

### ED-HMI2020-101C

# 10.1 inch Industrial Panel PC Based on Raspberry Pi CM4

**User Manual** 

**EDA Technology Co., LTD** 

August 2023

**Contact Us** 

Thank you very much for purchasing and using our products, and we will serve

you wholeheartedly.

As one of the global design partners of Raspberry Pi, we are committed to

providing hardware solutions for IOT, industrial control, automation, green

energy and artificial intelligence based on Raspberry Pi technology platform.

You can contact us in the following ways:

EDA Technology Co.,LTD

Address:Room 301, Building 24, No.1661 Jialuo Road, Jiading District,

Shanghai

Mail: sales@edatec.cn

Phone: +86-18217351262

Website: <a href="https://www.edatec.cn">https://www.edatec.cn</a>

**Technical Support:** 

Mail: support@edatec.cn

Phone: +86-18627838895

Wechat: zzw 1998-

### **Copyright Statement**

ED-HMI2020-101C and its related intellectual property rights are owned by EDA Technology Co.,LTD.

EDA Technology Co.,LTD owns the copyright of this document and reserves all rights. Without the written permission of EDA Technology Co.,LTD, no part of this document may be modified, distributed or copied in any way or form.

### **Disclaimer**

EDA Technology Co.,LTD does not guarantee that the information in this manual is up to date, correct, complete or of high quality. EDA Technology Co.,LTD also does not guarantee the further use of this information. If the material or non-material related losses are caused by using or not using the information in this manual, or by using incorrect or incomplete information, as long as it is not proved that it is the intention or negligence of EDA Technology Co.,LTD, the liability claim for EDA Technology Co.,LTD can be exempted. EDA Technology Co.,LTD expressly reserves the right to modify or supplement the contents or part of this manual without special notice.

### **Foreword**

### **Related Manuals**

All kinds of product documents contained in the product are shown in the following table, and users can choose to view the corresponding documents according to their needs.

Documents	Instruction
	This document introduces the product features, software and
ED-HMI2020-101C Datasheet	hardware specifications, dimensions and ordering code of
ED-HIMI2020-101C Datasfieet	ED-HMI2020-101C to help users understand the overall system
	parameters of the products.
	This document introduces the appearance, installation, startup
ED-HMI2020-101C User Manual	and configuration of ED-HMI2020-101C to help users use the
	product better.
	This document introduces the OS download, eMMC flashing and
ED-HMI2020-101C Application Guide	partial configuration of ED-HMI2020-101C to help users use the
	product better.

Users can visit the following website for more information:

https://www.edatec.cn

### **Reader Scope**

This manual is applicable to the following readers:

- Mechanical Engineer
- Electrical Engineer
- Software Engineer
- ♦ System Engineer

### **Related Agreement**

### **Terminology Convention**

Terminology	Meaning
CM4	Raspberry Pi CM4 Module, Full name is Compute Module 4

### **Symbolic Convention**

Symbolic	Instruction	
	Prompt symbols, indicating important features or operations.	
	Notice symbols, which may cause personal injury, system damage, or signal interruption/loss.	
4	May cause great harm to people.	

### **Safety Instructions**

- ◆ This product should be used in an environment that meets the requirements of design specifications, otherwise it may cause failure, and functional abnormality or component damage caused by non-compliance with relevant regulations are not within the product quality assurance scope.
- Our company will not bear any legal responsibility for personal safety accidents and property losses caused by illegal operation of products.
- Please do not modify the equipment without permission, which may cause equipment failure.
- When installing equipment, it is necessary to fix the equipment to prevent it from falling.
- ◆ If the equipment is equipped with an antenna, please keep a distance of at least 20cm from the equipment during use.
- ◆ Do not use liquid cleaning equipment, and keep away from liquids and flammable materials.
- ◆ This product is only supported for indoor use.

### Content

For	eword		
	Related Ma	anuals	
	Reader Sc	ope	
	Related Ag	reement	i
	Termin	ology Convention	i
	Symbo	olic Convention	i
Saf	ety Instruction	ons	ii
1	Product De	escription	1-1
	1.1 O	verview	1-2
	1.2 Pa	acking List	1-3
	1.3 A <sub>l</sub>	ppearance	1-4
	1.3.1	Front Panel	1-4
	1.3.2	Rear Panel	1-5
	1.3.3	Side Panel	1-5
	1.4 Bu	utton	1-8
	1.4.1	RESET Button	1-8
	1.4.2	PROGRAMING Button	1-8
	1.5 In	dicator	1-9
	1.6 In	terface	1-10
	1.6.1	Micro SD Card Slot	1-10
	1.6.2	Power Supply Interface	1-10
	1.6.3	Audio Interface	1-10
	1.6.4	1000M Ethernet Interface	1-10
	1.6.5	HDMI Interface	1-11
	1.6.6	USB 2.0 Interface	1-11
	1.6.7	USB 3.0 Interface	1-11
	1.6.8	Antenna Interface (optional)	1-11
2	Installing C	Components	2-1
	2.1 In	stalling Antenna (optional)	2-2
	2.2 In	stalling Micro SD Card	2-3
3	Installing D	evice	3-4
	3.1 E	mbedded Installation	3-5
4	Booting Th	e Device	4-1
	4.1 C	onnecting Cables	4-2
	4.2 Bo	ooting The System For The First Time	4-3
	4.2.1	Raspberry Pi OS (Desktop)	4-3
	4.2.2	Raspberry Pi OS (Lite)	4-3
5	Configuring	g System	5-1
	5.1 Fi	nding Device IP	5-2
	5.1.1	Query IP by Using ifconfig Command	5-2
	5.1.2	Login Router to Query IP	5-2
	5.1.3	Scan For Using NMAP Tool	5-3

5.2	2 Remote Login		
	5.2.1	Connecting To The Device Via SSH	5-4
	5.2.2	Connecting To The Device Desktop Through VNC	5-6
5.3	Co	nfiguring Storage Devices	5-9
	5.3.1	Mounting a Storage Device	5-9
	5.3.2	Unmounting The Storage Device	5-11
	5.3.3	Set The Storage Device To Mount Automatically	5-11
5.4	Co	nfiguring Ethernet IP	5-13
	5.4.1	Configuring IP by Using The NetworkManager Tool	5-13
	5.4.2	Configuring IP by Using The dhcpcd Tool	5-16
5.5	Co	nfiguring WiFi (Optional)	5-18
	5.5.1	Enabling WiFi Function	5-18
	5.5.2	Using The NetworkManager Tool To Configure WiFi Connections	5-20
	5.5.3	Configuring WiFi Connection By Using dhcpcd Tool	5-22
5.6	Configuring Bluetooth (optional)		5-24
	5.6.1	Basic Configuration Command	5-24
	5.6.2	Configuration Example	5-24
5.7	Co	nfiguring Buzzer	5-26
5.8	i.8 Configuring RTC		5-27
5.9	Co	nfiguring Audio	5-28
	5.9.1	Adjusting The Volume	5-28
	5.9.2	Configuring Record	5-30
5.10	) Co	nfiguring LCD Screen	5-32
	5.10.1	Rotating Orientation	5-32
	5.10.2	Adjusting Brightness	5-33
5.11	Co	11 Configuring Camera	

## 1 Product Description

This chapter introduces the product overview, packing list, appearance, button, indicators and interfaces.

- ✓ Overview
- ✓ Packing List
- ✓ Appearance
- ✓ Button
- ✓ Indicator
- ✓ Interface

### 1.1 Overview

ED-HMI2020-101C is an industrial Panel PC based on Raspberry Pi CM4. According to different application scenarios and user needs, different specifications of RAM and eMMC computer systems can be selected.

- ◆ RAM can choose 1GB、2GB、4GB and 8GB
- ◆ eMMC can choose 8GB、16GB and 32GB

ED-HMI2020-101C provides common interfaces such as HDMI, USB and Ethernet, and supports access to the network through Wi-Fi and Ethernet. The integration of RTC, EEPROM and encryption chip provides the ease of use and reliability of the product, which is mainly used in industrial control.





### 1.2 Packing List

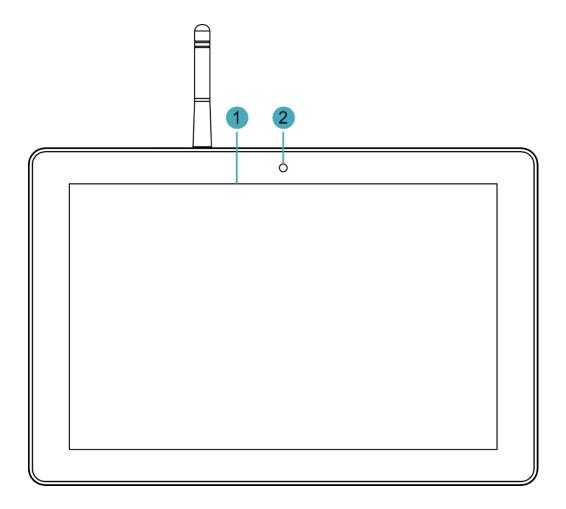
- ◆ 1x ED-HMI2020-101C Unit
- ◆ 4 x buckles(including 4xM4\*8 screws and 4xM4\*16 screws)
- ♦ [option WiFi/BT version] 1x 2.4GHz/5GHz WiFi/BT Antenna

### 1.3 Appearance

Introducing the functions and definitions of interfaces on each panel.

### 1.3.1 Front Panel

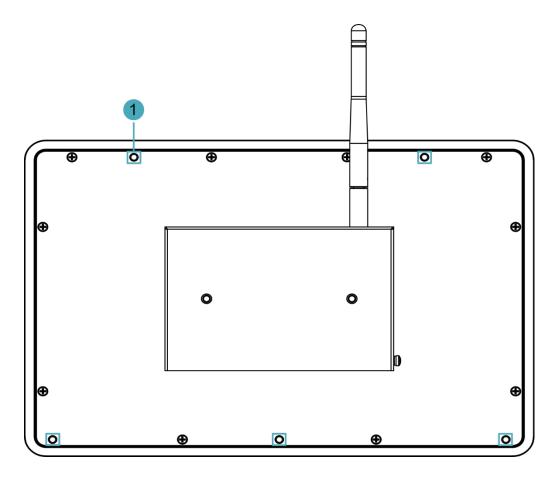
This section introduces types and definitions of the front panel interface.



NO.	Function Definition	
1	1 x LCD display, 10.1 inch LCD, which supports up to 1280x800 and multi-point capacitive touchscreen.	
2	1 x camera, 800M front camera.	

### 1.3.2 Rear Panel

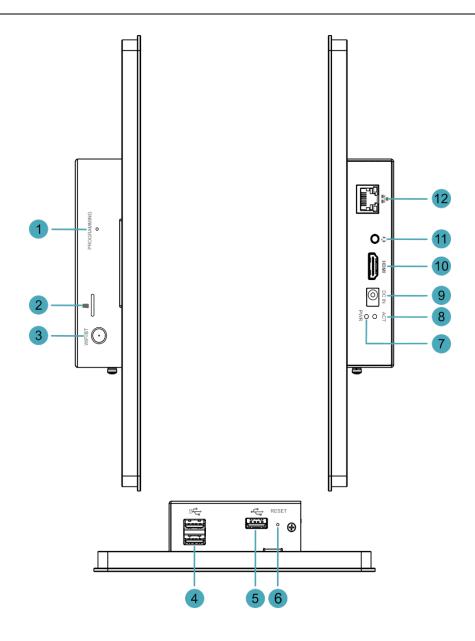
This section introduces types and definitions of the rear panel interface.



NO.	Function Definition	
	5 x installation holes of buckle, which are used to fix the buckles to the device for	
1	installation. You only need to use 4 installation holes during installation, and reserve	
	one as a spare.	

### 1.3.3 Side Panel

This section introduces types and definitions of the side panel interfaces.



Function Definition	
1 x PROGRAMING button, which is used to flash eMMC for the system	
1 x Micro SD card slot, which supports the installation of SD card for storing user	
data.	
1 x WiFi/BT antenna port, SMA connector, which is used to connect Wi-Fi/BT	
antenna.	
2 x USB 3.0 ports, type A connector, each channel supports up to 5Gbps.	
1 x USB 2.0 port, type A connector, which supports up to 480Mbps.	
1 x Reset button, hidden button, you can press the button to restart the device.	
1 x red power indicator, using to check the status of device power-on and power-off.	
1 x green system status indicator, using to check the working status of device.	
1 x DC input, DC Jack connector, which supports 9V~28V input.	
1 x HDMI port, type A connector, which compatibles with HDMI2.1 standard and	
supports 4K 60Hz. It supports to connect a display.	
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.	
1 x 10/100/1000M adaptive ethernet port, RJ45 connector, with led indicator. It can	
be used to access the network. PoE can be supported through expansion module.	

### 1.4 Button

The section introduces the function of buttons contained in ED-HMI2020-101C.

### 1.4.1 RESET Button

ED-HMI2020-101C includes a RESET button, which is a hidden button, and the silkscreen on the case is "RESET". The RESET button is connected with the Global EN pin of CM4 chip.

- ♦ When the Global\_EN pin is high level, it means that CM4 has been started;
- ◆ When the Global EN pin is low level, the CM4 will be reset.

Pressing the RESET button will pull the Global\_EN pin low and reset the device.

### 1.4.2 PROGRAMING Button

ED-HMI2020-101C includes a PROGRAMING button, the silkscreen on the case is "PROGRAMING".

Press the PROGRAMING button before the device is powered on(keep pressing it for a long time), and then power on the device again, the system will enter the programming mode. The user can flash eMMc through the USB 2.0 port on the device and the programming tool.

### 1.5 Indicator

This section introduces various statuses and meanings of indicators contained in ED-HMI2020-101C.

Indicator	Status	Description
	On	The device has been powered on.
PWR	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.
ACT	Off	The device is not powered on or does not read and write data.
Yellow indicator	On	The data transmission is abnormal.
of Ethernet port	Blink	Data is being transmitted over the Ethernet port
of Ethernet port	Off	The Ethernet connection is not set up.
	On	The Ethernet connection is in the normal state.
Green indicator	Blink	The Ethernet connection is abnormal.
of Ethernet port	Off	The Ethernet connection is not set up.

### 1.6 Interface

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

### 1.6.1 Micro SD Card Slot

ED-HMI2020-101C includes a Micro SD card slot, the silkscreen on the case of Micro SD card slot is

"
", which is used to install SD card for storing user data.

### 1.6.2 Power Supply Interface

The ED-HMI2020-101C includes one power input, the connector is DC Jack. The silkscreen of port is "DC IN", which supports 9V~28V input.

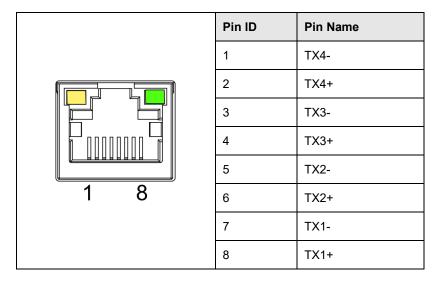
### 1.6.3 Audio Interface

ED-HMI2020-101C includes one audio input, the connector is a 3.5mm three-stage 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 1000M Ethernet Interface

ED-HMI2020-101C includes one adaptive 10/100/1000M Ethernet port, the connector is RJ45. The silkscreen of port is ", which can support PoE through the expansion module. When accessing to network, it is recommended to use the network cable of Cat6 and above. The pins corresponding to the terminal are defined as follows:



### 1.6.5 HDMI Interface

ED-HMI2020-101C includes one HDMI port, the connector is type A HDMI. The silkscreen of port is "**HDMI**", which can connect to an HDMI display and supports up to 4Kp60.

### 1.6.6 USB 2.0 Interface

ED-HMI2020-101C includes one USB 2.0 port, the connector is type A USB. The silkscreen of port is "", which can connect to standard USB 2.0 peripheral and supports up to 480Mbps.

#### 1.6.7 USB 3.0 Interface

ED-HMI2020-101C includes 2 USB 3.0 ports, the connector is type A USB. The silkscreen of port is "", which can connect to standard USB 3.0 peripherals and support up to 5Gbps.

### 1.6.8 Antenna Interface (optional)

ED-HMI2020-101C includes 1 SMA antenna port, the silkscreen of port is "WiFi/BT". It can be connected to WiFi/BT antenna.

# 2 Installing Components

This chapter describes how to install components.

- ✓ Installing Antenna (optional)
- ✓ Installing Micro SD Card

### 2.1 Installing Antenna (optional)

If the purchased ED-HMI2020-101C includes WiFi/BT function, the antenna needs to be installed before using the device.

### Preparation:

The antenna has been obtained from the packaging box.

### Steps:

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



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

### 2.2 Installing Micro SD Card

### Preparation:

The Micro SD card to be used has been obtained.

### Steps:

1. Locate the Micro SD card slot where the Micro SD is to be installed, as shown in the red box below.



2. Insert the Micro SD card with the front face down into the corresponding card slot, and hear a sound to indicate that the installation is complete.



# 3 Installing Device

This chapter introduces how to install the device.

✓ Embedded Installation

### 3.1 Embedded Installation

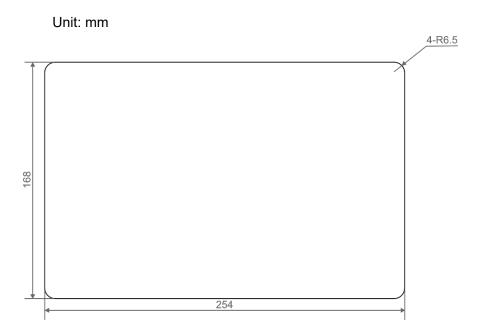
ED-HMI2020-101C supports embedded front installation, which is equipped with 4 buckles (including 4xM4\*8 screws and 4xM4\*16 screws).

### Preparation:

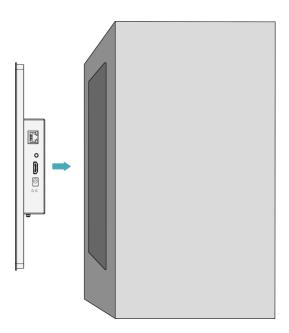
- ◆ The buckles (including 4xM4\*8 screws and 4xM4\*16 screws) have been obtained from the packaging box.
- A cross screwdriver has been prepared.

### Steps:

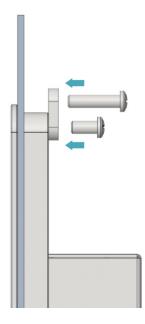
1. You need ensure the opening size of the cabinet according to the size of ED-HMI2020-101C, as shown in the figure below.



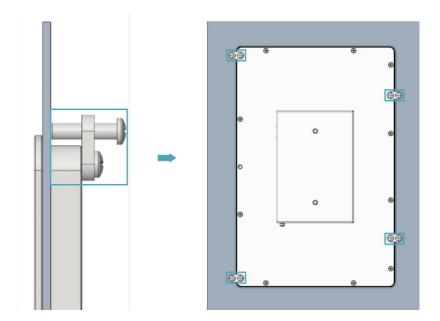
- 2. Drill a hole on the cabinet according to the hole size of step1.
- 3. Insert the ED-HMI2020-101C into the cabinet from the outside.



4. Align the screw holes of buckles with buckle installation holes on the side of the device.



5. Use 4xM4\*8 screws to tighten clockwise to fix the buckles to device, then use 4xM4\*16 screws to tighten clockwise to the end through the buckles.



# 4 Booting The Device

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

- ✓ Connecting Cables
- ✓ Booting The System For The First Time

### 4.1 Connecting Cables

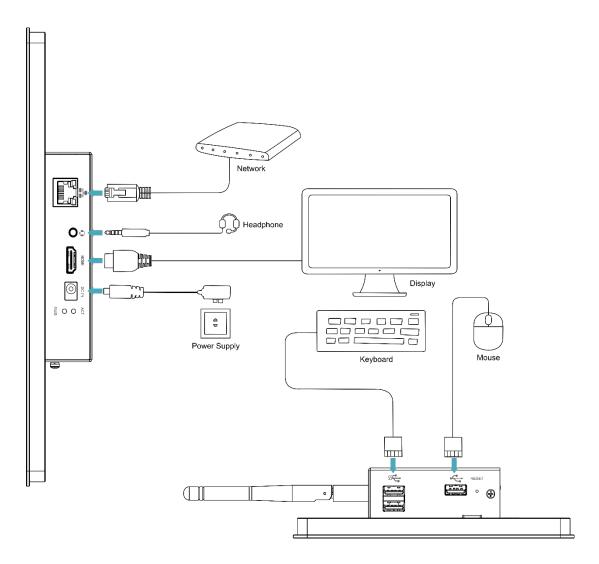
This section describes how to connect cables.

### 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-HMI2020-101C has no power switch. After the power supply is connected, the system will start.

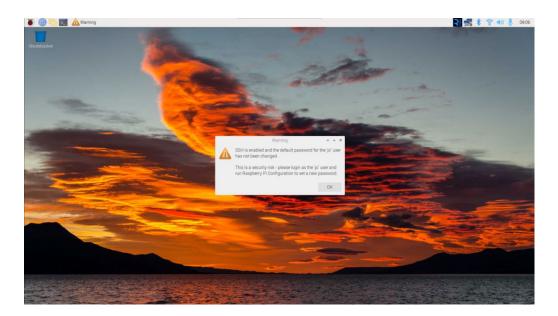
- The red PWR indicator is on, indicating that the device has been powered normally.
- ◆ The green ACT indicator is blinking, indicating that the system is started normally, and then the logo of Raspberry Pi will appear in the upper left corner of the screen.



Default username is pi, Default password is raspberry.

### 4.2.1 Raspberry Pi OS (Desktop)

If the Desktop version of the system is installed when the product leaves the factory, after the device is started, it will directly enter the desktop, as shown in the following figure.



### 4.2.2 Raspberry Pi OS (Lite)

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

```
[ II ] Started LSB: rng-tools (Debian variant).
[ III ] Started WPh supplicant.
[ III ] Started Authorization Manager.
[ III ] Started Authorization Manager.
[ III ] Started futhorization Manager.
[ III ] Listening on Load-Save RF witch Status /dev/rkill Watch.
Starting Poden Manager...

Starting Poden Manager...

Starting Permit User Sessions...
[ III ] Finished Remove Stale Onliwext4 Metadata Check Snapshots.
[ III ] Started /etc/rc.local Compatibility...

Starting Load-Save RF Will Switch Status...
[ III ] Finished Permit User Sessions...
[ III ] Finished Permit User Sessions...
[ III ] Started Getty on ttyl.
[ III ] Started Load-Save RF Will Switch Status...
[ III ] Started Load-Save RF Will Switch Status...
[ III ] Started Load-Save RF Will Switch Status...
[ III ] Started Load-Save RF Will Switch Status...
[ III ] Finished Save/Restore Sound Card State...
[ III ] Finished Restore Load-Fave/Restore Sound Card State...
[ III ] Finished Restore Load-Fave/Restore Sound Card State...
[ III ] Finished Restore Load-Fave/Restore Sou
```

# 5 Configuring System

This chapter introduces how to configure system.

- ✓ Finding Device IP
- ✓ Remote Login
- ✓ Configuring Storage Devices
- ✓ Configuring Ethernet IP
- ✓ Configuring WiFi (Optional)
- ✓ Configuring Bluetooth (optional)
- ✓ Configuring Buzzer
- ✓ Configuring RTC
- ✓ Configuring Audio
- ✓ Configuring LCD Screen
- ✓ Configuring Camera

### 5.1 Finding Device IP

In some application scenarios, it is necessary to remotely log in or manage devices, so it is necessary to obtain the device IP.

### 5.1.1 Query IP by Using ifconfig Command

After the device is started normally and the display is connected, you can use the ifconfig command to view the current device IP.

#### Preparation:

ED-HMI2020-101C has been connected to the network through the router.

#### Steps:

Run the following command in the command pane to view the detailed information of each port of the device, where the inet value in the eth0 interface is the device IP, as shown in the following figure.

#### ifconfig

```
pi@raspberrypi:~ $ ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
inet 192.168.168.252 netmask 255.255.255.0 broadcast 192.168.168.255
inet6 fe80::db33:ac79:e1ce:176 prefixlen 64 scopeid 0x20<link>
ether d8:3a:dd:04:7e:78 txqueuelen 1000 (Ethernet)
RX packets 44 bytes 5126 (5.0 KiB)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 63 bytes 9340 (9.1 KiB)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

### 5.1.2 Login Router to Query IP

When the device starts normally but the display is not connected, you can log in to the router to check the current device IP.

#### Preparation:

- ◆ ED-HMI2020-101C has been connected to the network through the router.
- ◆ The IP and network password of the router in the network have been obtained, and the IP address is 192.168.X.X.

#### Steps:

- 1. Open a browser, Enter the router IP of the network where ED-HMI2020-101C is located in the address bar: 192.168.x.x, and press Enter to enter the router login interface.
- 2. According to the interface prompts, enter the network password and enter the router management interface.
- 3. Find the IP address of ED-HMI2020-101C in the terminal device of the management interface.

### 5.1.3 Scan For Using NMAP Tool

When the device starts normally but the display is not connected, you can use nmap tool to scan the IP under the current network to obtain the IP information of the device. Nmap supports Linux, macOS, Windows and other platforms.

#### Preparation:

- ◆ ED-HMI2020-101C has been connected to the network through the router.
- ◆ The IP segment and mask of the router in the network have been obtained, for example, 192.168.X.X/24, where 24 is the subnet mask.

#### Steps:

For example, using nmap to scan the network segments from 192.168.3.0 to 255, you can use the following steps:

1. Open the nmap tool and scan the hosts in the 192.168.X.X/24 network segment.



The nmap tool operates differently in different operating systems, so please follow the actual interface or command prompts.

According to the scanned results, get the device IP of ED-HMI2020-101C.

### 5.2 Remote Login

There are many remote login methods, and users can choose according to their actual needs. This chapter only introduces SSH and VNC.

### 5.2.1 Connecting To The Device Via SSH

If the device uses Lite system, you can choose to connect to the device remotely through SSH to configure or debug it.

The tools for remote login are selected by users themselves, and the following is an example of logging in through MobaXterm.

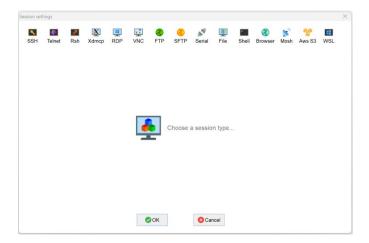
#### Preparation:

- ◆ The MobaXterm tool has been installed on the PC.
- ◆ ED-HMI2020-101C has been connected to the network through the router.
- ◆ IP address of ED-HMI2020-101C has been get.

#### Steps:

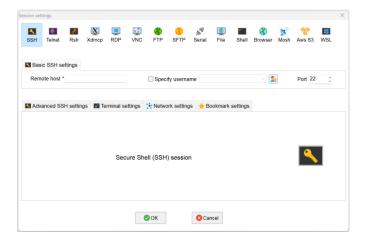


1. Open MobaXterm, click session, and open the window for creating connection, as shown in the figure below.

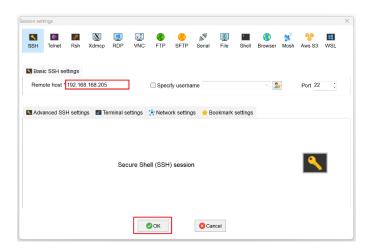




2. Click SSH in the upper left corner to open the SSH connection interface.



3. After entering the IP address of the obtained ED-HMI2020-101C, click "OK".



- 4. Click "Accept" in the pop-up prompt box to enter the system login interface.
- 5. Enter the username and password according to the prompt, and enter the system after logging in.



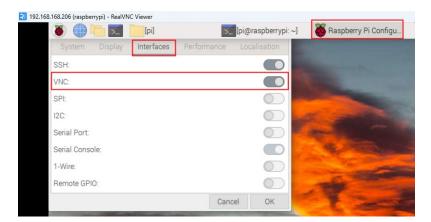
Default username is pi, Default password is raspberry.

# 5.2.2 Connecting To The Device Desktop Through VNC

If the device uses Desktop system, you can choose to connect to the device remotely through VNC to configure or debug it.

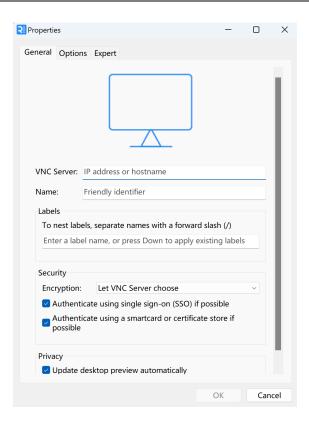
### Preparation:

- ◆ The RealVNC Viewer tool has been installed on PC.
- ◆ ED-HMI2020-101C has been connected to the network through the router.
- ◆ IP address of ED-HMI2020-101C has been get.
- ◆ The VNC function in the ED-HMI2020-101C system has been turned on, as shown in the following figure.

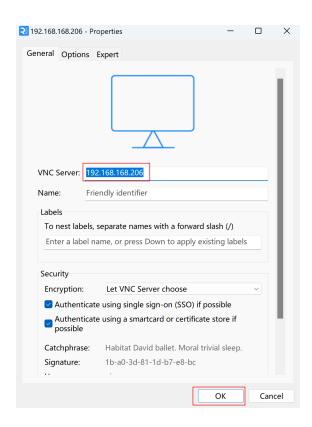


### Steps:

1. Open RealVNC Viewer and select "New connection···" in the File in the menu bar to open the window for creating a connection, as shown in the following figure.



2. After entering the IP address of ED-HMI2020-101C, click "OK".

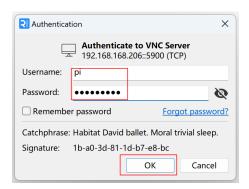


3. Enter the username and password in the Authentication prompt box that pops up.

5-8



Default username is pi, Default password is raspberry.



4. Select "OK" to log in and connect to the remote desktop.



# 5.3 Configuring Storage Devices

You can connect your external hard disk, SSD, SD card or USB stick to the corresponding port on the ED-HMI2020-101C, and mount the file system to access the data stored on it. When the ED-HMI2020-101C is turned off, it is necessary to unmount the storage device so that it can be safely pulled out.

The connectable storage devices of ED-HMI2020-101C include USB storage devices and SD cards. This chapter introduces how to configure the mounting and unmounting of storage devices.

## 5.3.1 Mounting a Storage Device

If the Lite version of the operating system is used (the Desktop version of the system supports automatic mounting), after the storage device is connected to the corresponding port on the ED-HMI2020-101C, it is necessary to mount the storage device in a specific folder location through configuration, usually in the /mnt folder, such as /mnt/mydisk.



The "/mnt" folder must be empty.

### Preparation:

The storage device is ready to be mounted.

### Steps:

- Connect the storage device to be mounted to the corresponding port on the ED-HMI2020-101C (USB storage device is inserted into USB port and SD card is inserted into SD card slot).
- 2. Run the following command to view all disk partitions on the ED-HMI2020-101C.

sudo Isbik -o UUID,NAME,FSTYPE,SIZE,MOUNTPOINT,LABEL,MODEL

After running the command, the information displayed is as follows:

SIZE MOUNTPOINT MODEL FSTYPE LABEL 3.8G Flash\_Disk 3.8G /media/pi/ADMESY ADMESY 7C9E-4F13 vfat mmcblk0 7.3G 256M /boot 336-AC83 bootfs eaaa4faa-eab6-400c-950f-dc96ae4e0400 mmcblk0p2 mmcblk0boot0 4M

- UUID\NAME\FSTYPE\SIZE\MOUNTPOINT\LABEL and MODEL are disk parameters that need to be listed.
- The types of MOUNTPOINT are "/" and "/boot".
- The storage device whose LABEL is "ADMESY" is the inserted USB storage device, and the corresponding disk name is sda1.
- FSTYPE indicates the file system type contained.
  - ✓ If the file system type of the inserted storage device is exFAT, please run the following commands to install the exFAT driver.

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

✓ If the file system type of the inserted storage device is NTFS (only read permission is supported), you can install ntfs-3g driver to realize write permission. Run the following commands to install ntfs-3g drivers.

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

3. Run the following command to get the location of the disk partition.

#### sudo blkid

After running the command, the following information is displayed, which the disk partition of the connected storage device is displayed as "/dev/sda1".

```
pi@raspberrypi:~ $ sudo blkid
/dev/mmcblk0p1: LABEL_FATB00T="bootfs" LABEL="bootfs" UUID="C336-AC83" BL0CK_SIZE="512" TYPE="vfat"
PARTUUID="7902e585-01"
/dev/mmcblk0p2: LABEL="rootfs" UUID="eaaa4faa-eab6-400c-950f-dc96ae4e0400" BL0CK_SIZE="4096" TYPE="
ext4" PARTUUID="7902e585-02"
/dev/sda1: LABEL="ADMESY" UUID="7C9E-4F13" BL0CK_SIZE="512" TYPE="vfat"
```

4. Create a target folder as the mount point of the storage device. Assuming that the mount name is mydisk and the directory to be mounted is "/mnt", the command to be executed is as follows:

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

5. Mount the storage device at the created mount point, and execute the following command:

sudo mount /dev/sda1 /mnt/mydisk

6. Verify the success of mounting the storage device by executing the following command.

#### Is /mnt/mydisk

- ✓ After executing the command, if the displayed information lists all files in the storage device, it means that the mount is successful.
- ✓ After executing the command, if the displayed information does not list the contents of related files, it means that the mount is failed.

## **5.3.2 Unmounting The Storage Device**

When the ED-HMI2020-101C is turned off, it is necessary to manually unmount the storage device so that it can be pulled out safely.



Both Lite and Desktop versions of the system need to manually unmount the storage device.

### Preparation:

The storage device has been successfully mounted.

### Steps:

If "/mnt" is the mounted directory and "mydisk" is the name of the mount point, you can execute the following command to complete the unmounting.

#### sudo umount /mnt/mydisk

- ✓ After executing the command, if no error message is displayed, it means that the unmounting has been completed and the storage device can be completely pulled out.
- ✓ After executing the command, if an error message is displayed, it means that the unmounting is failed.

# **5.3.3 Set The Storage Device To Mount Automatically**

If you are using the Lite version of operating system, you can automatically mount it by modifying the fstab settings.

### Preparation:

The storage device to be mounted has been connected to the corresponding port on the ED-HMI2020-101C device.

### Steps:

1. Execute the following command to view all disk partitions on the ED-HMI2020-101C and get the file system type of the storage device to be mounted, as "vfat" shown in the figure below.

sudo Isbik -o UUID, NAME, FSTYPE, SIZE, MOUNTPOINT, LABEL, MODEL

```
        pi@raspberrypi:~ $ sudo lsblk -o UUID, NAME, FSTYPE, SIZE, MOUNTPOINT, LABEL, MODEL

        UUID
        NAME sda
        FSTYPE sIZE MOUNTPOINT sda
        LABEL MODEL

        7C9E-4F13
        `-sda1 mmcblk0
        3.86 /media/pi/ADMESY ADMESY
        Flash_Disk

        C336-AC83
        |-mmcblk0p1 vfat
        256M /boot
        bootfs

        eaaa4faa-eab6-400c-950f-dc96ae4e0400
        '-mmcblk0p2 mmcblk0boot0
        4M
        rootfs

        mmcblk0boot1
        4M
        4M
```

2. Execute the following command to obtain the UUID of the storage device to be mounted, such as "7C9E-4F13" in the figure below.

#### sudo blkid

```
pi@raspberrypi:~ $ sudo blkid
/dev/mmcblk0p1: LABEL_FATB00T="bootfs" LABEL="bootfs" UUID="C336-AC83" BLOCK_SIZE="512" TYPE="vfat"
PARTUUID="7902e585-01"
/dev/mmcblk0p2: LABEL="rootfs" UUID="eaaa4faa-eab6-400c-950f-dc96ae4e0400" BLOCK_SIZE="4096" TYPE="
ext4" PARTUUID="7902e585-02"
/dev/sda1: LABEL="ADMESY" UUID="7C9E-4F13" BLOCK_SIZE="512" TYPE="vfat"
```

3. Execute the following command to open the fstab file.

sudo nano /etc/fstab

4. Add the following to the fstab file.

UUID=7C9E-4F13 /mnt/mydisk vfat defaults,auto,users,rw,nofail 0 0

- ✓ The value of UUID is the value found in Step 2 above.
- √ "/mnt" is the directory to be mounted, and mydisk is the name of the mount point.
- ✓ Vfat is the file system type queried in step 1.
- ✓ If the type of file system is FAT or NTFS, the added content is "UUID = 7C9E-4F13 /mnt/mydisk vfat defaults,auto,users,rw,no fail umask = 000 0 0", which will allow all users to "read/write" access to each file on the storage device.



More information about the fstab command can be viewed by executing the man fstab command.

5. Use Ctrl+X to save the file and exit edit mode.

# 5.4 Configuring Ethernet IP

The IP address is automatically obtained by default. If you need to reconfigure the IP, you can configure it through NetworkManager and dhcpcd.

## 5.4.1 Configuring IP by Using The NetworkManager Tool

The operating systems of Desktop and Lite have enabled NetworkManager by default, which can be directly configured by using NetworkManager.

### 5.4.1.1 Raspberry Pi OS(Desktop)

In the Desktop version of the operating system, it is recommended to use the graphical NetworkManager tool to configure IP.



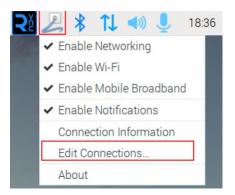
The Desktop version of the operating system has the NetworkManager graphical tool installed by default.

### Preparation:

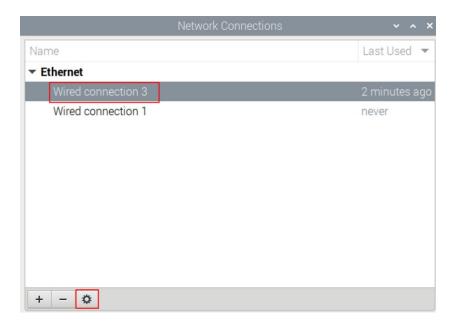
NetworkManager is enabled.

#### Steps:

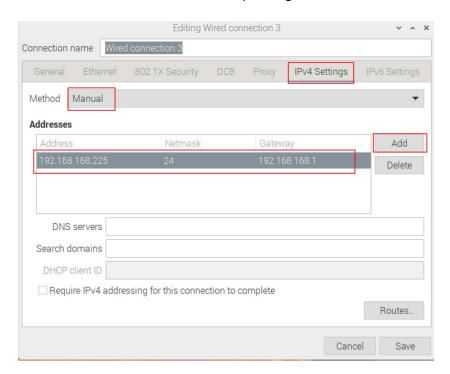
1. Right-click the NetworkManager icon and select "Edit Connections..." from the menu.



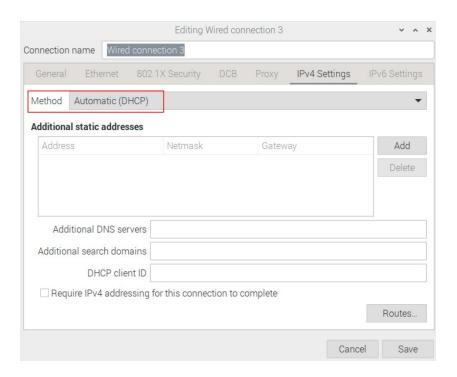
2. In the pop-up "Network Connections" pane, select the connection name to be modified, and then click the Settings button below.



- 3. In the pop-up "Editing Wired connection" pane, select the "IPv4 Settings" page, and then set the IP address as required.
  - If you want to set the IP as a static IP, set the "Method" as "Manual", add an entry in Addresses and enter the corresponding IP address information.



 If you want to set the IP to automatic acquisition mode, you only need to set the "Method" as "Automatic(DHCP)".



- 4. Click "save" to return to "Network Connections" pane and close the page.
- 5. Execute the **sudo reboot** command to restart the device.

### 5.4.1.2 Raspberry Pi OS(Lite)

In the Lite version of operating system, it is recommended to use the command to configure IP.

### Preparation:

NetworkManager is enabled.

### Steps:

Set a static IP address

- 1. Get the assigned IP address, subnet mask and gateway address, for example, the IP address is 192.168.1.101/24 and the gateway IP is 192.168.1.1.
- 2. Open the command terminal pane and execute the following command to set the IP address to the obtained IP address.

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

3. Execute the following command to set the gateway IP to the obtained gateway IP.

sudo nmcli connection modify <name> ipv4.gateway 192.168.1.1

#### Set the IP to automatic mode

Execute the following command to set the way of obtaining IP address to automatic mode.

sudo nmcli connection modify <name> ipv4.method auto

## 5.4.2 Configuring IP by Using The dhcpcd Tool

Since NetworkManager is enabled on the Desktop and Lite of operating systems by default. If you need to switch to using the dhcpcd tool for configuration, you need to stop and disable the NetworkManager service and enable the dhcpcd service before configuration.

### Steps:

1. Execute the following command to stop the NetworkManager service.

#### sudo systemcti stop NetworkManager

2. Execute the following command to disable the NetworkManager service.

#### sudo systemctl disable NetworkManager

3. Execute the following command to enable the dhcpcd service.

### sudo systemctl enable dhcpcd

4. Execute the following command to restart the device.

#### sudo reboot

5. Execute the following command to open the /etc/dhcpcd.conf file.

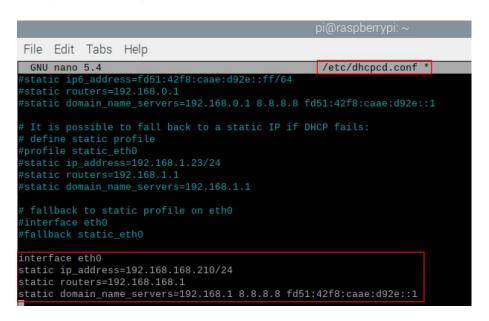
```
sudo nano /etc/dhcpcd.conf
```

6. Add the following content at the end of the /etc/dhcpcd.conf file.

```
interface eth0
static ip_address=192.168.168.210/24
static routers=192.168.168.1
static domain_name_servers=192.168.168.1 8.8.8.8 fd51:42f8:caae:d92e::1
```

- ✓ eth0 is the Ethernet port of the IP to be configured;
- ✓ 192.168.0.10/24 indicates the IP address and subnet mask to be configured;

- √ 192.168.0.1 indicates the gateway IP to be configured;
- √ 8.8.8.8 represents the DNS server address, which should be configured according to the actual needs.
- ✓ fd51:42f8:caae:d92e::1 indicates the IPV6 address, which should be configured according to the actual needs.



7. Use Ctrl+X to save the file and exit edit mode.

# 5.5 Configuring WiFi (Optional)

User can choose the ED-HMI2020-101C with WiFi version, which needs to be configured before using WiFi.

## 5.5.1 Enabling WiFi Function

The WiFi function is blocked by default, and you need to set the country region to enable it.

### 5.5.1.1 Raspberry Pi OS(Desktop)

In the Desktop version of the operating system, you can use the desktop icon to open the configuration window for setting.

### Steps:

1. Left-click the icon in the upper right corner of the desktop and select "Click here to set Wi-Fi country" from the menu.



2. Set the value of Country in the pop-up "Wireless LAN Country" pane, and select it according to the actual region.



3. Select "OK" to complete the setting.

### 5.5.1.2 Raspberry Pi OS(Lite)

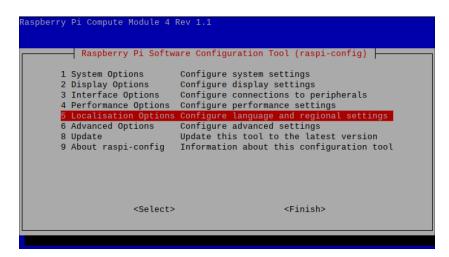
In the Lite version of the operating system, WiFi can be enabled through the command line.

### Setps:

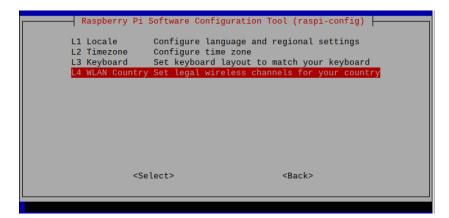
1. Open the command terminal pane and execute the following command to open the Raspberry Pi Software Configuration Tool (raspi-config) interface.

#### sudo raspi-config

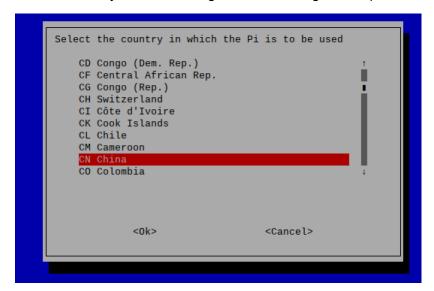
2. Choose "5 Localisation Options" and press Enter.



3. Select "L4 WLAN Country" and press Enter.



4. Select a country code according to the actual region and press Enter.



5. Open "Wireless LAN country set to CN" interface.



6. Press Enter to exit the main interface of the pane, select "Finish" and press Enter to complete the setting and return to the command line.

## 5.5.2 Using The NetworkManager Tool To Configure WiFi Connections

The operating systems of Desktop and Lite have enabled NetworkManager by default, which can be directly configured by using NetworkManager.

## 5.5.2.1 Raspberry Pi OS(Desktop)

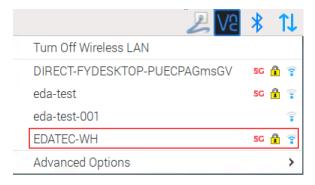
In the Desktop version of the operating system, you can connect to WiFi through the desktop icon.

### Preparation:

WiFi function is enabled.

### Steps:

1. Left-click the icon in the upper right corner of the desktop, select the WiFi to be connected in the pop-up WiFi list and click.



2. Enter the WiFi Password in the pop-up "Wi-Fi Network Authentication Required" pane.



3. Click "Connect" to connect to the network. After the connection is completed, the WiFi icon will be displayed normally in the upper right corner of the desktop.

### 5.5.2.2 Raspberry Pi OS(Lite)

In the Lite version of the operating system, it is supported to configure WiFi through the command line.

### Preparation:

- WiFi function is enabled.
- The WiFi name and password that can be connected are prepared, for example, the WiFi name is SSID and the password is password.

### Steps:

1. Open the terminal and execute the following command to scan the list of connectable WiFi name.

### sudo nmcli device wifi



2. Execute the following command to connect the WiFi to be accessed.

sudo nmcli device wifi connect SSID password password

Where SSID is the name of the WiFi to be connected and password is the password of the WiFi to be connected.

3. Execute the following command to set up automatic WiFi connection.

sudo nmcli connection modify SS/D connection.autoconnet yes

Where SSID is the name of the WiFi to be connected.

## 5.5.3 Configuring WiFi Connection By Using dhcpcd Tool

In both Desktop and Lite versions of the operating system, you can connect to WiFi through the dhcpcd tool.

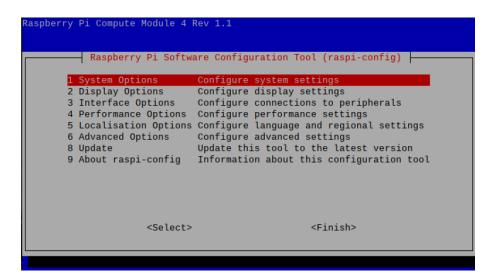
### Preparation:

- WiFi function is enabled.
- The WiFi name and password that can be connected are prepared, for example, the WiFi name is EDATEC-WH and the password is password.

### Steps:

1. Open the terminal and execute the following command to open the Raspberry Pi Software Configuration Tool (raspi-config) interface.

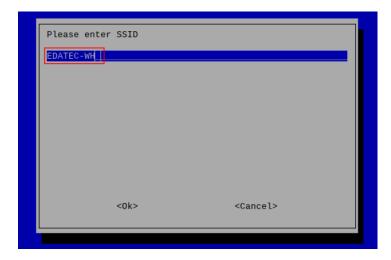
### sudo raspi-config



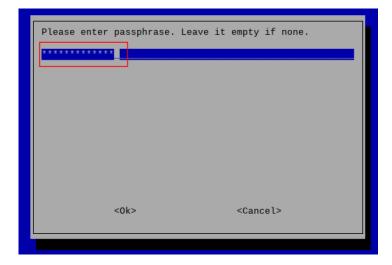
2. Select "1 System Options" and press Enter, and then select "S1 Wireless LAN" in the interface.



3. Press Enter and enter the WiFi name in the "Please enter SSID" interface.



4. Press Enter to enter the WiFi password in the "Please enter passphrase. Leave it empty if none" interface.



5. Press Enter to exit the main interface of the pane, select "Finish" and press Enter to complete the setting and return to the command line window.

# 5.6 Configuring Bluetooth (optional)

User can choose ED-HMI2020-101C with Bluetooth version, and the Bluetooth function is enabled by default, so relevant configuration is required before using Bluetooth.

# **5.6.1 Basic Configuration Command**

Command	Function Description
bluetoothctl scan on	Enable Bluetooth scanning
bluetoothctl scan off	Disable Bluetooth scanning
bluetoothctl discoverable on	Enable Bluetooth discovery (which can be discovered by the other
	party)
bluetoothctl discoverable off	Disable Bluetooth discovery
bluetoothctl trust device_MAC	Trust device
bluetoothctl connect device_MAC	Connect device
bluetoothctl disconnect device_MAC	Disconnect device

# 5.6.2 Configuration Example

This chapter introduces how to configure Bluetooth through a configuration example.

### Preparation:

- Bluetooth scanning is enabled.
- Bluetooth discovery is enabled.

### Steps:

1. Enter the Bluetooth view;

#### sudo bluetoothctl

2. Enable bluetooth.

### power on

Scan Bluetooth device.

### scan on

Returned display information:

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

4. Find the name of the turned-on Bluetooth device;

#### devices

Returned display information:

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

5. Pairing target devices;

pair 34:12:F9:91:FF:68

34:12:F9:91:FF:68 is target device's device\_MAC

Returned display information:

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

6. Add as trusted device

trust 34:12:F9:91:FF:68

34:12:F9:91:FF:68 is target device's device\_MAC

Returned display information:

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

# **5.7 Configuring Buzzer**

The ED-HMI2020-101C contains a buzzer, and the control pin is GPIO6. You can manually configure the buzzer to turn on and off.

Execute the following command to turn on the buzzer.

### raspi-gpio set 6 op dh

op means set to output, dh means that pin is high level.

◆ Execute the following command to turn off the buzzer.

### raspi-gpio set 6 op dl

op means set to output, and dl means that pin is low level.

# **5.8 Configuring RTC**

ED-HMI2020-101C contains an integrated RTC, which automatically reads the system time synchronously by default, and can manually read and write the system time into RTC.

Execute the following command to read the RTC time manually.

### sudo hwclock -r

◆ Execute the following command to write the system time into RTC.

sudo hwclock -w

# 5.9 Configuring Audio

ED-HMI2020-101C contains one audio input (supports access to MIC) and one extended speaker output. The volume of Master, MIC and Speaker can be adjusted, and support recording.

## 5.9.1 Adjusting The Volume

It supports manual adjustment of MIC, Speaker and Master volume.

♦ If you are using the Desktop version of the operation system, you can adjust the volume of the MIC and Master directly through the desktop icon.

### Steps:

1. Click the icon or in the upper right corner of the desktop to open the volume adjustment colume.



- 2. Drag the button of the volume adjustment column up and down to adjust the volume, check or uncheck the Mute check box to mute or unmute the audio.
- ♦ Both Desktop and Lite versions of the operation system support opening the volume adjustment interface through the command line to adjust the volume.

### Steps:

1. Execute the following command to open the volume adjustment interface.

#### alsamixer

```
Card: PulseAudio
Chip: PulseAudio
View: F3:[Playback] F4: Capture F5: All F6: Select sound card Esc: Exit

Ttem: Master

AlsaMixer v1.2.4

F1: Help F2: System information F6: Select sound card Esc: Exit
```

2. View the volume value of the current Master in the opened interface. You can adjust the volume through the 1 key and 1 key on the keyboard, and press the M key to mute and unmute the audio.

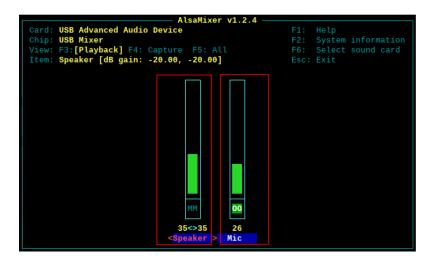
Keyboard Key	Function
1	Volume+
1	Volume-
M	Mute or Unmute

3. Press F6 to open "Sound Card" interface, select "2 USB Advanced Audio Device".



4. Press Enter to open the volume interface of MIC and Speaker, and you can adjust the volume of MIC and Speaker respectively through the **1** key and **↓** key on the keyboard, and press M to mute and unmute MIC/Speaker.

Keyboard Key	Function
1	Volume+
1	Volume-
M	Mute or Unmute



## 5.9.2 Configuring Record

It supports the audio recording of MIC input.

### Preparation:

The audio interface has been connected to MIC.

### Steps:

1. Execute the following command to open the volume adjustment interface.

#### alsamixer

- Press F6 to open the "Sound Card" interface, select "2 USB Advanced Audio Device", and press Enter to open the volume adjustment interface of MIC and Speaker to ensure that MIC is not muted.
- 3. Press Esc to exit to the command pane, execute the following command to start recording audio named test1.way, as shown in the figure below.

arecord -fcd -Dhw:2 -c 1 --vumeter=mono test1.wav | aplay -fcd -Dhw:2

```
pi@raspberrypi:~ $ arecord -fcd -Dhw:2 -c 1 --vumeter=mono test1.wav | aplay -fc
d -Dhw:2
Recording WAVE 'test1.wav' : Signed 16 bit Little Endian, Rate 44100 Hz, Mono
#+ | 00%
```

Parameters	Description
cd	Indicates the audio format, which can be set to cd, cdr, dat and other formats, and can
	be set as needed.
2	Indicates the sound card for recording, it needs to be obtained by executing <b>arecord</b> -
	I before recording, as shown in the following figure:
	<pre>pi@raspberrypi:~ \$ arecord -l ***** List of CAPTURE Hardware Devices **** card 2: Device [USB Advanced Audio Device], device 0: USB Audio [USB Audio]    Subdevices: 1/1    Subdevice #0: subdevice #0</pre>
test1.wav	Indicates the recorded file name, which can be customized by the user.

- 4. Use Ctrl+C to close recording.
- 5. Execute the following command to obtain the storage path of the recording file.

### pwd

```
pi@raspberrypi:~ $ pwd
/home/pi
```

# 5.10 Configuring LCD Screen

When using the LCD screen, you can adjust rotation of LCD screen orientation and brightness.

## 5.10.1 Rotating Orientation

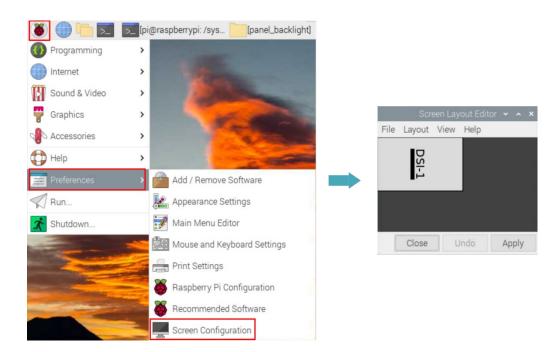
If you are using the Desktop version of the operation system, you can adjust the rotation of LCD screen orientation through the interface menu.

### Preparation:

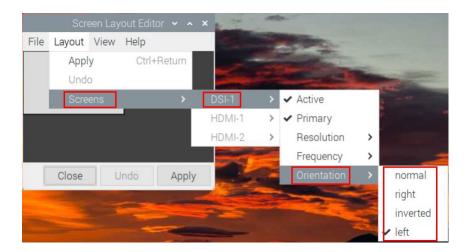
The audio interface has been connected to MIC.

### Steps:

1. Click the Raspberry Pi Logo on the upper left corner of desktop, and select "Preferences > Screen Configuration" to open Screen Layout Editor interface.

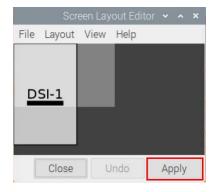


2. Click "Layout" in the main menu, select "Screen > DSI-1 > Orientation" to open the LCD screen rotation parameters. Then, you can select the rotation parameters to set as required.



Parameters	Description
normal	Rotate 0°
left	Rotate -90°
right	Rotate 90°
inverted	Rotate 180°

3. When you have finished the parameter setting, it will return to main menu of Screen Layout Editor. Then, you need click "Apply".



4. You can click "OK" in the pop-up prompt box to make settings take effect.



# **5.10.2 Adjusting Brightness**

You can manually adjust the brightness of LCD screen.

### Steps:

1. Execute the following command to enter the /sys/class/backlight directory.

cd /sys/class/backlight

2. Execute the following command to display the files in the directory.

ls

3. Execute the following command to enter the panel\_backlight folder.

cd panel\_backlight

4. Execute the following command to display the files in the folder.

ls

5. Execute the following command to view the value of max\_brightness, which is the maximum brightness.

cat max\_brightness

6. Execute the following command to view the value of brightness, which is the current brightness.

cat brightness

7. Execute the following command to set the value of brightness.

### echo $y \mid$ sudo tee brightness

y indicates the brightness value that you need set. If the value of max\_brightness is x, the brightness adjustment range is  $0\sim x$ .

# 5.11 Configuring Camera

Before using the camera, you need configure it to enable the camera.

### Steps:

1. Execute the following command to open the /boot/config.txt file.

### sudo nano /boot/config.txt

2. Add the following content at the end of the /boot/config.txt file.

dtoverlay=imx219

- 3. Use Ctrl+X to save the file and exit edit mode.
- 4. Execute the following command to reboot the system, which make the camera configuration take effect.

### sudo reboot

### **Other Configuration Commands**

Commands	Description
libcamera-hello	Check camera
libcamera-jpeg -o jpg1	Take a photo, where jpg1 is a custom photo name
libcamera-vid -t 10000 -o video1	Record video
	10000 indicates the recording time, the unit is ms.
	video1 indicates the name of the recorded video, which
	can be customized.
vlc video1	Play the recorded video, where video1 is the name of the
	recorded video.