
SunFounder Retro Game HAT

www.sunfounder.com

Aug 02, 2022

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ABOUT THE RETRO GAME HAT

Retro Game HAT is a DIY handheld game console based on Raspberry Pi.

Equipped with 800*480 high-resolution screen and two 8ohm 4w stereo speakers, through simple assembly, you can have a retro game console.

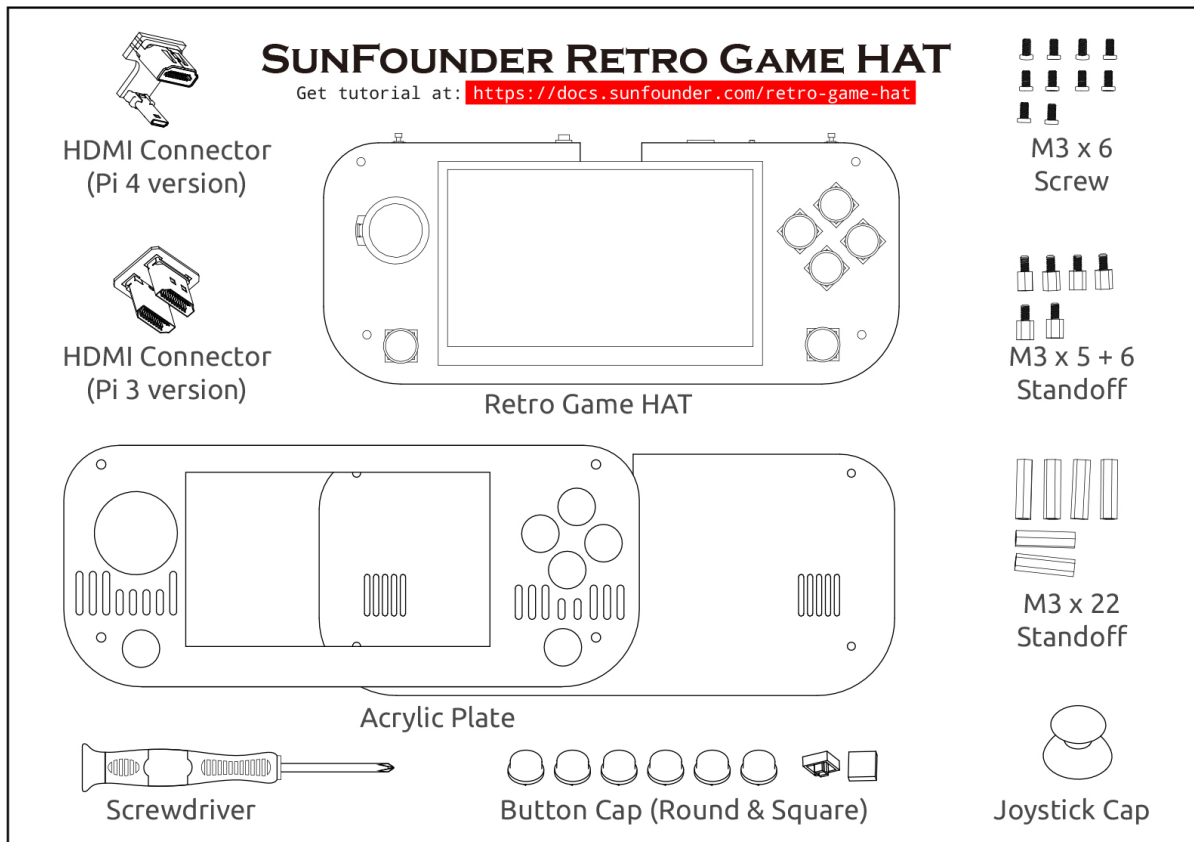
It integrates battery charging circuit, powered by 18650 lithium battery (not included), you can play anytime and anywhere.

In addition, it is equipped with HDMI and Micro HDMI connectors, which can be compatible with almost all Raspberry Pi versions.

If you want to learn another projects which we don't have, please feel free to send Email and we will update to our online tutorials as soon as possible, any suggestions are welcomed.

Here is the Email: cs@sunfounder.com.

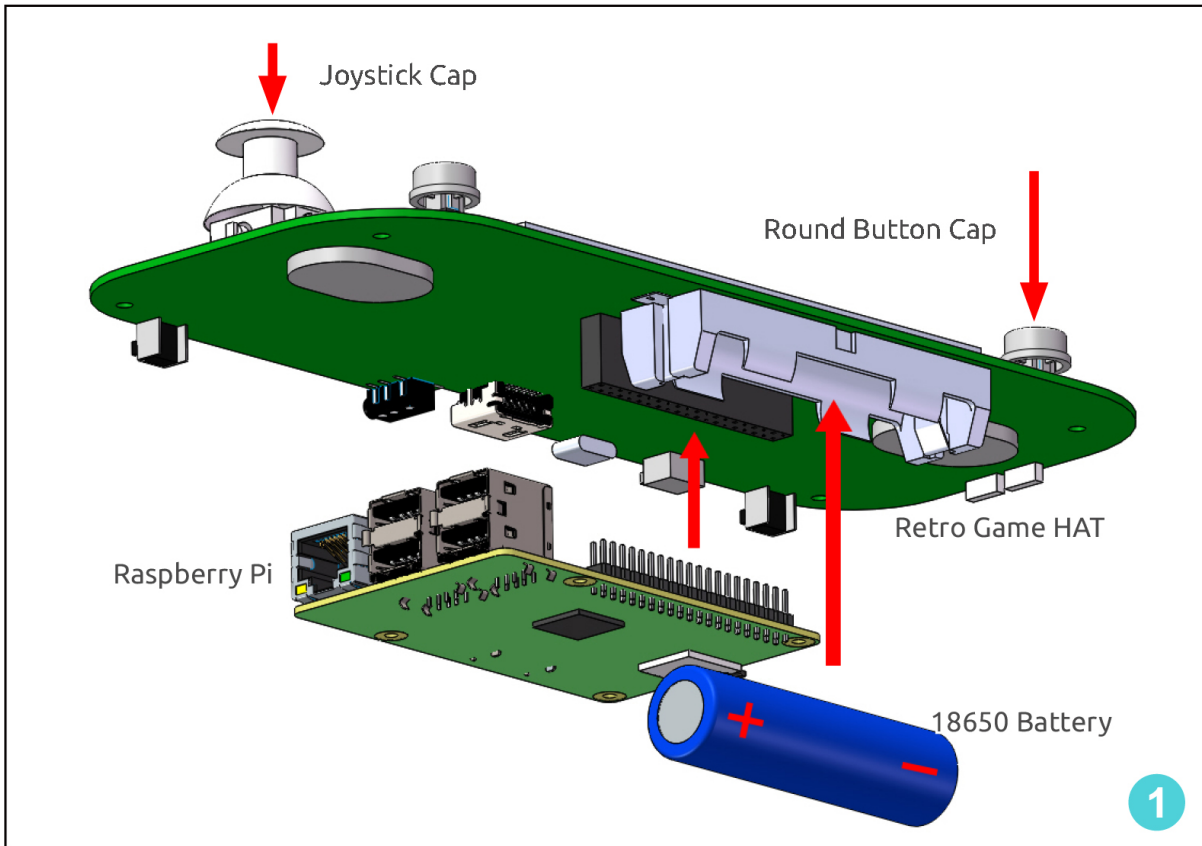
1.1 Components List



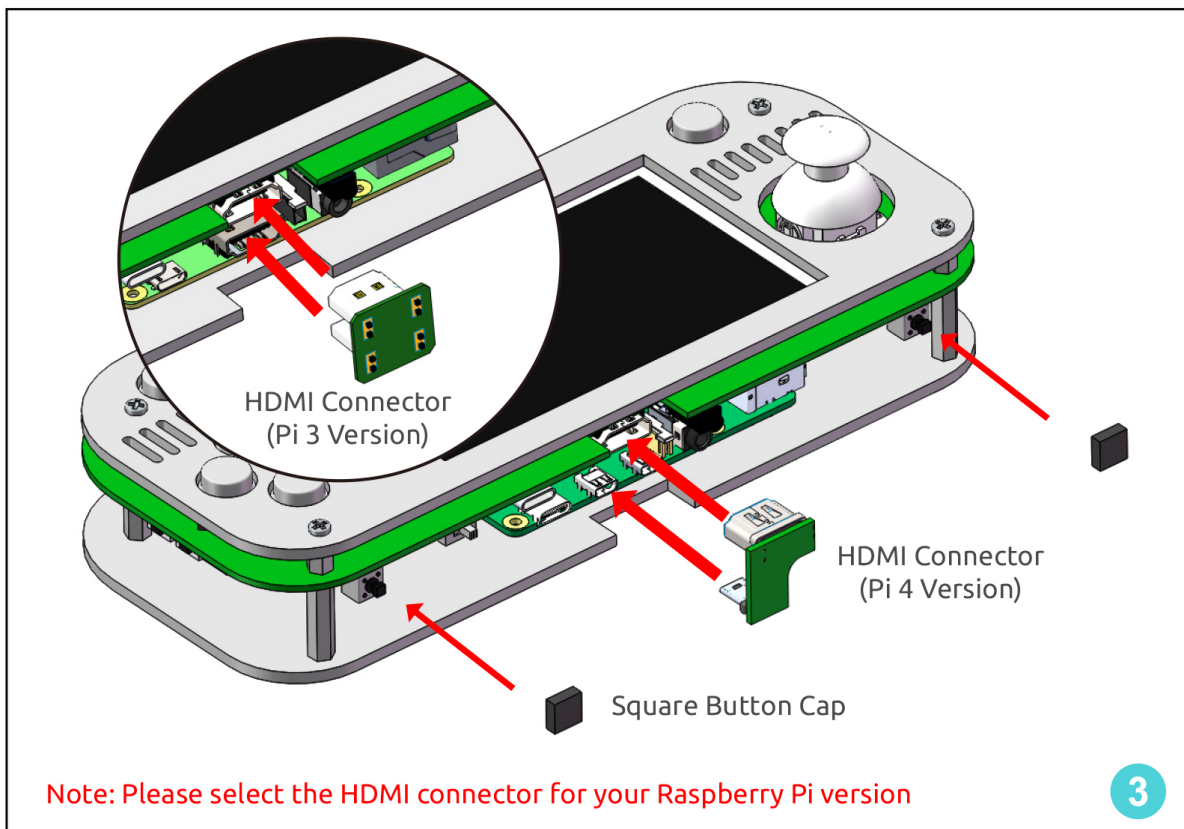
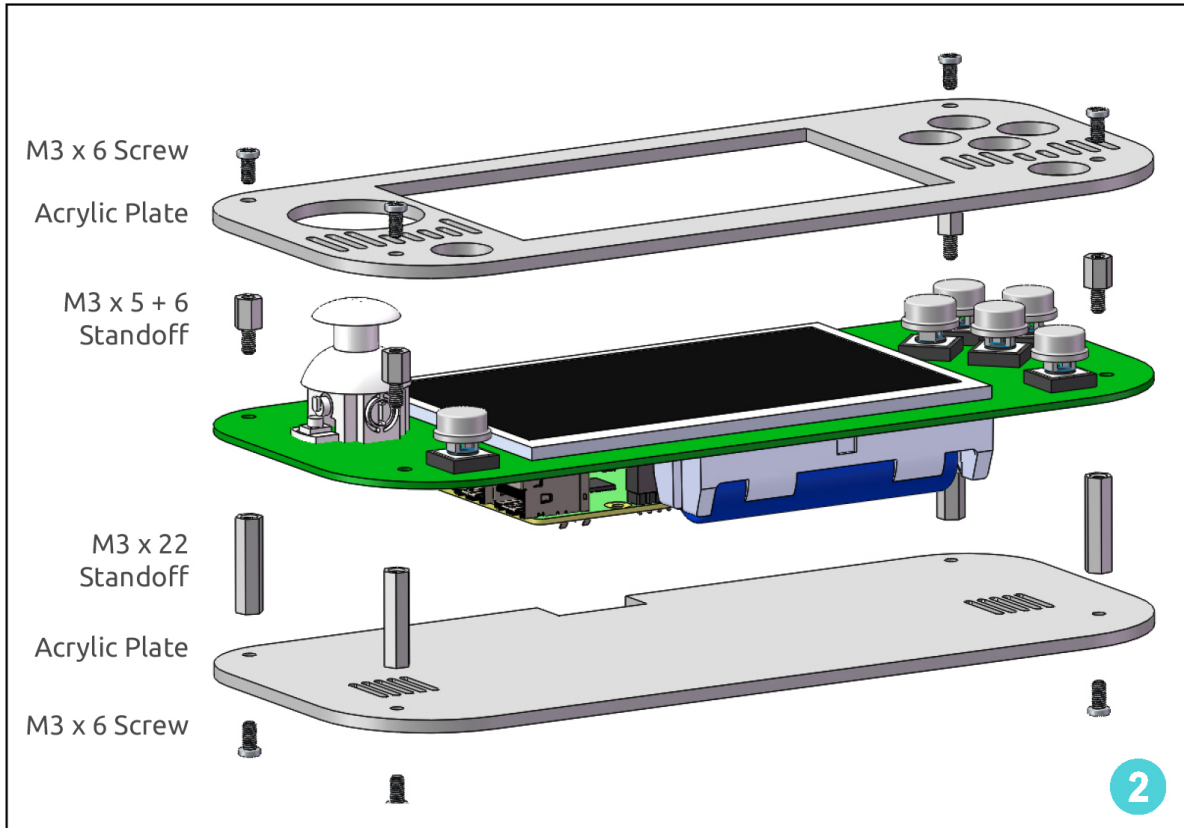
Note: You need to prepare an 18650 battery and a Type-C cable by yourself.

1.2 Assemble

step1

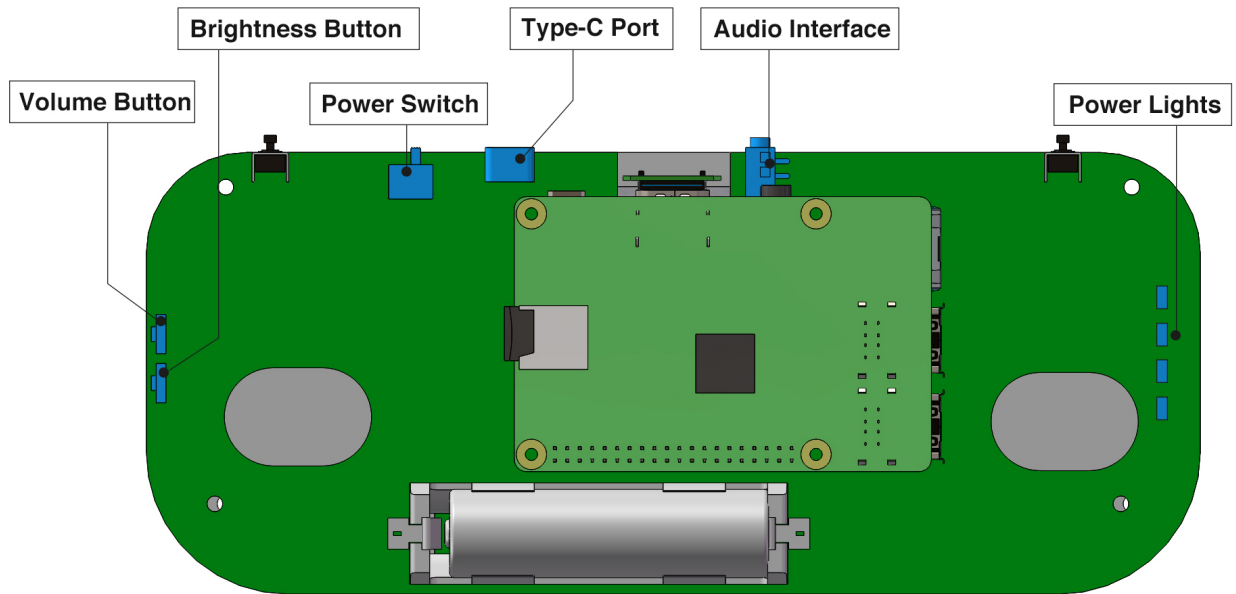


step2



1.3 Features

- Screen Type: 5 inch IPS screen LVDS interface
- Resolution: 800*480
- Supply Voltage: 4.5V/2A-5.5V/2A
- Port Type: Type-C
- Speakers: 8ohm 4w
- Earphone Holder: 3.5 round head earphone holder 6 feet
- Battery: 18650 single-cell battery



- **Volume Button:** Click it to enter the volume adjustment interface.
- **Brightness Button:** Click it to enter the screen brightness adjustment interface.
- **Power Switch:** Toggle to the left to turn off the power, and to the right to turn on the power.
- **Type-C Port:** After connecting to 5V/2A power, the battery will start charging, if all 4 lights are on, it means it is full.
- **Audio Interface:** You can plug in the earphones and enjoy the good game time alone. When an audio device is connected, Retro Game HAT will be muted.
- **Power Lights:** There are four power indicator lights, each of which represents 25% of the power. When the power supply is insufficient, Retro Game HAT will have a flickering screen, and you should charge it at this time.

Note: When entering the volume adjustment interface/screen brightness adjustment interface, press the volume key to increase the volume level/screen brightness, and press the brightness key to decrease the volume level/screen brightness.

Note: When using it for the first time, you need to insert a 5V/2A Type-C into the Retro Game HAT to activate the battery power supply function.

You can use the battery to supply power later, and this Type-C cable can be used for charging.

1.4 RetroPie

If you want to play games on Retro Game HAT, you need to install a game system, here we select **RetroPie**.

RetroPie allows you to turn your Raspberry Pi, ODroid C1/C2, or PC into a retro-gaming machine. It builds upon Raspbian OS, Emulation Station, RetroArch and many other projects to enable you to play your favorite Arcade, home-console, and classic PC games with the minimum set-up.

1.4.1 Install RetroPie

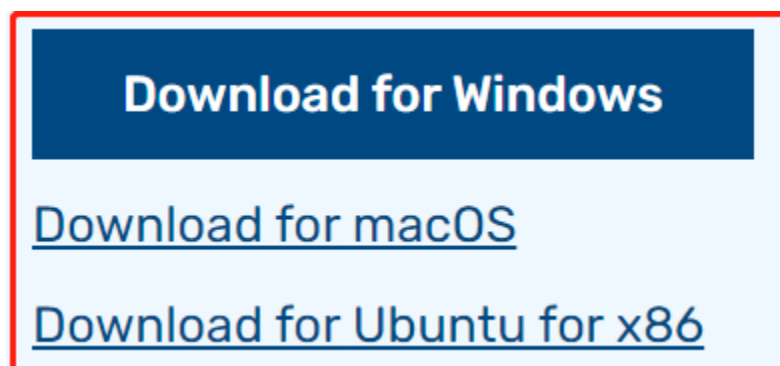
Required Components

Any Raspberry Pi	1 * Personal Computer
1 * Micro SD card	

Step 1

Raspberry Pi have developed a graphical SD card writing tool that works on Mac OS, Ubuntu 18.04 and Windows, and is the easiest option for most users as it will download the retroPie image and install it automatically to the SD card.

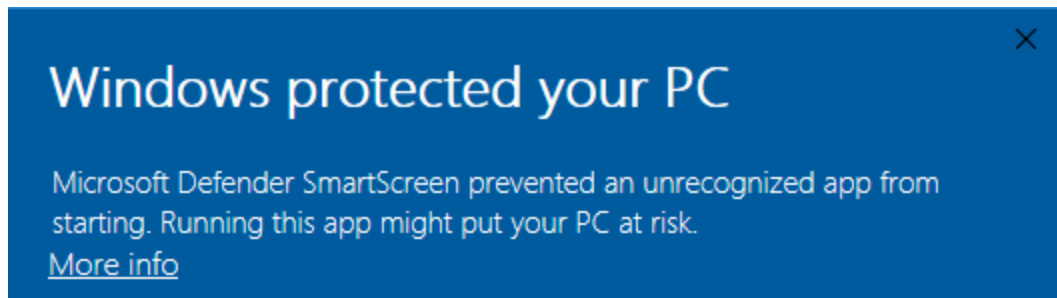
Visit the download page: <https://www.raspberrypi.org/software/>. Click on the link for the Raspberry Pi Imager that matches your operating system, when the download finishes, click it to launch the installer.



Step 2

When you launch the installer, your operating system may try to block you from running it. For example, on Windows I receive the following message:

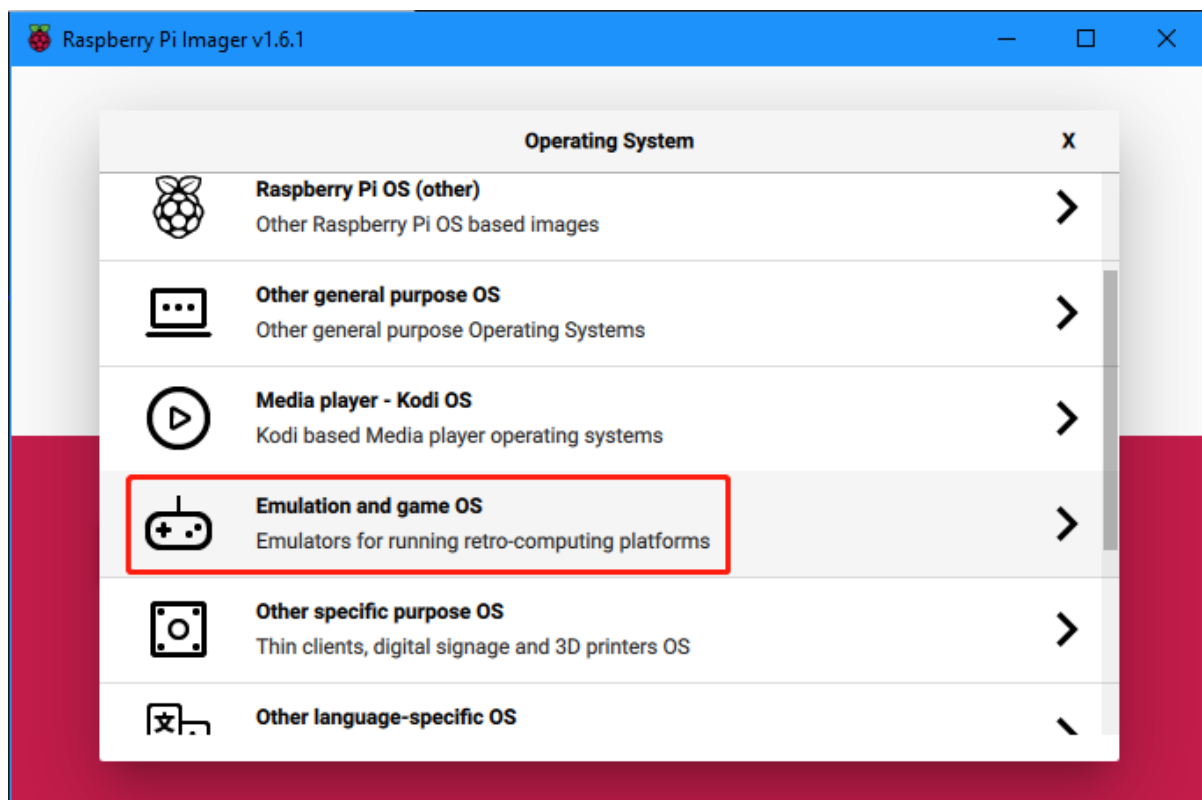
If this pops up, click on **More info** and then **Run anyway**, then follow the instructions to install the Raspberry Pi Imager.

**Step 3**

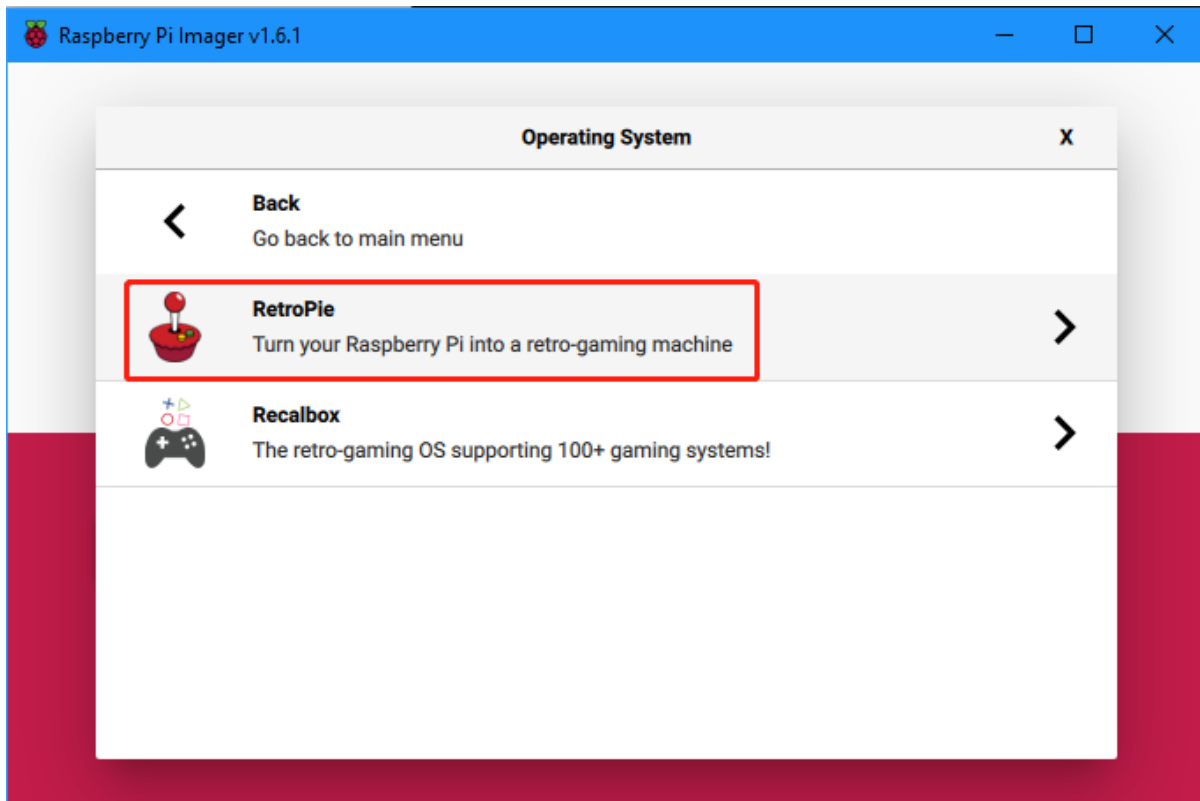
Insert your SD card into the computer or laptop SD card slot.

Step 4

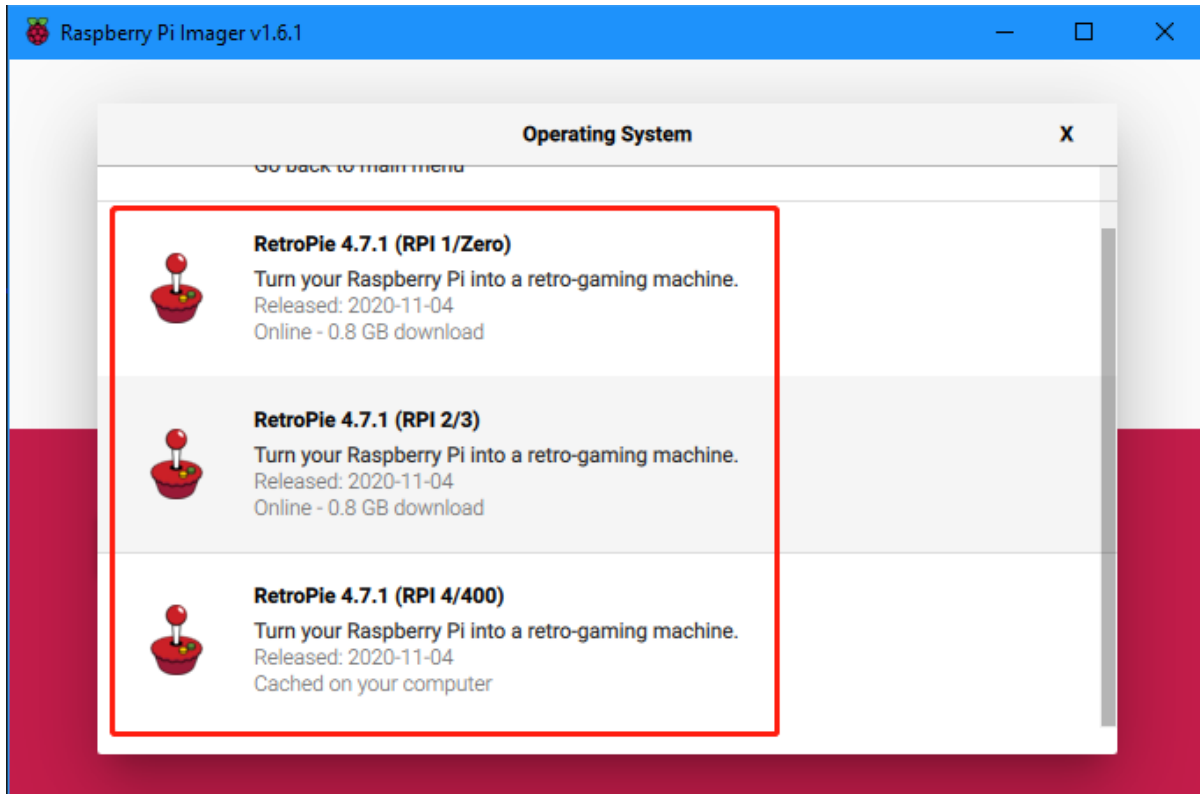
In the Raspberry Pi Imager, select the **Emulation and game OS**.



Select **RetroPie**.

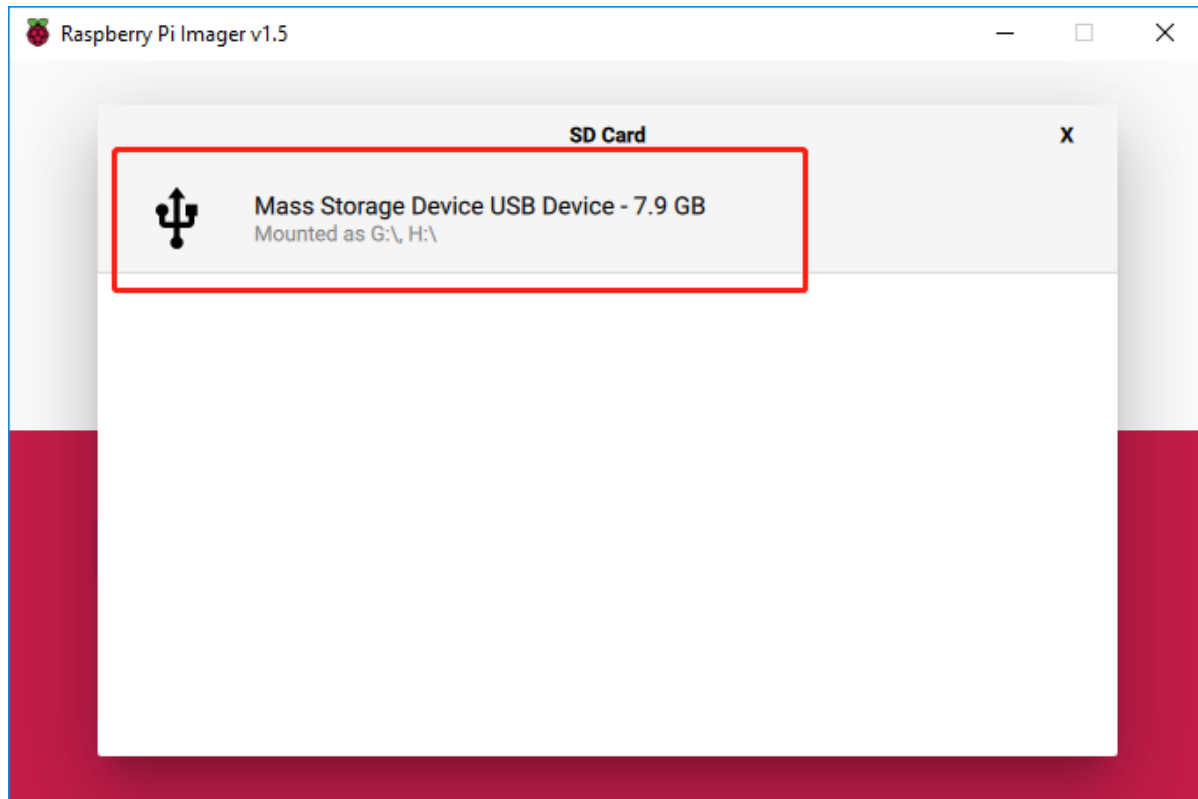


Choose the corresponding version according to your Raspberry Pi model.



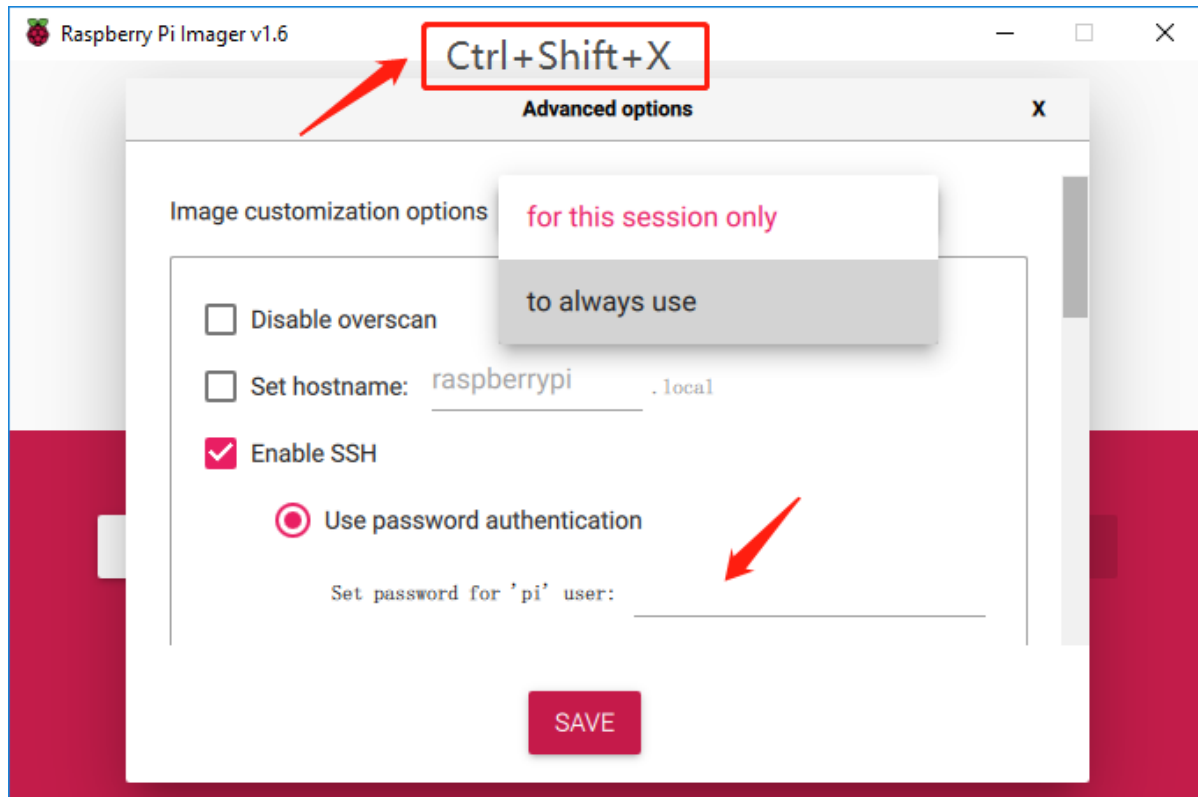
Step 5

Select the SD card you are using.



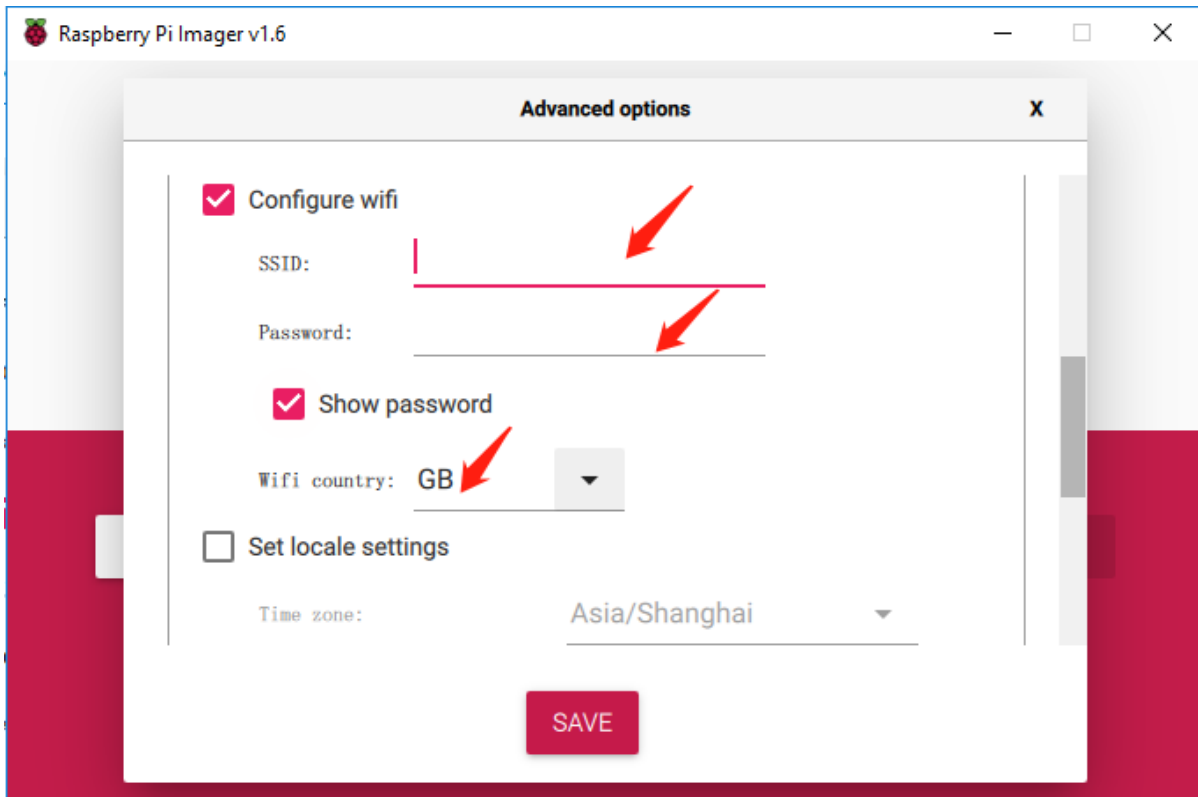
Step 6

Press **Ctrl+Shift+X** to open the **Advanced options** page to enable SSH and configure wifi, these 2 items must be set, the others depend on your choice . You can choose to always use this image customization options.



Then scroll down to complete the wifi configuration and click **SAVE**.

Note: **wifi country** should be set the two-letter [ISO/IEC alpha2 code](https://en.wikipedia.org/wiki/ISO_3166-1_alpha-2#Officially_assigned_code_elements) for the country in which you are using your Raspberry Pi, please refer to the following link: https://en.wikipedia.org/wiki/ISO_3166-1_alpha-2#Officially_assigned_code_elements



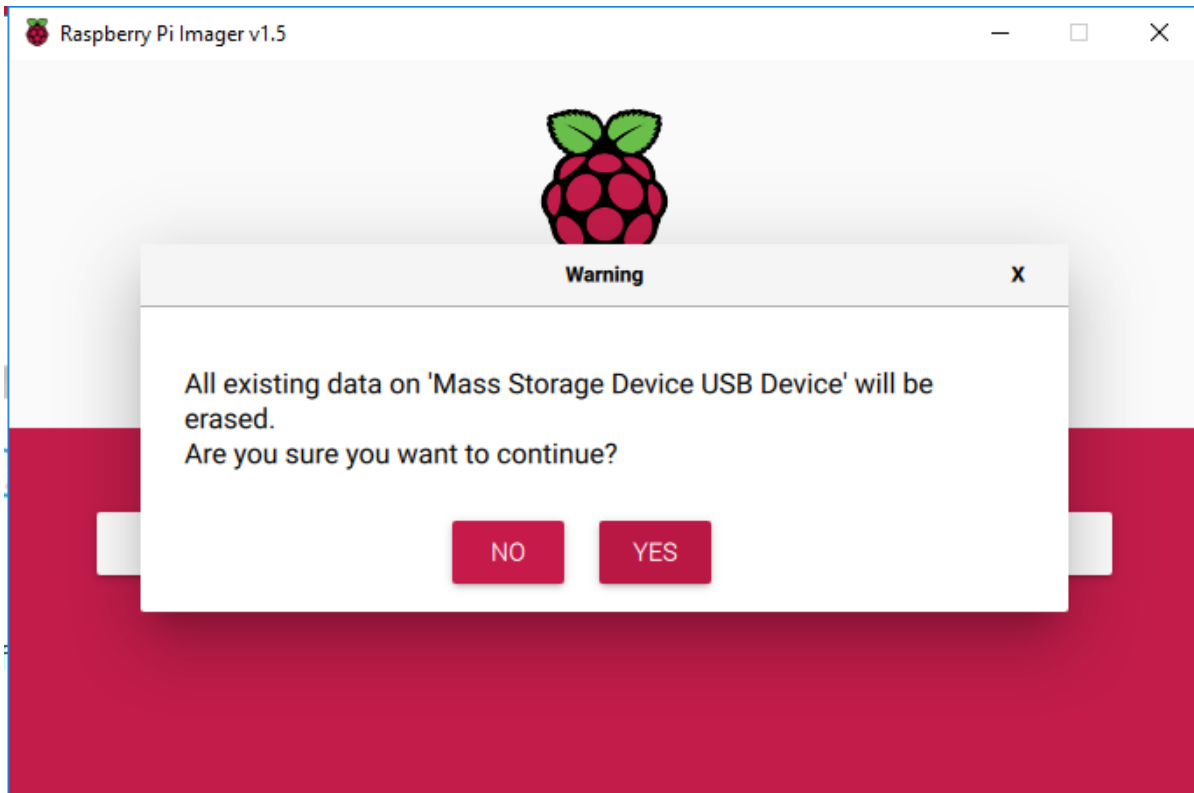
Step 7

Click the **WRITE** button.



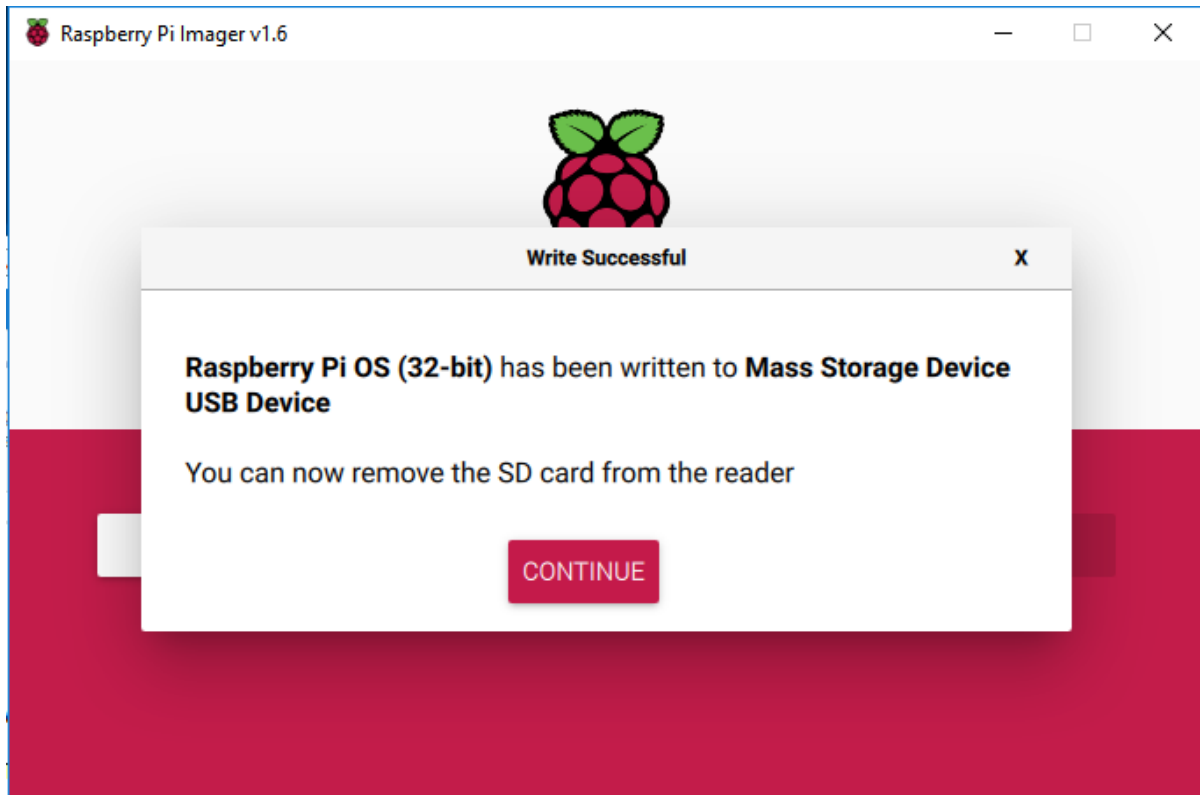
Step 8

If your SD card currently has any files on it, you may wish to back up these files first to prevent you from permanently losing them. If there is no file to be backed up, click **Yes**.

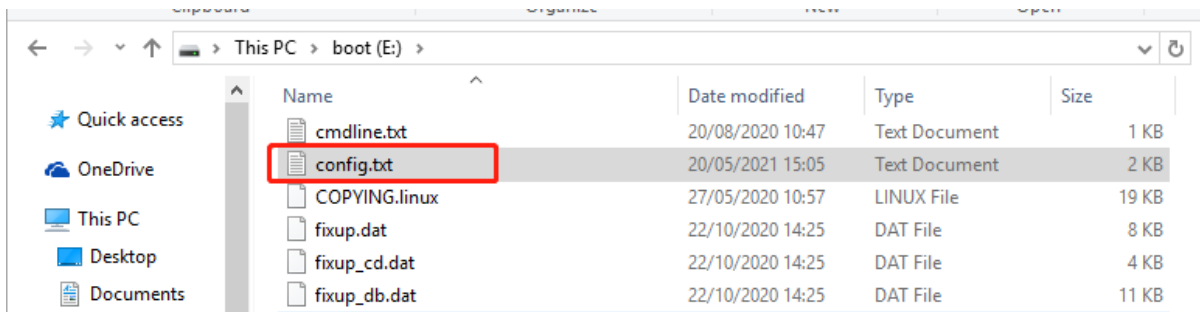


Step 9

After waiting for a period of time, the following window will appear to represent the completion of writing.

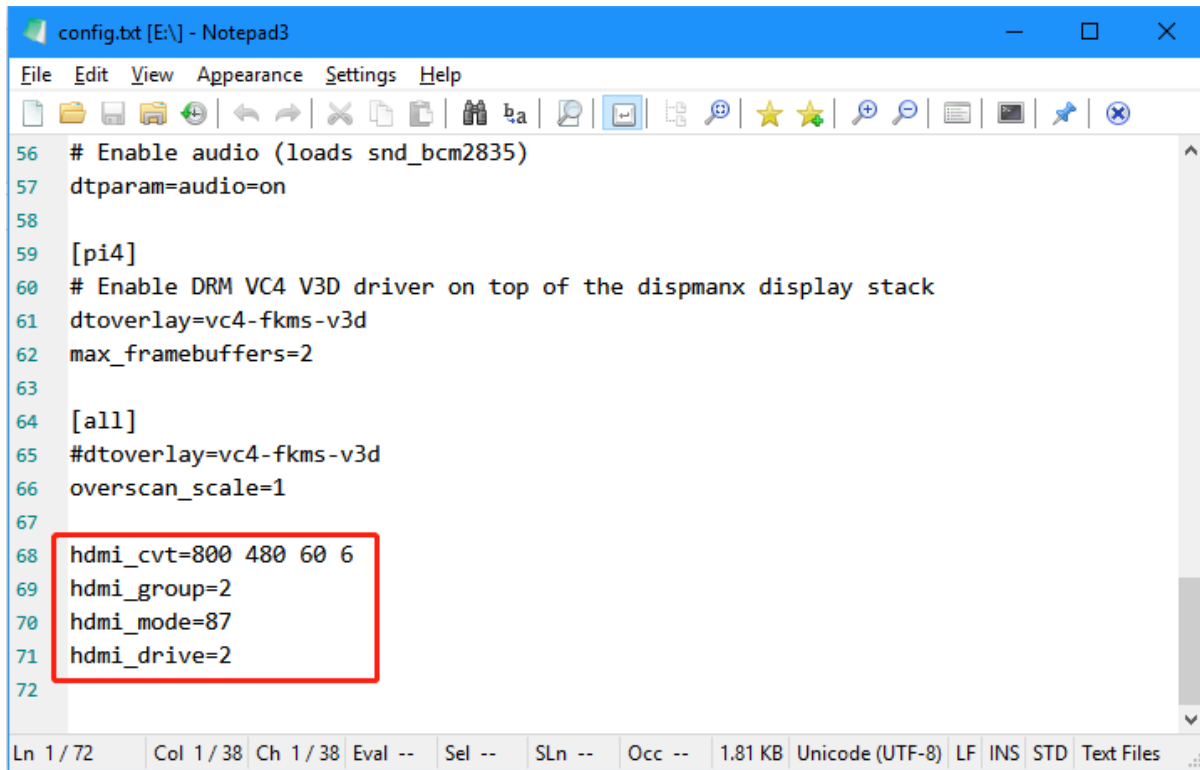


After the image is burned, open the config.text file of the SD card to configure the screen resolution.



Add the following at the end of the file.

```
hdmi_cvt=800 480 60 6  
hdmi_group=2  
hdmi_mode=87  
hdmi_drive=2
```



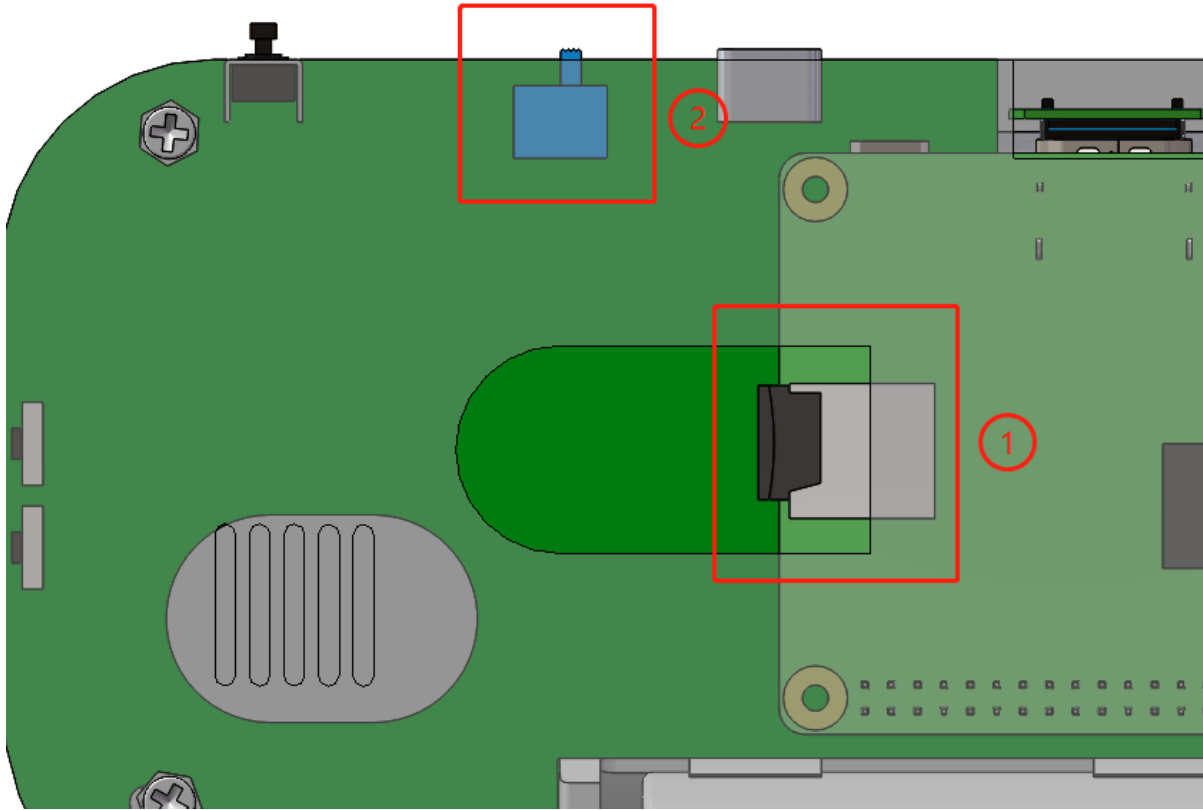
```
56 # Enable audio (loads snd_bcm2835)
57 dtparam=audio=on
58
59 [pi4]
60 # Enable DRM VC4 V3D driver on top of the dispmanx display stack
61 dtoverlay=vc4-fkms-v3d
62 max_framebuffers=2
63
64 [all]
65 #dtoverlay=vc4-fkms-v3d
66 overscan_scale=1
67
68 hdmi_cvt=800 480 60 6
69 hdmi_group=2
70 hdmi_mode=87
71 hdmi_drive=2
72
```

After adding, save the file and you will be able to eject the card reader.

1.4.2 Install the Button Driver

You need to install the button driver before you can use the buttons on the Retro Game HAT.

Insert the SD card into Retro Game HAT, turn the power switch to ON.



Note: When using it for the first time, you need to insert a 5V/2A Type-C into the Retro Game HAT to activate the battery power supply function.

You can use the battery to supply power later, and this Type-C cable can be used for charging.

Get the IP Address

After the Retro Game HAT is connected to WIFI, we need to get the IP address of it. There are many ways to know the IP address, and two of them are listed as follows.

1. Checking via the router

If you have permission to log in the router(such as a home network), you can check the addresses assigned to Raspberry Pi on the admin interface of router.

The default hostname of the Retro Game HAT is raspberrypi, and you need to find it. (If you are using ArchLinuxARM system, please find alarmpi.)

1. Network Segment Scanning

You can also use network scanning to look up the IP address of Raspberry Pi. You can apply the software, Advanced IP scanner and so on.

Scan the IP range set, and the name of all connected devices will be displayed. Similarly, the default hostname of the Retro Game HAT is raspberrypi, if you haven't modified it.

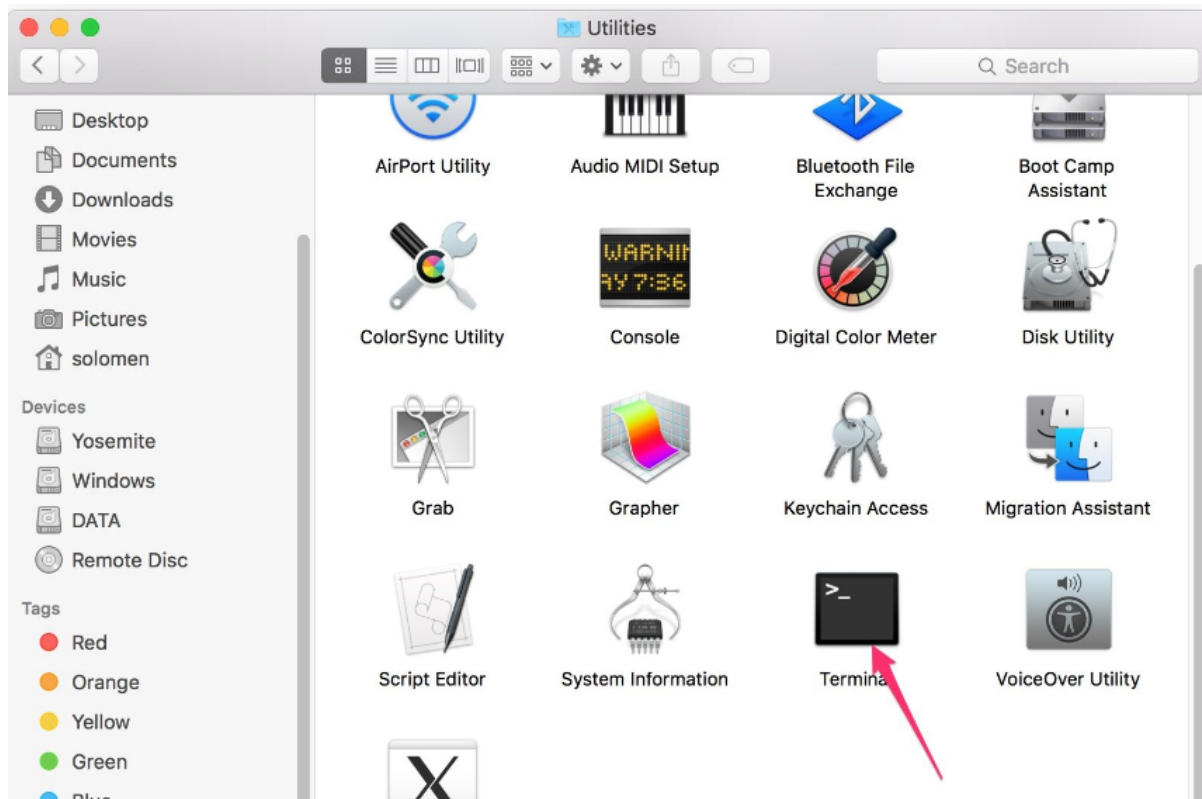
Use the SSH Remote Control

We can open the Bash Shell of RetroPie by applying SSH. Bash is the standard default shell of Linux. The Shell itself is a program written in C that is the bridge linking the customers and Unix/Linux. Moreover, it can help to complete most of the work needed.

For Linux or/Mac OS X Users

Step 1

Go to **Applications->Utilities**, find the **Terminal**, and open it.



Step 2

Type in `ssh pi@ip_address` . “pi”is your username and “ip_address” is your IP address. For example:

```
ssh pi@192.168.18.197
```

Step 3

Input “yes”.

```
1. ssh pi@192.168.18.197 (ssh)
Last login: Fri Apr 12 16:56:20 on ttys000

# hang_chen @ hang-chendeMacBook-Pro in ~ [17:09:55]
$ ssh pi@192.168.18.197
The authenticity of host '192.168.18.197 (192.168.18.197)' can't be established.
ECDSA key fingerprint is SHA256:60tKKQtCCRVUCohWmvVcbp7tBHtQL0f8/0kusPjVsEU.
Are you sure you want to continue connecting (yes/no)?
```

Step 4

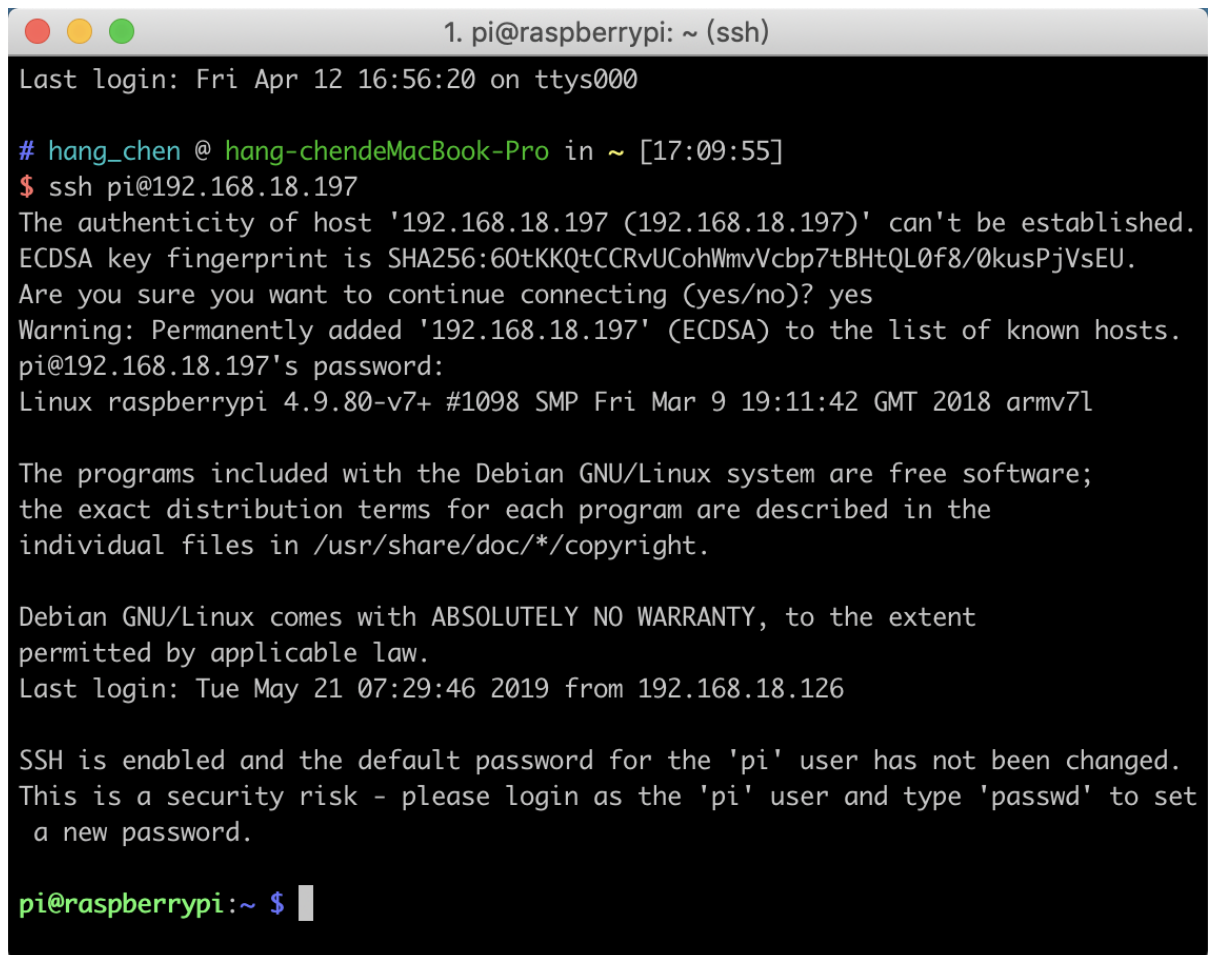
Input the passcode and the default password is **raspberrypi**.

```
1. ssh pi@192.168.18.197 (ssh)
Last login: Fri Apr 12 16:56:20 on ttys000

# hang_chen @ hang-chendeMacBook-Pro in ~ [17:09:55]
$ ssh pi@192.168.18.197
The authenticity of host '192.168.18.197 (192.168.18.197)' can't be established.
ECDSA key fingerprint is SHA256:60tKKQtCCRVUCohWmvVcbp7tBHtQL0f8/0kusPjVsEU.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.18.197' (ECDSA) to the list of known hosts.
pi@192.168.18.197's password: 
```

Step 5

We now get the Raspberry Pi connected and are ready to go to the next step.



```
1. pi@raspberrypi: ~ (ssh)
Last login: Fri Apr 12 16:56:20 on ttys000

# hang_chen @ hang-chendeMacBook-Pro in ~ [17:09:55]
$ ssh pi@192.168.18.197
The authenticity of host '192.168.18.197 (192.168.18.197)' can't be established.
ECDSA key fingerprint is SHA256:60tKKQtCCRvUCohWmvVcbp7tBHtQL0f8/0kusPjVsEU.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.18.197' (ECDSA) to the list of known hosts.
pi@192.168.18.197's password:
Linux raspberrypi 4.9.80-v7+ #1098 SMP Fri Mar 9 19:11:42 GMT 2018 armv7l

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 May 21 07:29:46 2019 from 192.168.18.126

SSH is enabled and the default password for the 'pi' user has not been changed.
This is a security risk - please login as the 'pi' user and type 'passwd' to set
a new password.

pi@raspberrypi:~ $
```

Note: When you input the password, the characters do not display on window accordingly, which is normal. What you need is to input the correct password.

For Windows Users

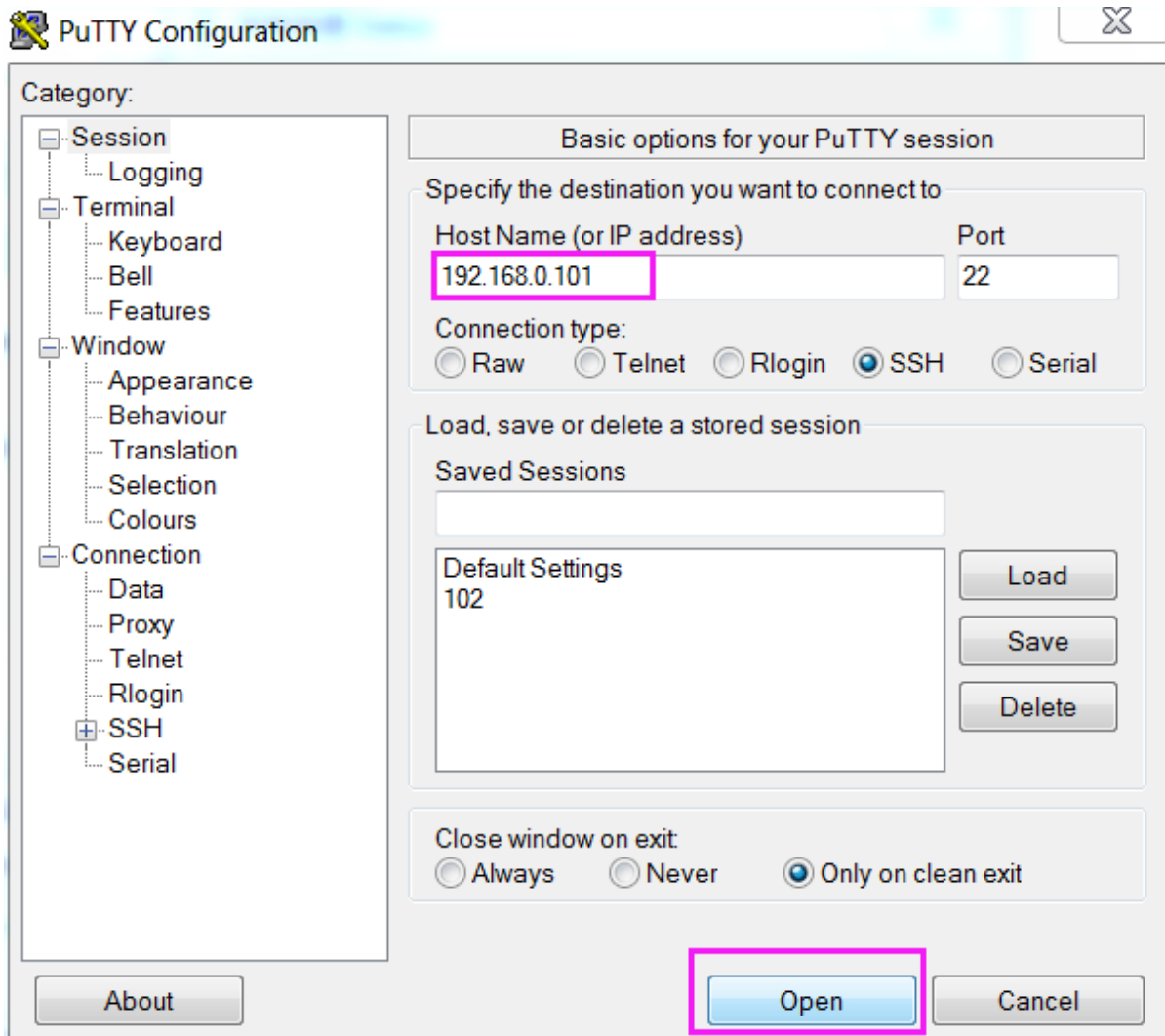
If you're a Windows user, you can use SSH with the application of some software. Here, we recommend **PuTTY**.

Step 1

Download PuTTY.

Step 2

Open PuTTY and click **Session** on the left tree-alike structure. Enter the IP address of the RPi in the text box under **Host Name (or IP address)** and **22** under **Port** (by default it is 22).

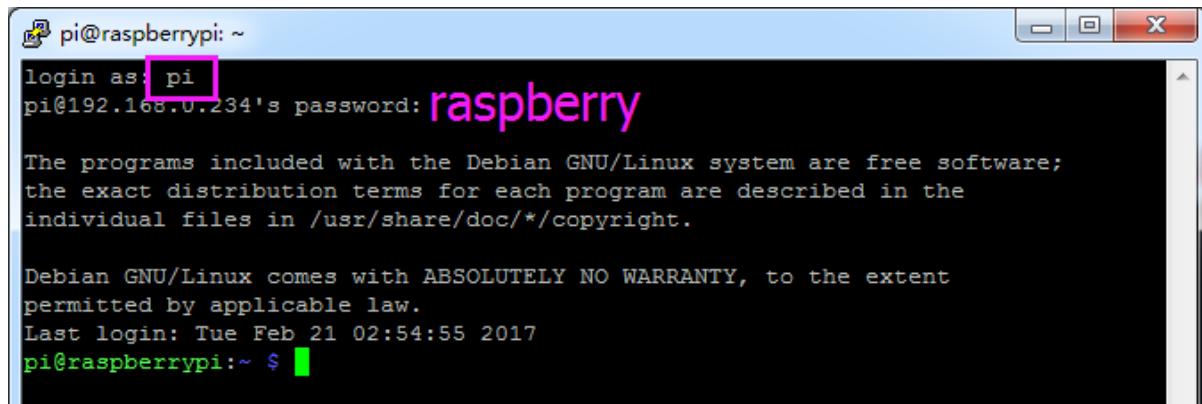


Step 3

Click **Open**. Note that when you first log in to the Raspberry Pi with the IP address, there prompts a security reminder. Just click **Yes**.

Step 4

When the PuTTY window prompts “**login as:**”, type in “**pi**”(the user name of the RPi), and **password:** “**raspberrypi**” (the default one, if you haven’t changed it).



```
pi@raspberrypi: ~
login as: pi
pi@192.168.0.234's password: raspberr
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 Feb 21 02:54:55 2017
pi@raspberrypi:~ $
```

Step 5

Here, we get the Raspberry Pi connected and it is time to conduct the next steps.

Note: When you input the password, the characters do not display on window accordingly, which is normal. What you need is to input the correct password.

Install Key Drive

When you enter the RetroPie terminal via ssh, enter the following command to download the source code of the button driver.

```
git clone https://github.com/sunfounder/retro-game-hat
cd retro-game-hat/game-hat-button-driver
```

Install the button driver.

```
sudo python3 install.py
```

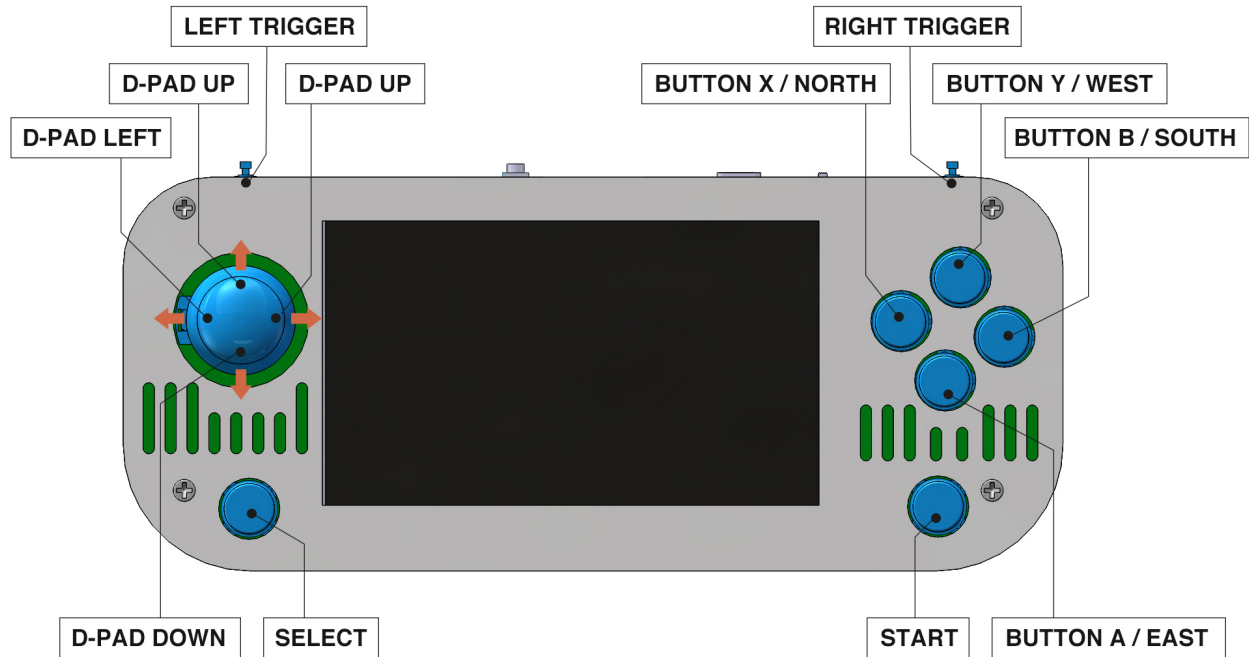
After the installation is complete, it is prompted whether to restart, enter Y to confirm.

```
Installation finished, do you want to reboot? (y/N) Y
```

1.4.3 Configure Retro Game HAT

After you install the button driver and restart, RetroPie needs you to perform button configuration again (long press any button to enter the configuration mode), the specific configuration method can refer to [RetroPie First-Installation](#).

Here we provide a configuration method, you can refer to this method to configure your RetroPie buttons.



Note: If there is an unconfigured key position, long press any key to skip the key position configuration.

RetroPie's official website not only provides detailed tutorials on button configuration, but also provides specific methods for adding games. If you still have questions about RetroPie, you can find the answers in the official tutorial.

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