherwise the default keyboard layout of the system is the English keyboard layout (our domestic keyboards are generally the American keyboard layout), and some special symbols may not be typed.**
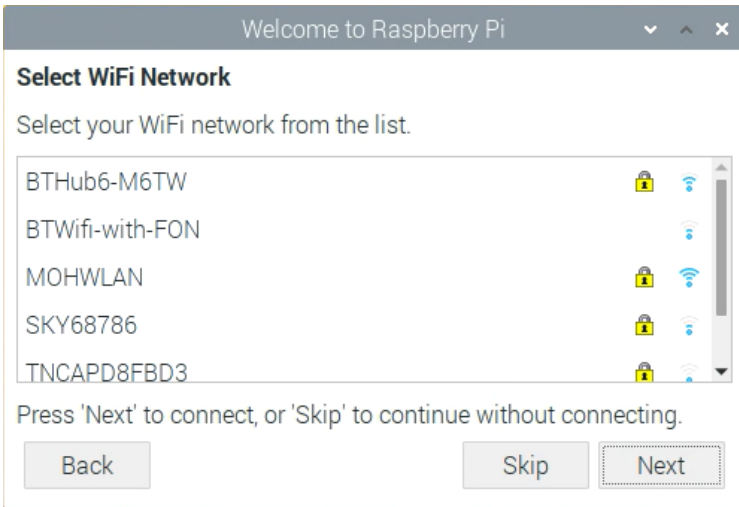


- Input a new password for the default account pi, and click Next.
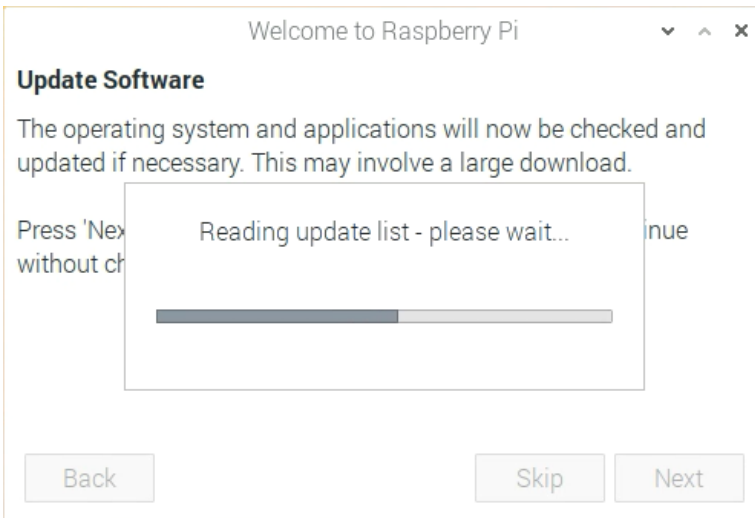**NOTE: Default password is raspberry**
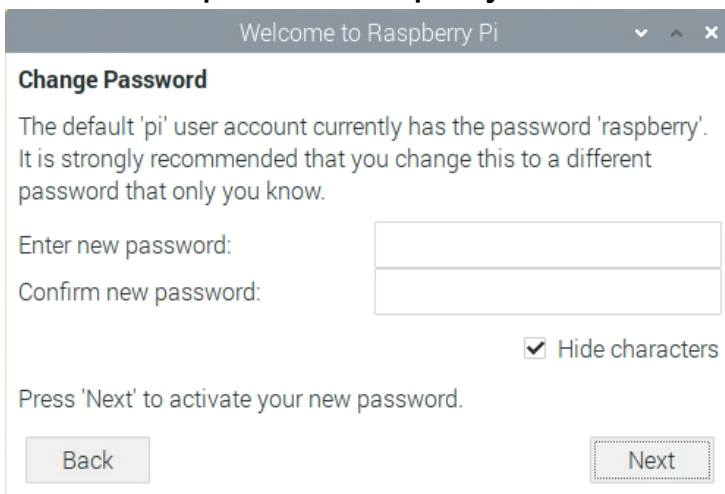
- Select the wireless network you need to connect to, enter the password, and then click Next.



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

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



- 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.

● Set the configuration keyboard layout
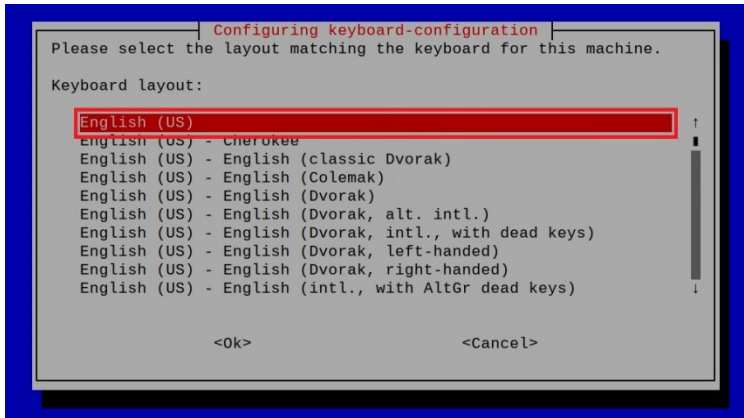
- Creat new user name
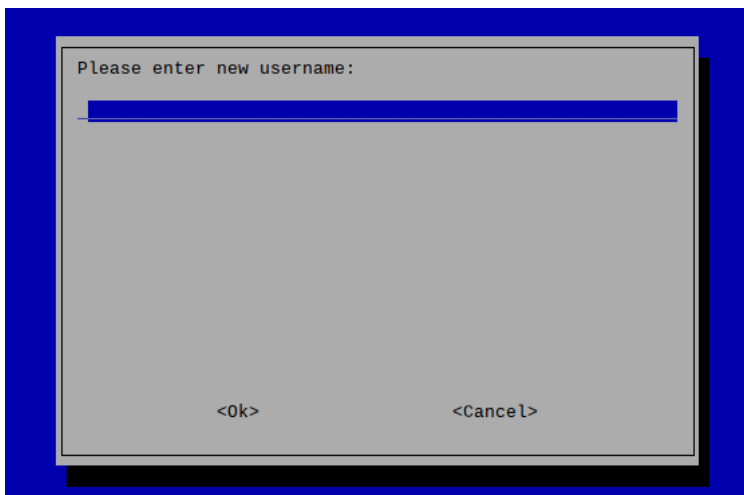


Then set the password corresponding to the user according to the prompt, and enter the password again for confirmation. At this point, you can log in with the user name and password you just set.

# 3 Wiring Guide

## 3.1 Panel I/O

### 3.1.1 micro-SD Card

There is a micro SD card slot on CM4 Media. Please insert the micro SD card face up into the micro SD card slot.
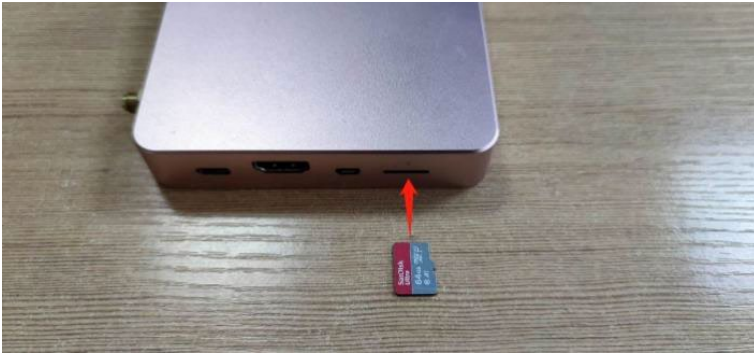
# 4 Software Operation Guide

## 4.1 USB 2.0 & USB 3.0

### 4.1.1 Check USB Device Information

List USB device

```
lsusb
```

The information displayed is as follows:

```
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.

```
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.

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

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

```
sudo umount /mnt
```

### 4.1.2.1    Mount

CM4 Media uses the desktop version of the system, and the system will automatically mount the storage device in the /media directory. If users need to modify the hanging location, they need to manually uninstall it and then remount it.

### 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:

```
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.

# 4.2 Ethernet Configuration

## 4.2.1 Gigabit Ethernet

There is an adaptive 10/100/1000Mbsp Ethernet interface on CM4 Media, which is adjacent to the DC power supply 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 Network Manager Tool 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.

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

**NOTE:   If use our factory image, the network-manager tool and the network-manager-gnome plug-in are installed by default.**
**NOTE:   If 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. 。
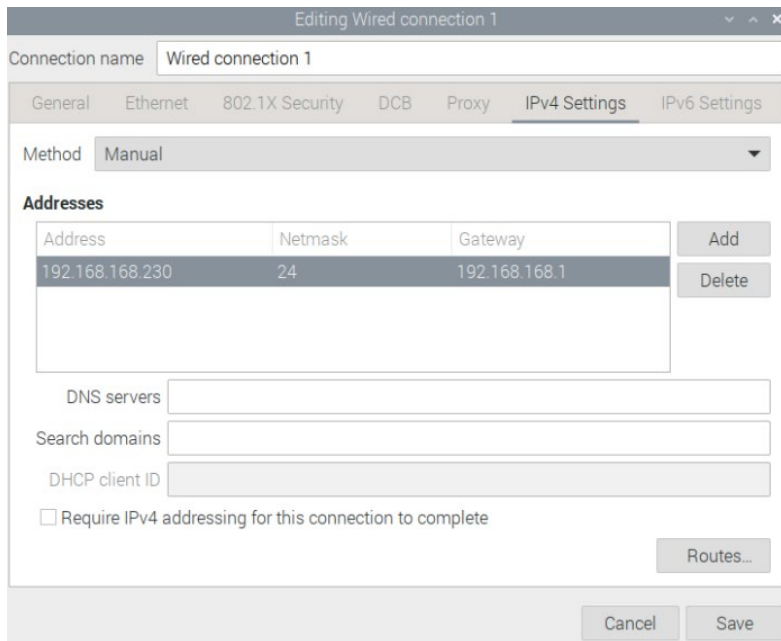
Right-click the NetworkManager icon and select Edit Connections。
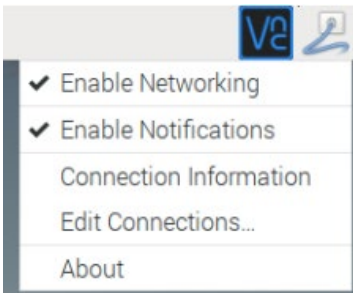


Select the connection name to modify, and then click the gear below.
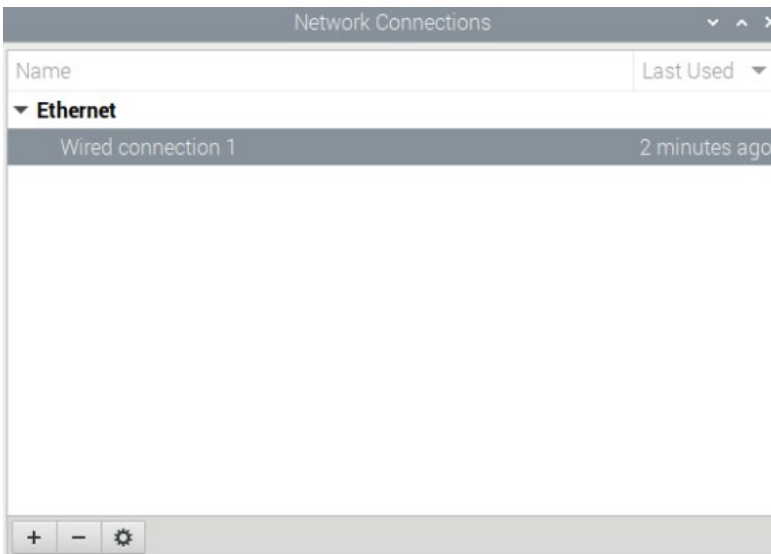


Switch to the configuration page of IPv4 Settings. If you want to set static IP, the Method selects Manual, and Addresses the IP you want to configure. If you want to set it as dynamic IP acquisition, just configure the Method as Automatic(DHCP) and restart the device.

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

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

Set dynamic IP acquisition
```
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.

```
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.

```
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

Customers can purchase CM4 Media 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
```
sudo nmcli device wifi
```

Connect WIFI with password.
```
sudo nmcli device wifi connect <SSID> password <password>
```

Set up WIFI automatic connection
```
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.

```
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/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 shell and is equipped with an external antenna, you can switch by the following operations:

Edit /boot/config.txt

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

Choose external add

```
dtparam=ant2
```

Than reboot the device to take effect.

## 4.3.3 AP and bridge mode

WiFi on CM4 Media also supports configuration in AP router mode, bridge mode or mixed mode.

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

## 4.4 Bluetooth

CM4 Media can choose whether the Bluetooth function is integrated or not. If it has 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](#) guide to configure and use Bluetooth.

### 4.4.1 Usage

Scan：

```
bluetoothctl scan on/off
```

Find：

```
bluetoothctl discoverable on/off
```

Trust device：

```
bluetoothctl trust [MAC]
```

Connect device：

```
bluetoothctl connect [MAC]
```

Disconnect device：

```
bluetoothctl disconnect [MAC]
```

## 4.4.2 Example

Into bluetootch shell

```
sudo bluetoothctl
```

Enable Bluetooth

```
power on
```

Scan device

```
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.

```
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

```
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

```
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

CM4 Media is 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 the CM4 Media is powered off, the RTC is still working and timing.

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

**WARN：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:**

```
sudo systemctl disable rtc
sudo systemctl stop rtc
```

**Re-enable this service:**

```
sudo systemctl enable rtc
sudo systemctl start rtc
```

**Read RTC Time manually:**

```
sudo hwclock -r
```

```
2022-11-09 07:07:30.478488+00:00
```

**Manually synchronize RTC time to the system:**

```
sudo hwclock -s
```

**Write the system time into RTC:**

```
sudo hwclock -w
```

**trouble shooting**

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

```
ls /dev/rtc0
```

If not, maybe you used the official standard system, but didn't install our BSP package.

Other possible checkpoints:

● Is CR1220 installed in button cell?
● 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 Multimedia Interface

CM4 Media has an onboard microphone and two 5W speakers, and Media also has a 3.5mm standard headphone jack, which supports stereo playback. When the user connects the headphone jack, the device will automatically switch to the headphone to play sound, and the onboard microphone will also switch to the headphone microphone.

## 4.6.1 Microphone

CM4 Media has an onboard microphone, which is located inside the device and automatically switches to the headset microphone after the user plugs in the headset.

Users can use the microphone to record through the arecord command. If you want to play it in real time, you can use aplay command to play it through the pipeline.

```
arecord -fcd -Dhw:2 | aplay -fcd -Dhw:2
```

The function of -Dhw:2 is to designate the sound card as sound card 2. The sound card number may change under different configurations. Users can use the following command to find the sound card corresponding to the wm8960 chip.

```
aplay -l
```

## 4.6.2 Camera

CM4 Media has Sony IMX219 8 megapixel camera, which can be controlled by libcamera. This package is pre-installed in Raspberry Pie and can be used directly.

Check the camera

```
libcamera-hello
```

Camera taking pictures

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

Record 10 seconds of video

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

Play the video you just recorded

```
vlc test.h264
```

## 4.6.3 Check The Sound Card

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

```
aplay -l
```

## 4.6.4 Recording

Users can record with the following commands:

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

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

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

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

```
man arecord
```

## 4.6.5 Playback

Users can use the following commands to play sounds:

```
aplay test.mp3
```

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

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

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

```
man aplay
```

# 5 Operating System Installation

## 5.1 Image Download

We have burned the system in the hard disk before leaving the factory, and users can skip this section and use it directly.

We have provided the factory image. If the system is restored to factory settings, please click the following link to download the factory image.

Default login information:
- User name: pi
- password: raspberry
- SSH：default enable，default port 22

**Raspberry Pi OS with desktop, 64-bit**

- Release date: Feb 3rd 2023
- System: 64-bit
- Kernel version: 5.15
- Debian version: 11 (bullseye)
- Downloads: https://1drv.ms/f/s!Au060HUAtEYBef-WCNe67PXbyr4?e=n2tE9W

## 5.2 SSD Burning Image

### 5.2.1 Tool Download

It is recommended to use the official burning tool of Raspberry Pi:

Raspberry Pi Imager (https://downloads.raspberrypi.org/imager/imager_latest.exe)

SD Card Formatter (https://www.sdcardformatter.com/download/)

### 5.2.2 Burn

1.  Download the image you want to burn to an SD card that has already burned the image.
2.  Insert the SD card and let the device boot from the SD card.
3.  Start the device and use lsusb to check the current disk mounting. The default SSD name should be sda, and the following default SSDs are sda operations. If there are differences, please change them according to the actual situation.
4.  execute the command

```
sudo dd if=image of=/dev/sda bs=4MiB
sync
```

5. Wait for the command to be executed.
6. At this time, you can see that sda has two partitions, sda1 and sda2, and mount sda1 in the /mnt directory.

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

7. Modify the cmdline.txt file

```
sudo nano /mnt/cmdline.txt
```

8. Add the following at the beginning of the document

```
usb-storage.quirks=152d:0578:u
```

9. Save the file to exit and unmount sda1.

```
sudo umount /mnt
```

10. Shut down and then remove the SD card and restart the device.

# 6 FAQ

## 6.1 Default Username and Password

User name：pi
password：raspberry

# 7 About us

## 7.1 About EDATEC

EDATEC, located in Shanghai, is one of Raspberry Pi's global design partners. Our vision is to provide hardware solutions for Internet of Things, industrial control, automation, green energy and artificial intelligence based on Raspberry Pi technology platform.

We provide standard hardware solutions, customized design and manufacturing services to speed up the development and time to market of electronic products.

## 7.2 Contact us

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