

HIFI AMP HAT User Manual



1、Overview

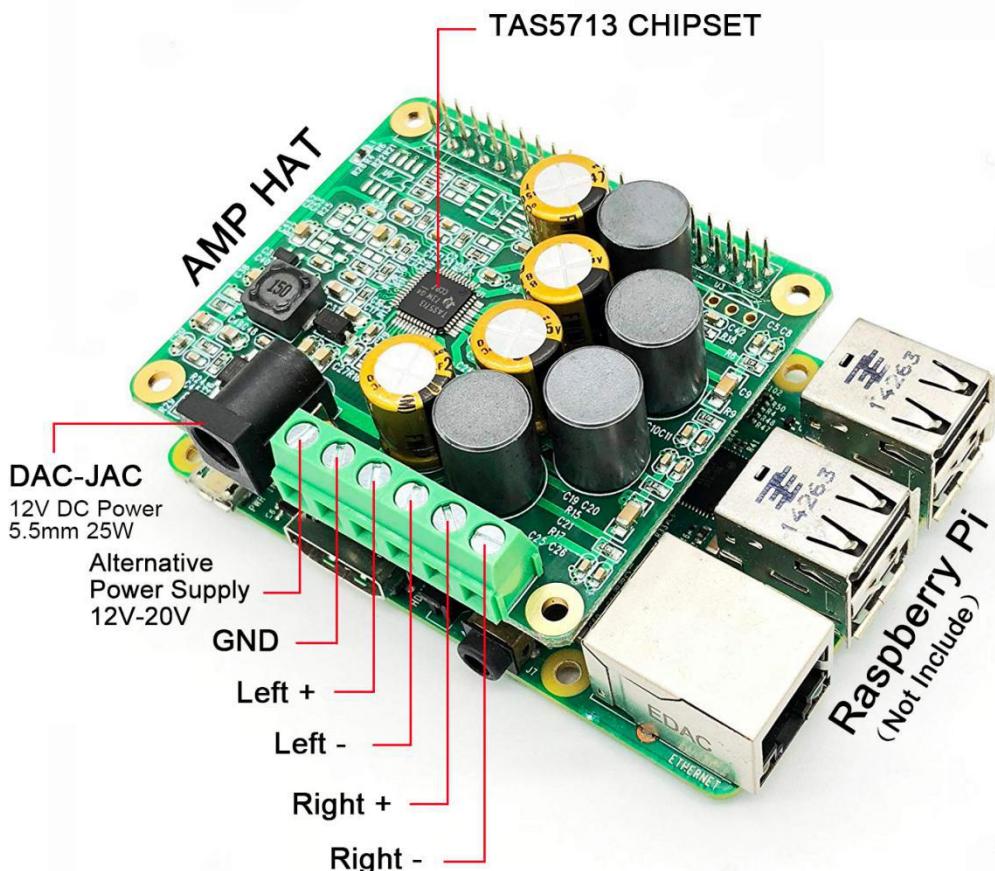
The Innomaker HiFi AMP Hat is the best optimized partner for RPI audio output, high-quality, highly efficient ,up to 25W Class-D power amplifier for the Raspberry Pi. Just plug it into Raspberry and do some simple configuration, You can get a same high-class music player, but only pay 1/10 to 1/100 of the market price. This is a good choice to DIY your home stereo theatre or broadcasting system.

2、Functions and Features

1. Compatible with Raspberry Pi Zero,Zero W,3B,3B+ through the 40-pin connector. Connects directly to the Raspberry Pi board, no additional cables required,no soldering required. Easy to get more beautiful and fantastic sound by this RPI+AMP HIFI suits.
2. Absolutely perfect to support all Raspberry Pi music player system ,such as OSMC, Max2Play, RuneAudio, Volumio, Moode, Pi CorePlayer, Pi MusicBox, OpenELEC, Debian, Ubuntu etc. Support play music from a hard disk or over the network. Support DSD over PCM(DOP) mode.
3. On-board TAS5713 is a 25-W Class-D digital-audio power amplifier for driving stereo bridge-tied speakers. Offers low distortion and acoustically accurate audio reproduction.
4. Accept a wide range of input data 8-Khz to 48-Khz, Up to 90% Efficient, Supports speakers 4 Ohm impedance allows you to enjoy high quality audio.
5. Comes with software, document and friendly technology support. For more information please refer to our wiki (view the link on color page comes with the goods)

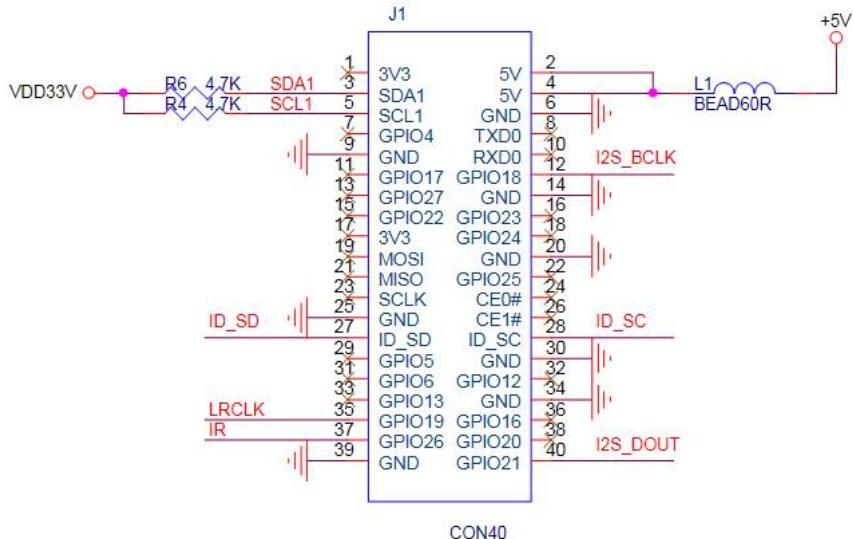
3. Hardware Description

3.1 Overview



3.2 PINOUT USAGE- FEMALE CONNECTOR

1) 40 PIN Interface Schematic



2) 40 PIN Interface Description

PIN	Symbol	Description
2, 4	+5V	+5V Supply Pin, connected to the main 5V supply of the Raspberry Pi
3	SDA1	SDA Used for AMP and EEPROM
5	SCL1	SCL Used for AMP and EEPROM
12	GPIO_18	IIS_BCLK
35	GPIO_19	IIS_LRCLK
37	GPIO_26	Infrared receiver reserved port
40	GPIO_21	IIS_DOUT
27, 28	ID_SCL and ID_SDA	Reserved for an ID EEPROM on the Raspberry Pi. These pins are always reserved and should never be used to connect external components
6, 9, 14, 20, 25, 30, 34, 39	GND	Ground Pin, connected to the main system Ground of the Raspberry Pi

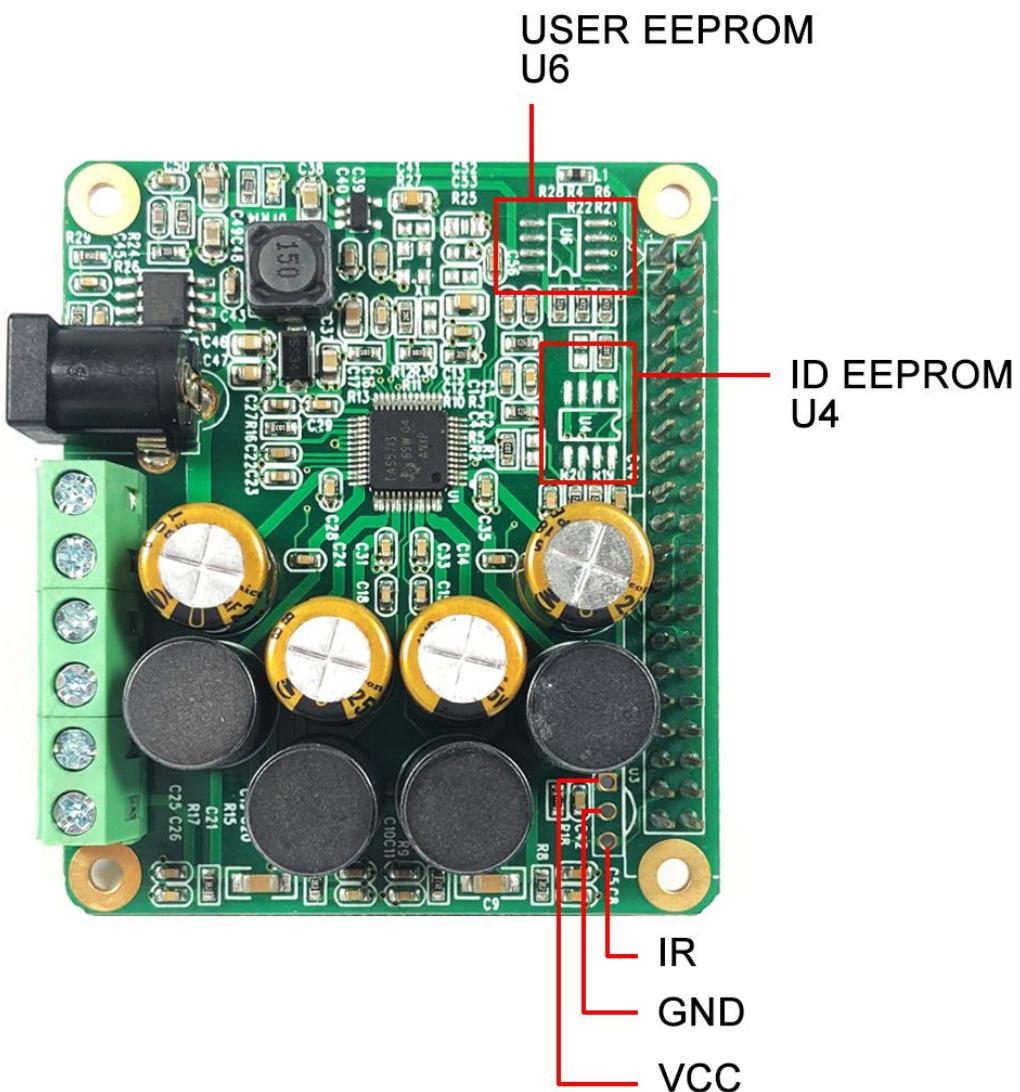
The remaining pins are unused, You can use them for your other hardware boards.

For more information about GPIO of Raspberry Pi, please refer to below link:

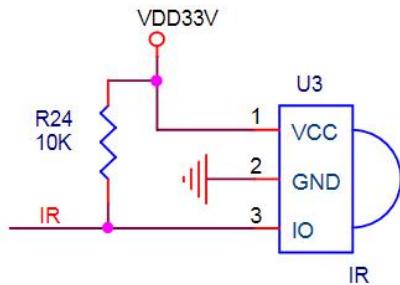
<https://www.raspberrypi-spy.co.uk/2012/06/simple-guide-to-the-rpi-gpio-header-and-pins/#prettyPhoto>

<https://docs.microsoft.com/en-us/windows/iot-core/learn-about-hardware/pinmappings/pin mappingsrpi>

3.3 Extended Function

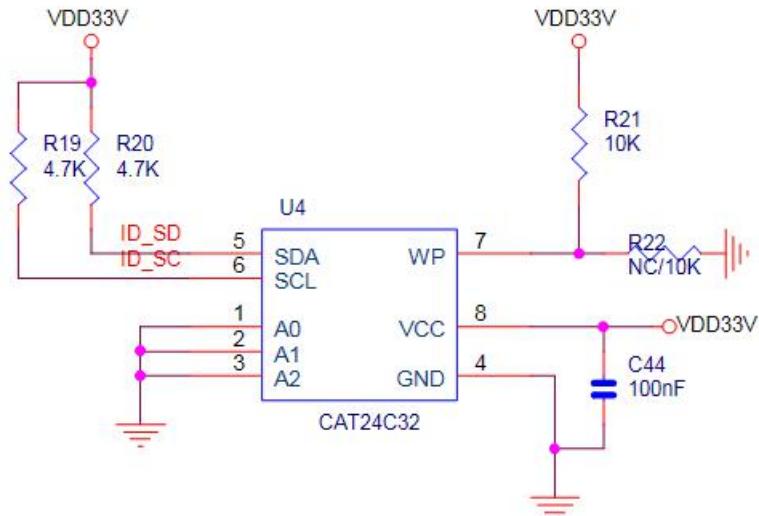


1) Infrared Receiver Function: (U3, No Soldering On-board)



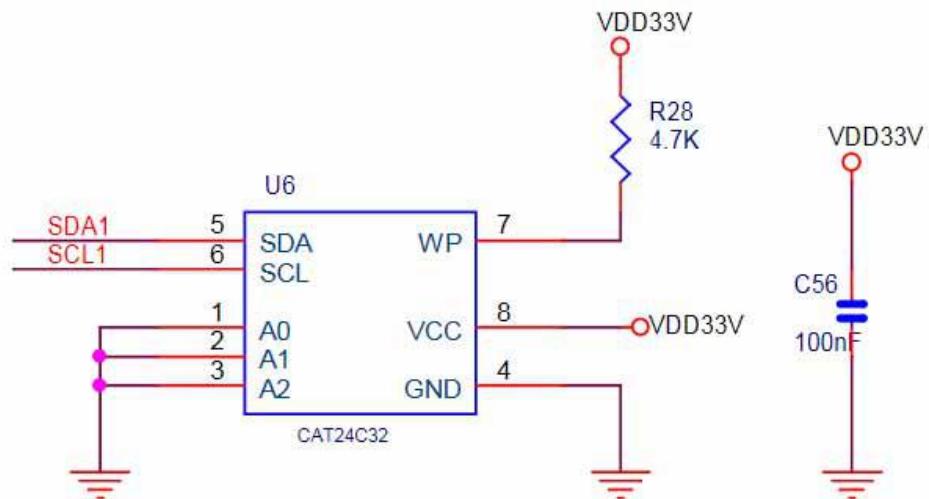
IR is connected to PIN37(GPIO_26) , But we have no software for it right now. We will release new software version after finish it. If you have any advices please feel free to E-mail to us.

2) ID EEPROM: (U4, No soldering on-board)



Pin 27 and 28 are always reserved for an ID EEPROM on the Raspberry Pi. Independently which card you use. It's useless for most application. If you want to use this function, you need to solder the IC, resistance and capacitance by yourself.

3) USER EEPROM: (U6 No soldering on-board)

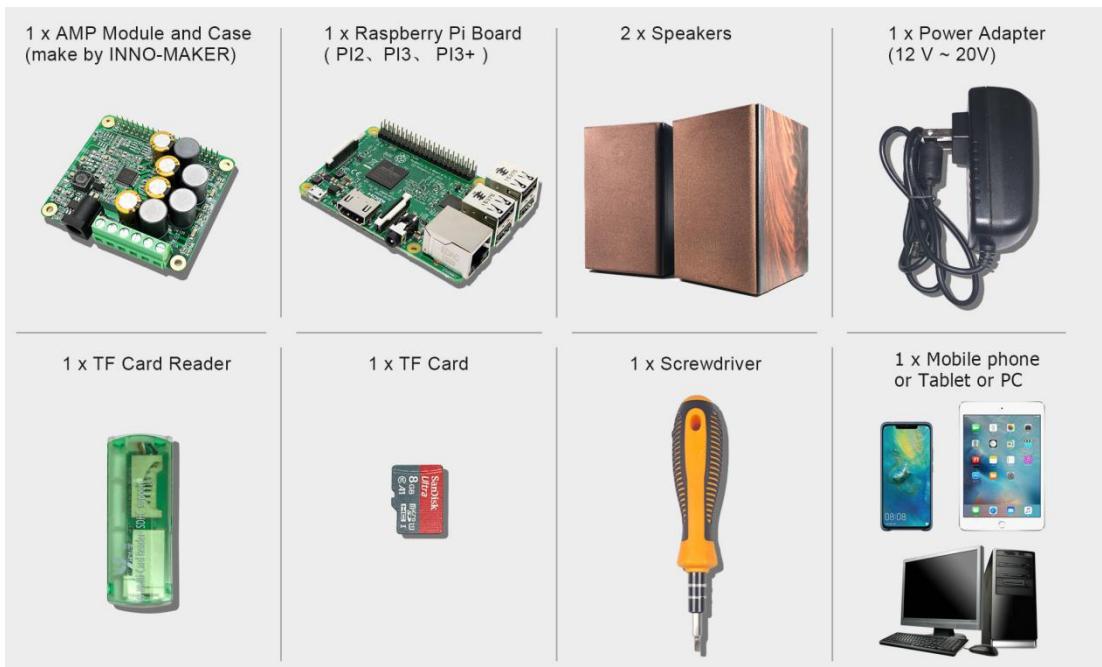


If connected to the same IIC port with AMP you need to solder the IC and Confirm IIC slave devices. If you a novice of Raspberry Pi, We really wouldn't advise do that.

4. Hardware connection

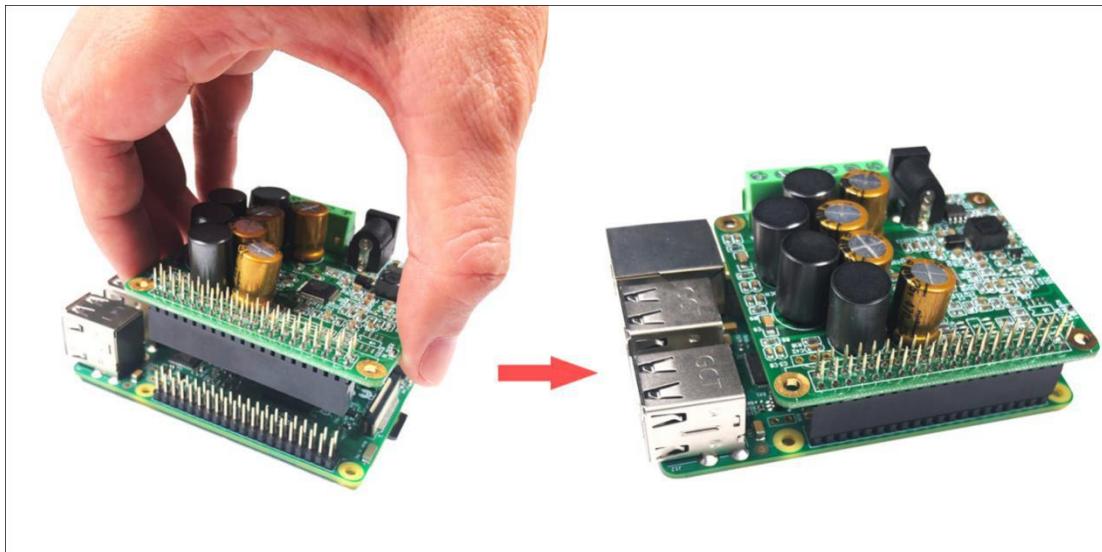
4.1 Prepare:

- 1、 one Raspberry pi board (PI2,PI3,PI3+, PI Zero, PI Zero W)
- 2、 one TF card (at least 8G)
- 3、 one TF card reader
- 4、 one AMP module and case (make by INNO-MAKER)
- 5、 one Power Adapter (12 V ~ 20V)
- 6、 2 Speakers
- 7、 Screwdriver
- 8、 One mobile phone o Tablet or PC

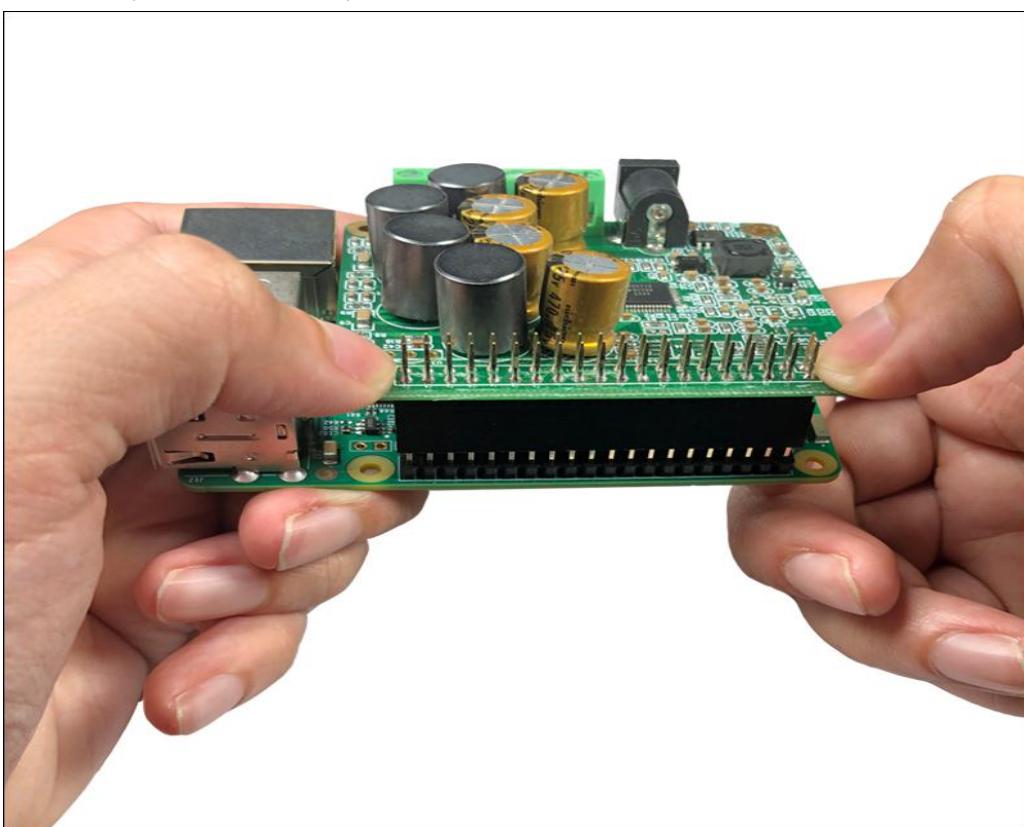


4.1 Plug it together

- (1) Plug the AMP module into the 40 pin GPIO head, and make sure the four hole are aligned correctly.



- (2) And then push it down slowly with either thumb , but doesn't take much force.

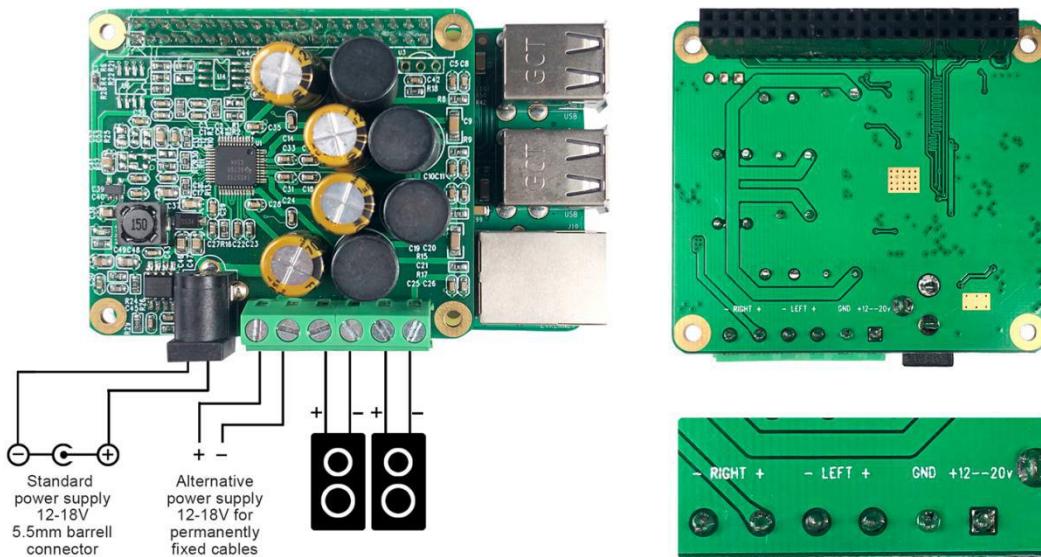


4.2 Wiring

(1) Unscrew the six cover screws



- (2) And then plug the speaker cables into connector correctly and screw down. Please check the silk-screen on the back of the board.



- (3) Please make sure your network is usable and plug in the LAN cable to Raspberry Pi. If you want to play local music files through USB, please plug it into Raspberry Pi port.

Warning : The Raspberry Pi will be powered by the Amp. It is not allowed to connect 5V to the Micro-USB port of the Raspberry Pi. Power supply is only one external 12-20V power supply that will be connected directly to the Amp.

5. Software Description

5.1 Overview

HIFI AMP HAT module compatible with many Raspberry pi music playback system such as:
OSMC / Max2Play / RuneAudio / Volumio / Moode / PiCorePlayer / PiMusicBox / OpenELEC etc.
You can choose your favorite. We take **Volumio/Moode/Max2play/Debian** Preset System for Example.

Note:

- 1) Because the third party will update the version unscheduled, so the actual UI may different from below user guide. But the configurations will be the same. If you meet any problem, you can check the user help on the website of the third party or feel free to e-mail us.
- 2) Check the user help on the website of the third party or feel free to e-mail us.
- 3) The default setting is maximum volume of most system, it' will offensive your ears. So please turn down the volume before you enjoy it.

5.2 Download Image from website

Download the lastest image for Raspberry PI:

Volumio Image:

<http://volumio.org/get-started/>

Moode Image:

<http://www.moodeaudio.org/>

Max2Play Image:

<https://www.max2play.com/en/max2play-image/>

Debian Image:

http://directordownloads.raspberrypi.org/raspbian_full/images/raspbian_full-2019-04-09/2019-04-08-raspbian-stretch-full.zip



www.inno-maker.com

Design Service, Production Service

5.3 Load Image on to SD card.

Prepare a capacity of more than 8GB TF card and a card reader. Load the image file onto a SD card, using the instructions provided on the Raspberry Pi website for Linux, Mac or PC:

<https://www.raspberrypi.org/documentation/installation/installing-images/README.md>

5.4 VOLUMIO Setup

Volumio is an entirely new music system. It is designed to play all your music, whether is an Hi-Res file or a Web Radio, with the highest quality. Control it with your favourite device, a smartphone, PC or tablet, and enjoy your music as you never did before.

Volumio is a Free and Open Source Linux Distribution, designed and fine-tuned exclusively for music playback. It supports all filetypes: FLAC, Alac, Aac, Vorbis, Mp3, DSD etc. and support

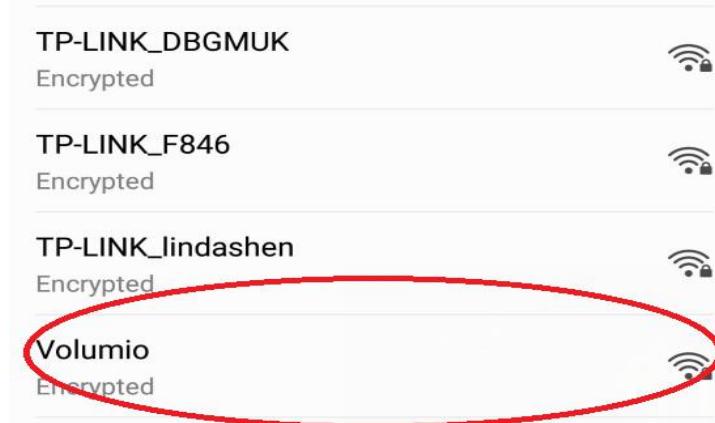
By flashing (installing) Volumio on any platforms, it will then become a headless Audiophile Music Player. Headless means that the only way to control it will be with another device, such as a Smartphone, Tablet, PC or anything that has a browser.

For more detail please refer to <https://volumio.org/discover/>.

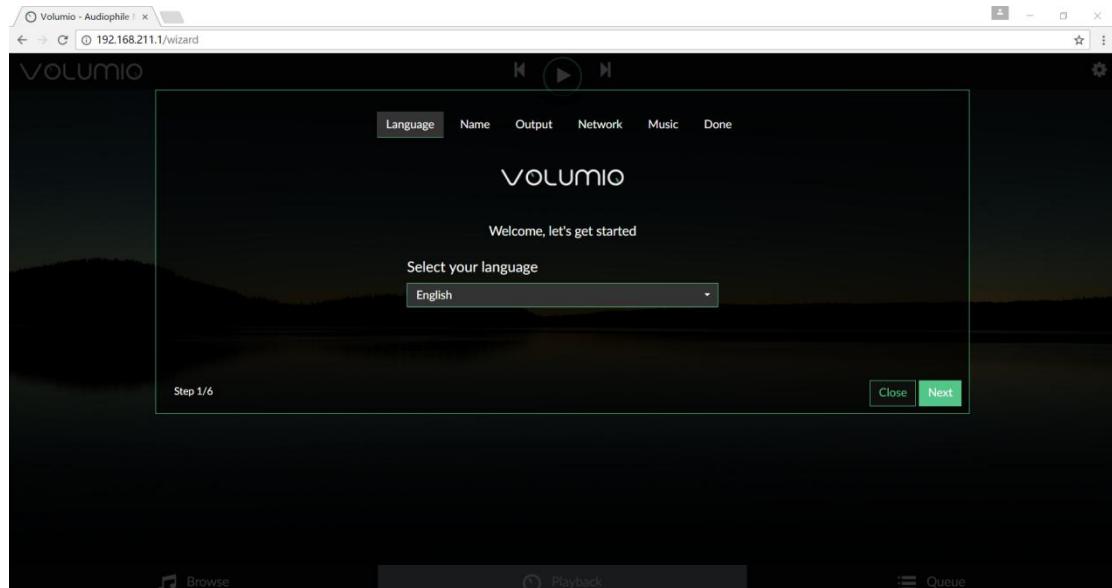
STEP:

- 1) Insert the TF card with volumio image into the Raspberry pi then power on.

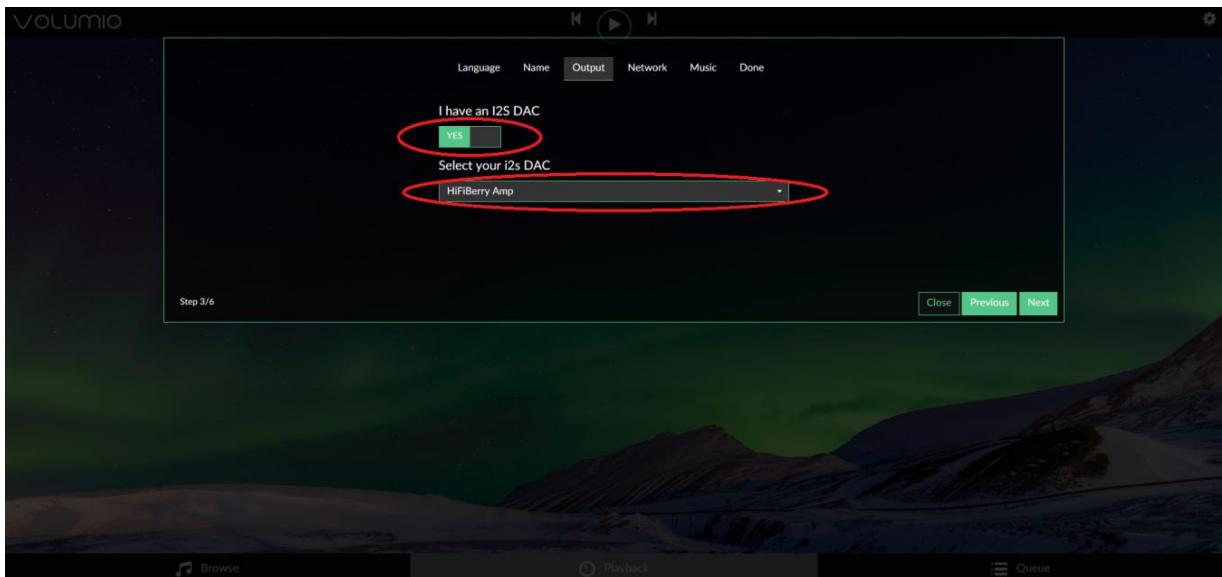
2) By using your smart phone, tablet or any device with WIFI and browser search for WIFI hotspots. You can see a 'Volumio' name in the search list. Connect this hotspot with password 'volumio2'. You can change your password after login.



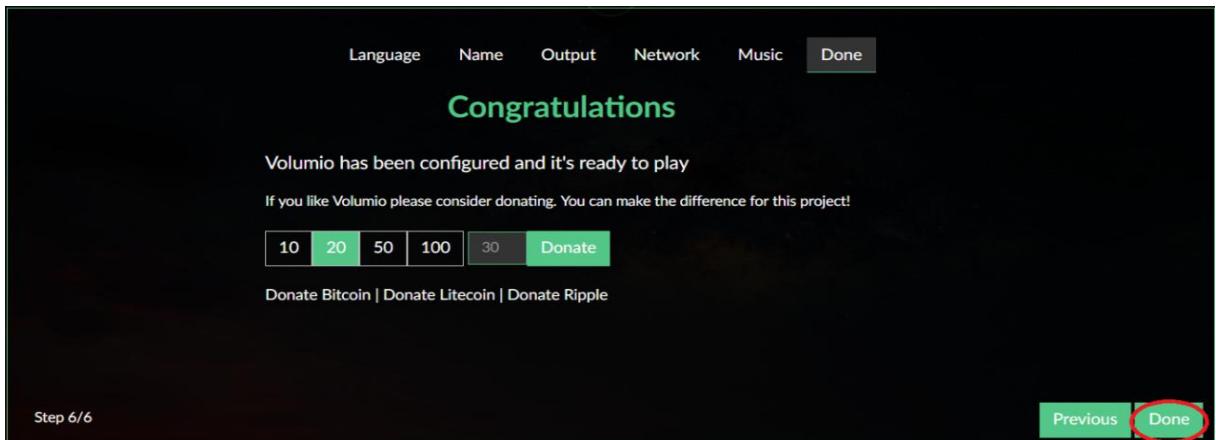
3)The browser will automatically eject playback software UI which is based on web interface (if you connect the hotspot successfully but for some reason browser can't pop up the playback page automatically, you can using <http://192.168.211.1> to login. You can see below wizard of Volumio. We only need to set "Language" , "Name" "Output" and "Done" for simple application.



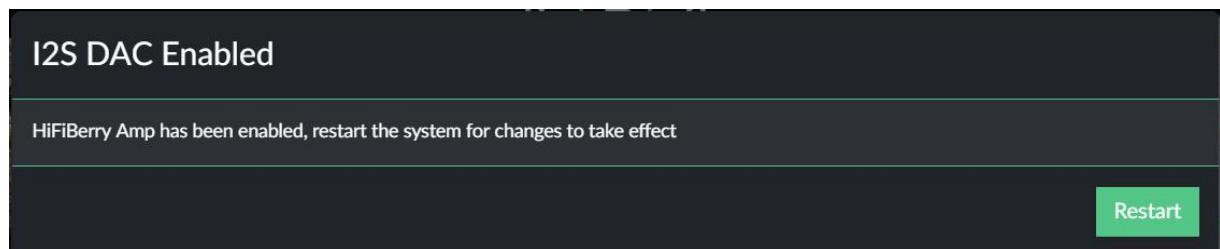
4) It should be noted that 'Output' page must set as below. This is an essential step, otherwise you can't hear anything.



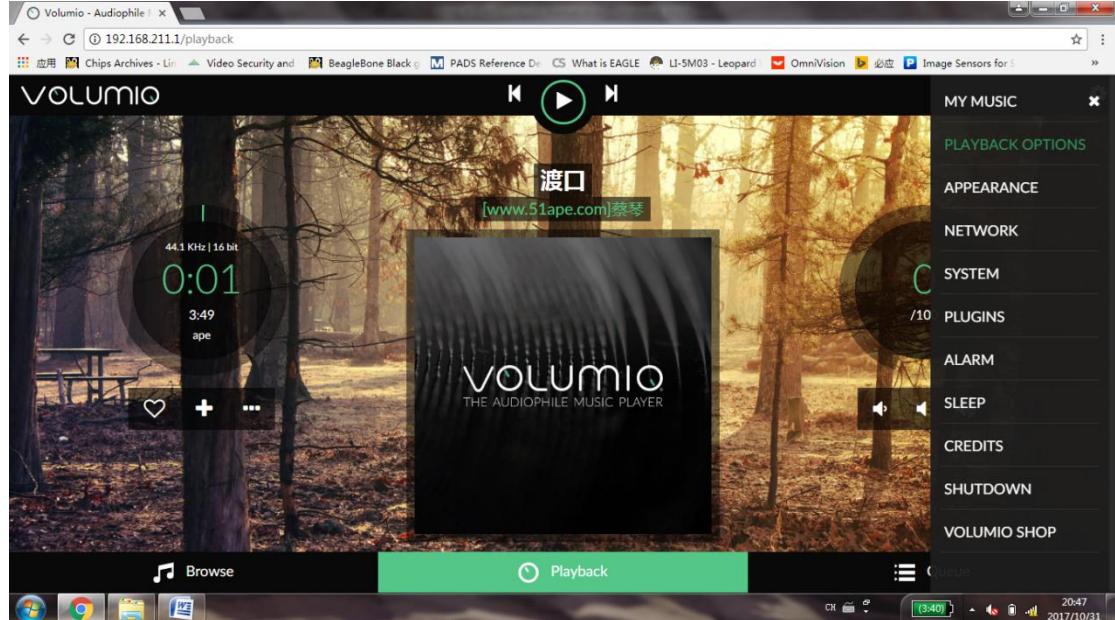
5) In 'Done' Page, you can see a request for donations from Volumio. It's depend on you. You can give them some help if you like this application. Gifts of roses, hand a fragrance.



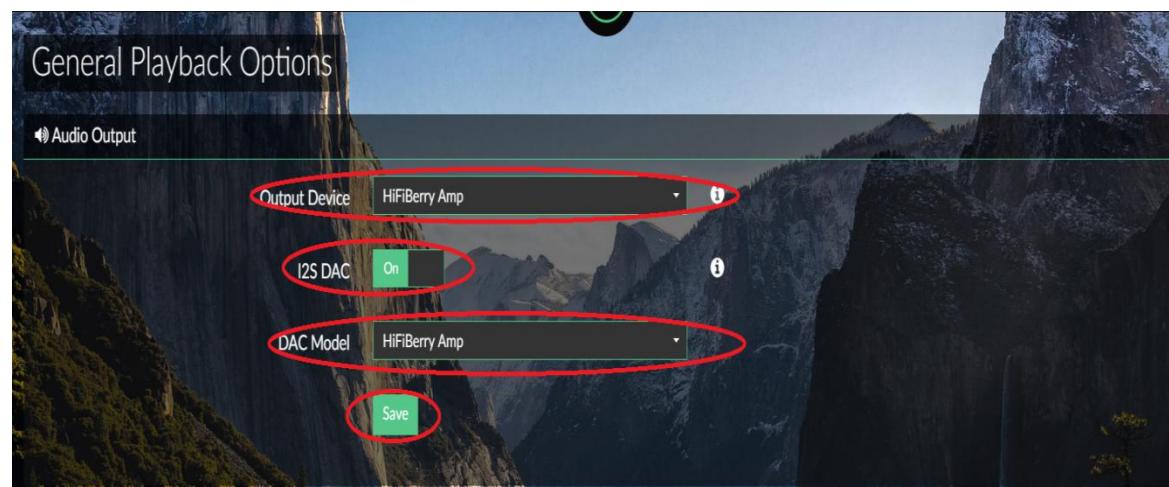
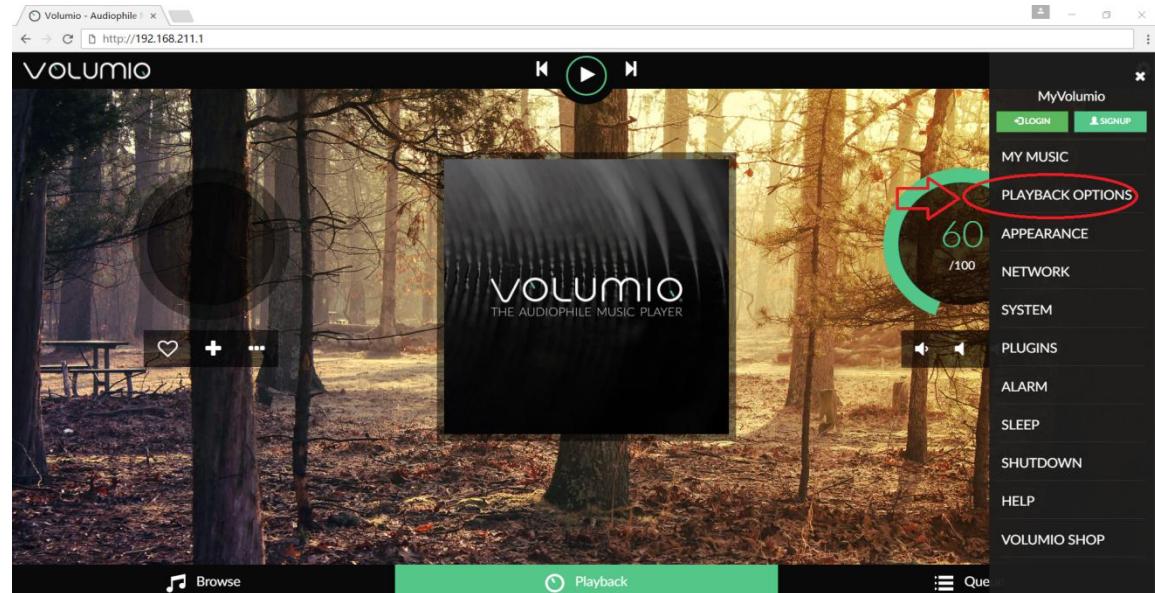
6) Click 'Done' to finish initialization of Volumio. And then restart Volumio.



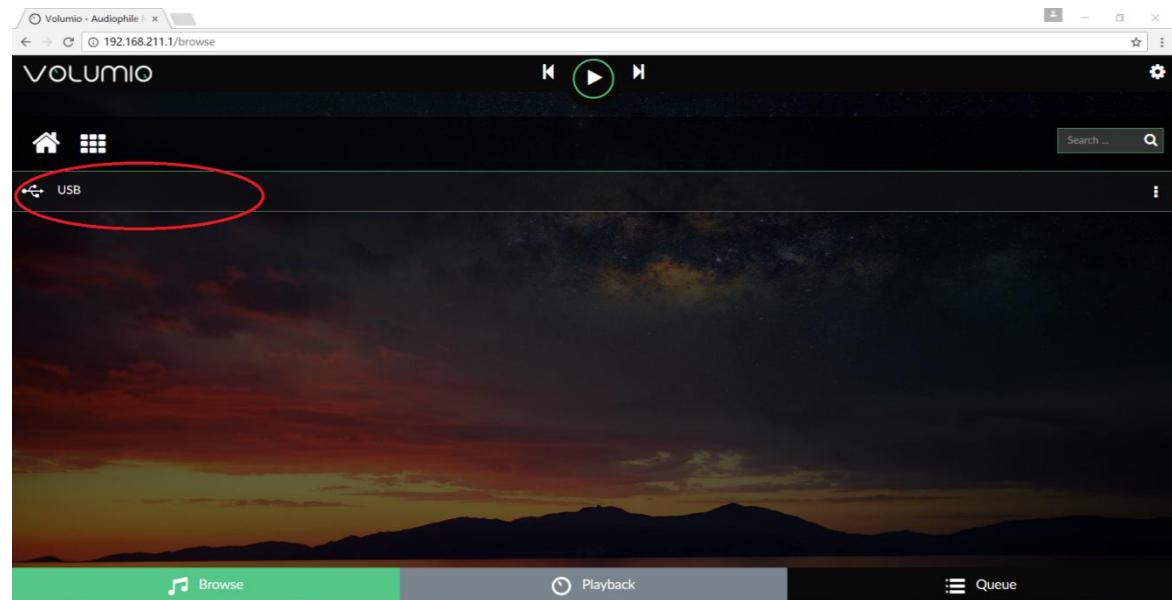
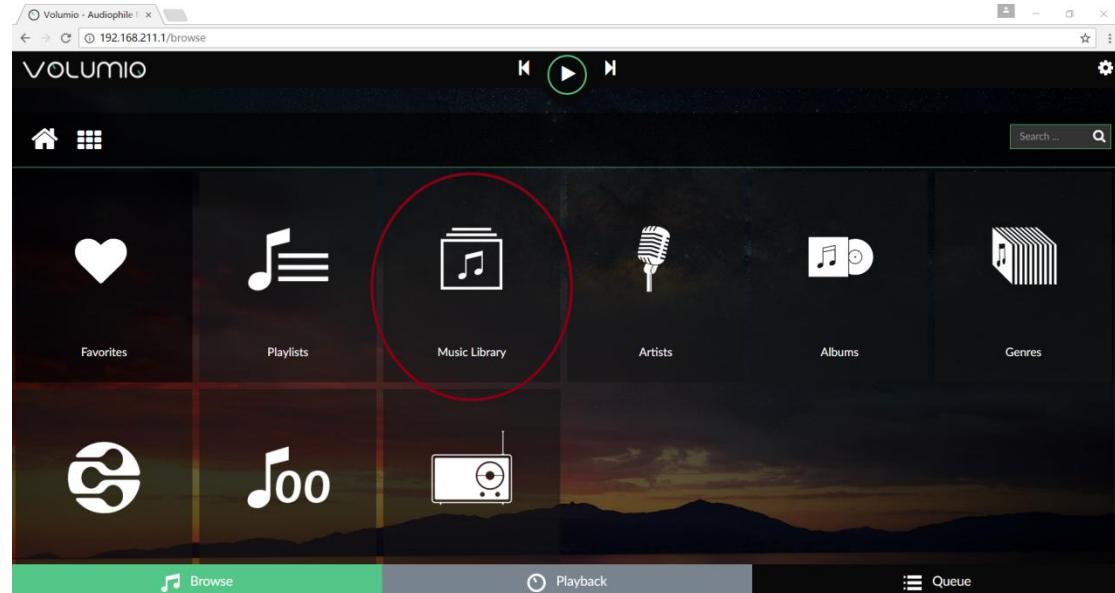
7) In this restart process, "Volumio" hotpot will turn off for a moment. Sometimes your mobile phone or Tablet or PC will automatic connect to other. You need to set back to 'Volumio' hotpot.
After restart you can see the main page of Volumio.



8) If you can't play music properly, please Click 'Setting' → PLAYBACK OPTION, check the output setting as below picture. This is an essential step, otherwise you can't hear anything.



9) You can insert the USB Disk or mobile hard disk with your own audio file into Raspberry Pi USB connector, and find the music list of your USD disk in “Music Library” .



5.5 VOLUMIO Play DSD Music Files

DSD64, DSD128 AND DSD256 are now natively supported in direct DSD mode on Volumio.

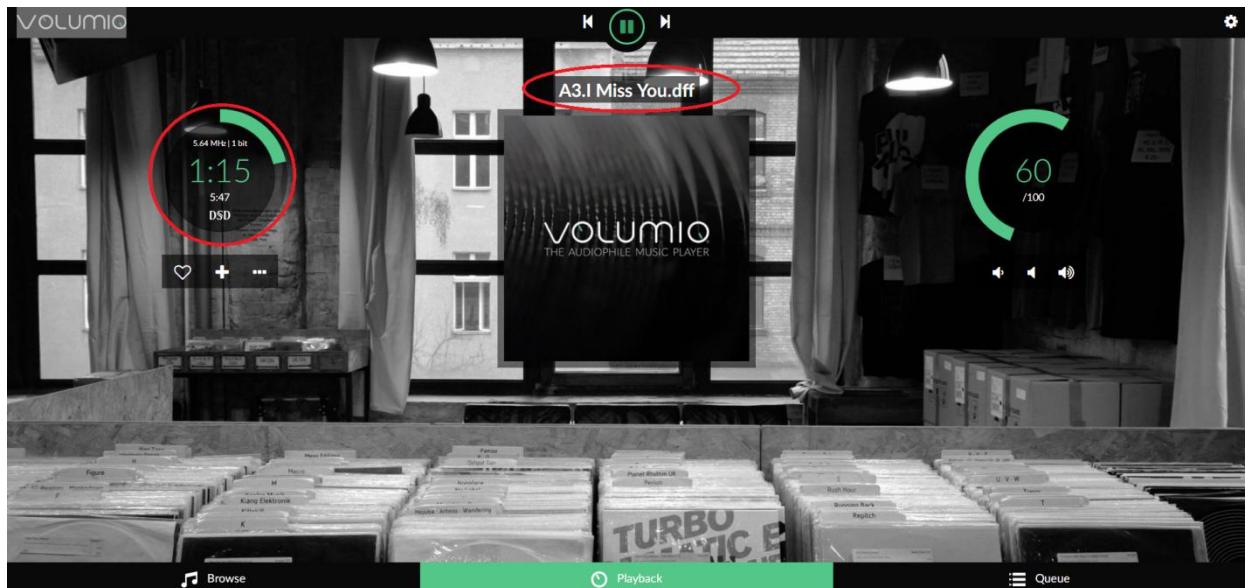
For more DSD information please refer to Volumio link:

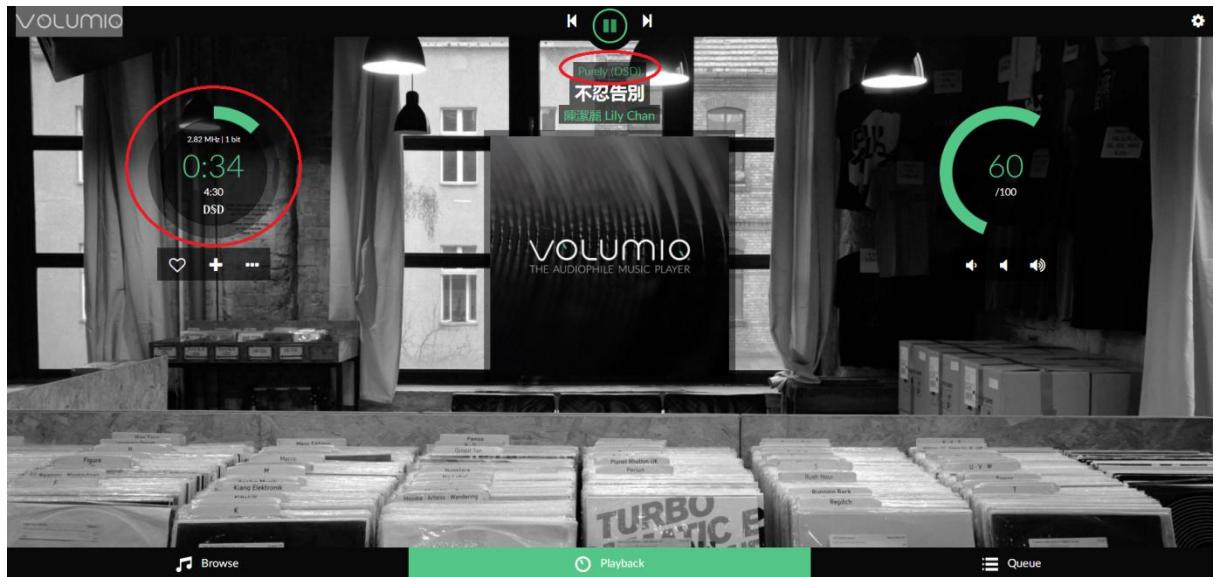
<https://volumio.org/direct-dsd-support-volumio-dsd512/>

Please set 'General Playback Options' mode as below picture:



Restart and enjoy DSD music.





5.6 MoOde Setup

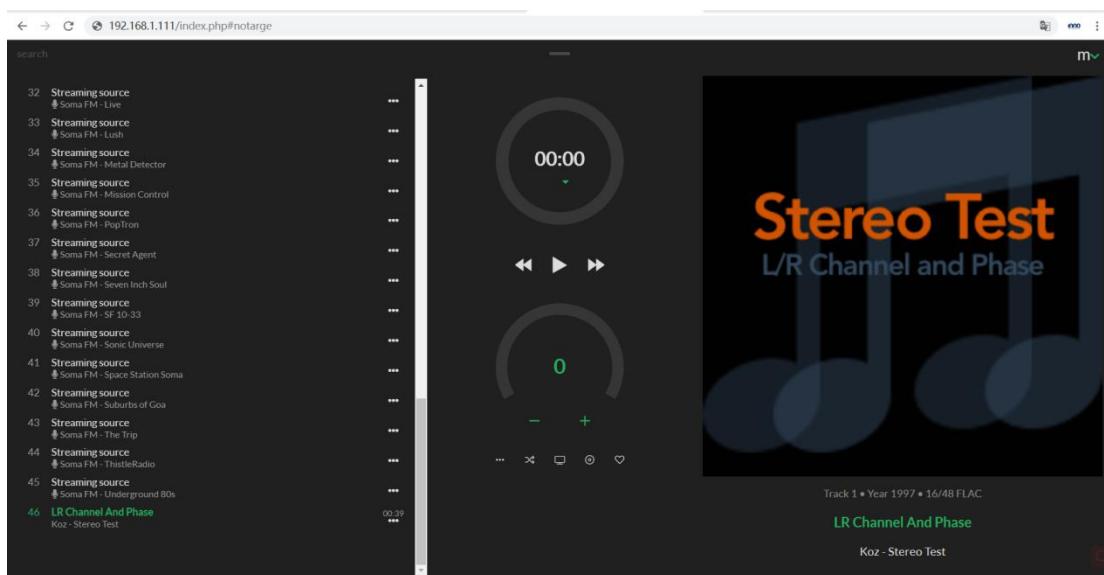
1) We just talk about the basics, for more information please read the official user manual:

<https://github.com/moode-player/moode/blob/master/www/setup.txt>

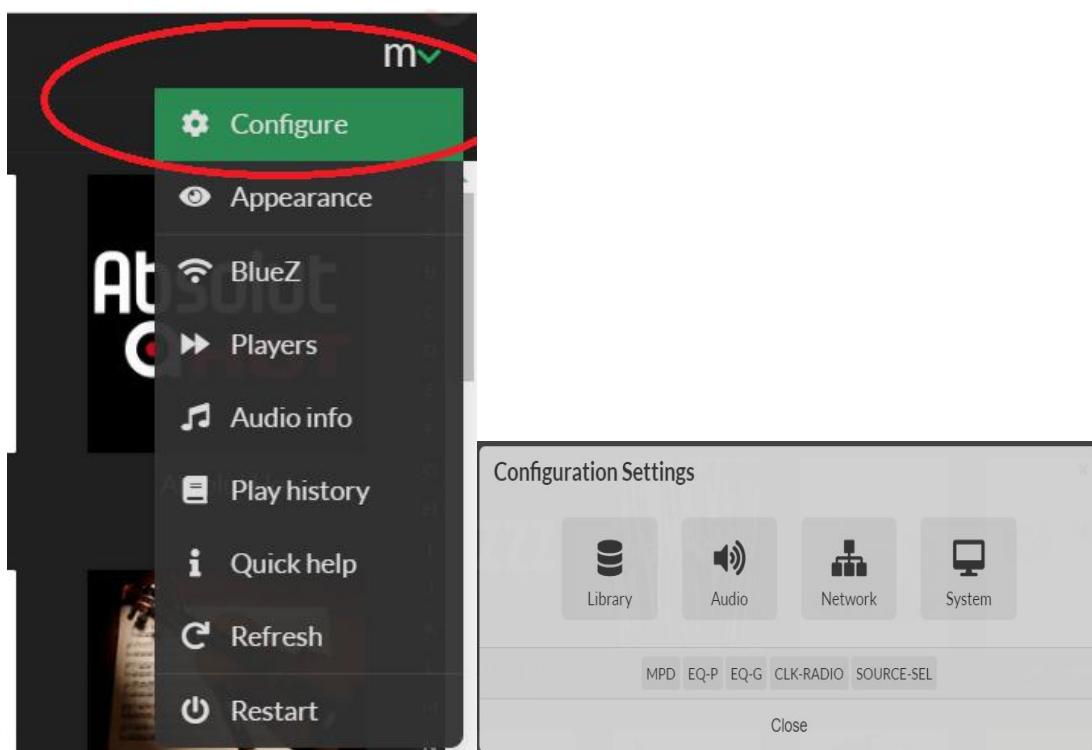
2) Insert the TF card with MoOde image into the Raspberry Pi, and then connect to your router by LAN cable. Finally power on. Make sure your Raspberry Pi, Desktop (mobile phones, laptop, pad and so on) in the same local area network (LAN). Get the IP address of Raspberry Pi through check up the router or use some IP checker tools.



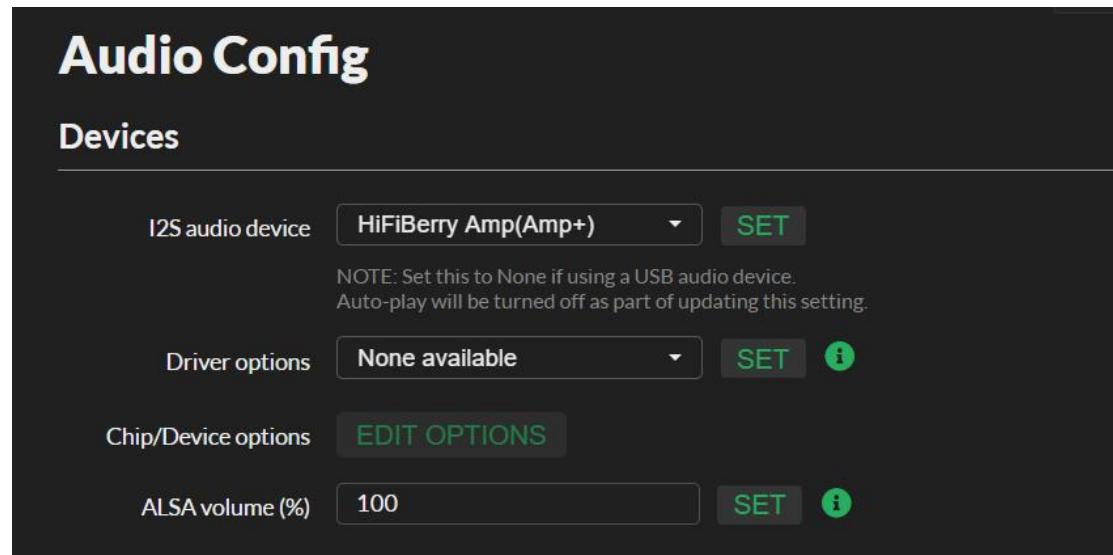
3) Connected the Raspberry Pi through browser. You get the display of Moodie.



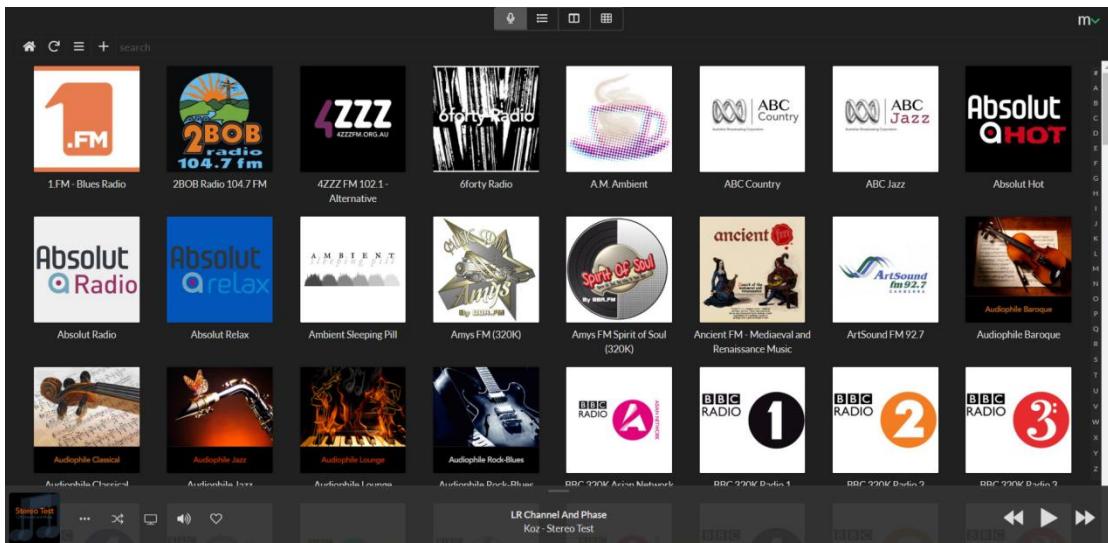
4) Click the icon in the upper right for setting the system.



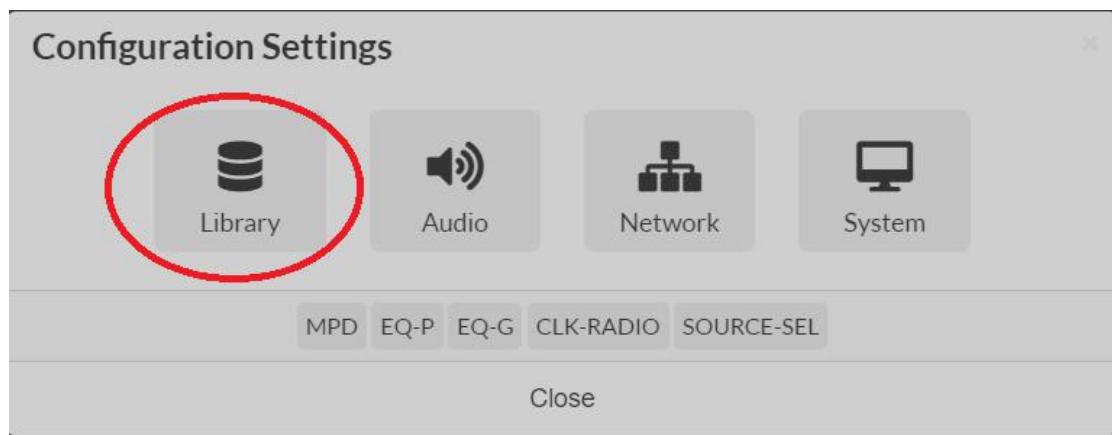
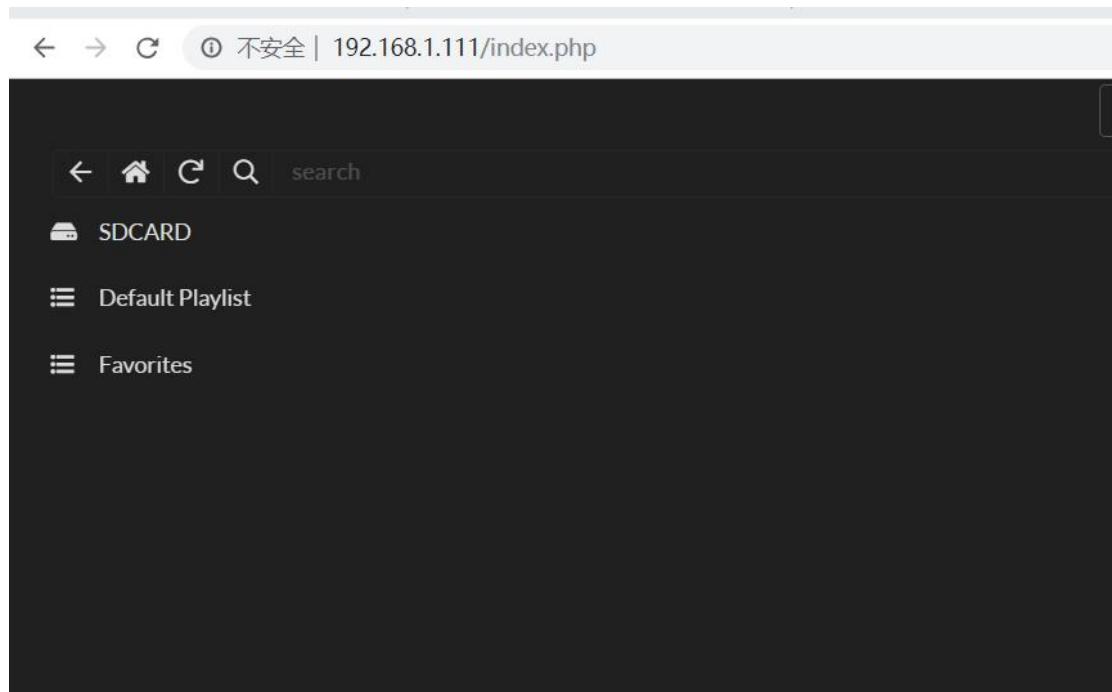
5) Click 'Audio', set as below and save and restart. This is an essential step, otherwise you can't hear anything.

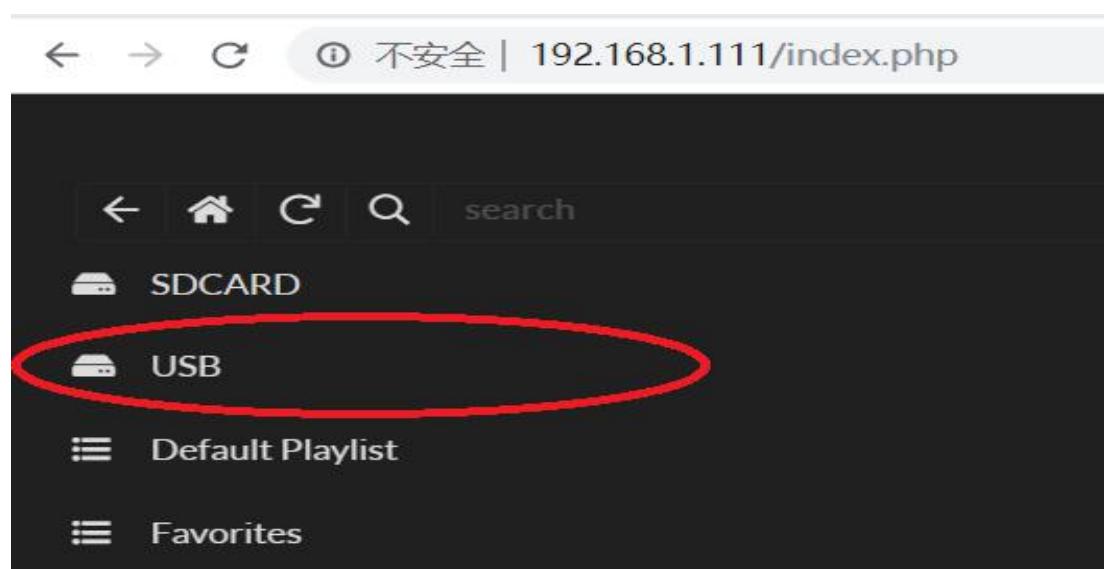
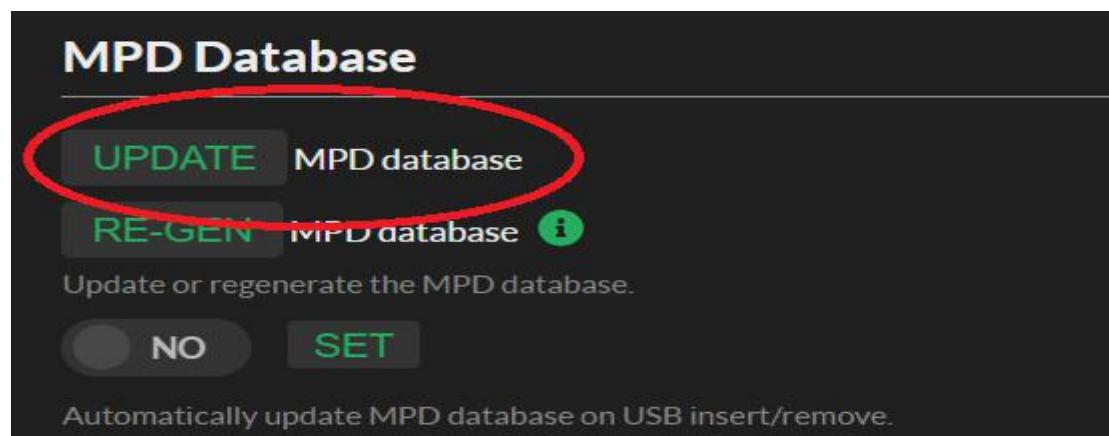


6) Now you can enjoy your music.



7) You can play music in the SD/MMC card, U disk which connected with Raspberry Pi. But Moodie may not automatic update disk default, so you need to update by yourself follow these steps.





5.7 MoOde Play DSD Music Files

Moode is very excellent in play DSD music files. If you want to play DSD music. In MPD settings, you need to set "DSD over PCM" to 'YES', and then it's very important to select the proper SoX resampling rate. Otherwise It doesn't work well for play DSD music.

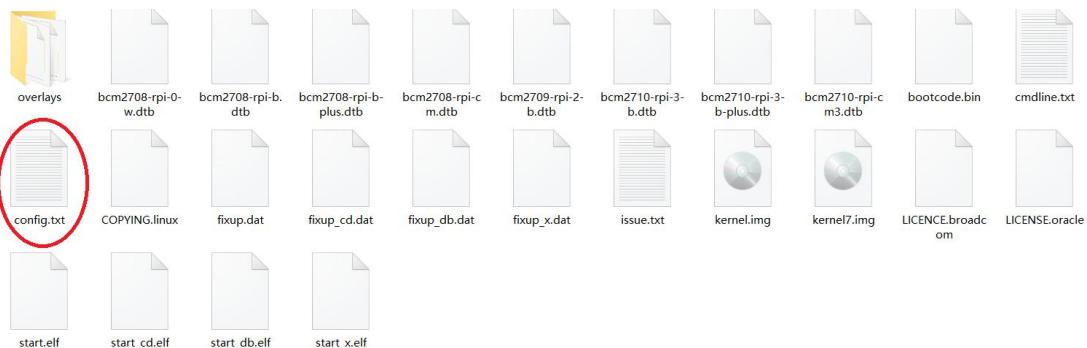
The screenshot shows the Moode MPD Config interface. At the top, there is a note about MPD version 0.21.6. Below it, the 'MPD options' section has a red oval around the 'EDIT OPTIONS' button. The main configuration area starts with 'Audio device' settings: 'Device type' is set to 'I2S audio device', 'Volume control' is 'Software', and 'DSD over PCM' is set to 'Yes'. A red oval surrounds the 'DSD over PCM' dropdown. Below this is the 'SoX Resampling' section, which includes 'Sample rate' (set to '32 bit / 96 kHz'), 'Quality' (set to 'Very high quality'), and 'Multithreading' (set to 'No'). A red oval surrounds the 'Sample rate' dropdown. At the bottom, the playback interface shows a circular progress bar at 02:48, a volume slider at 69, and a large album art for 'B4.Million Years Ago' by an unknown artist. The album art features a woman's face with a red circle containing the number '25' in the bottom right corner.

5.8 Debian System Setup

1) After load the image onto TF card, Open TF disk directory and Find the file named

config.txt. For more information about this file please refer

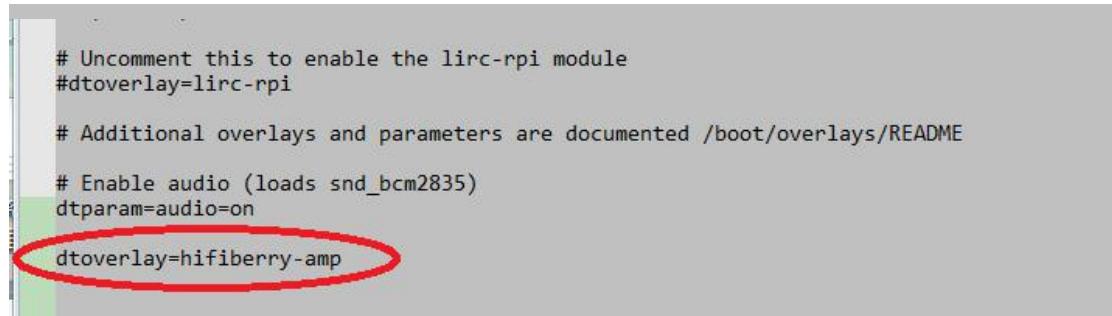
to :<https://www.raspberrypi.org/documentation/configuration/config-txt/>



2) Append the following lines to the end of the file, enable the audio module. Notice the format

Otherwise it doesn't work.

```
dtoverlay=hifiberry-amp
```



```
# Uncomment this to enable the lirc-rpi module
#dtoverlay=lirc-rpi

# Additional overlays and parameters are documented /boot/overlays/README

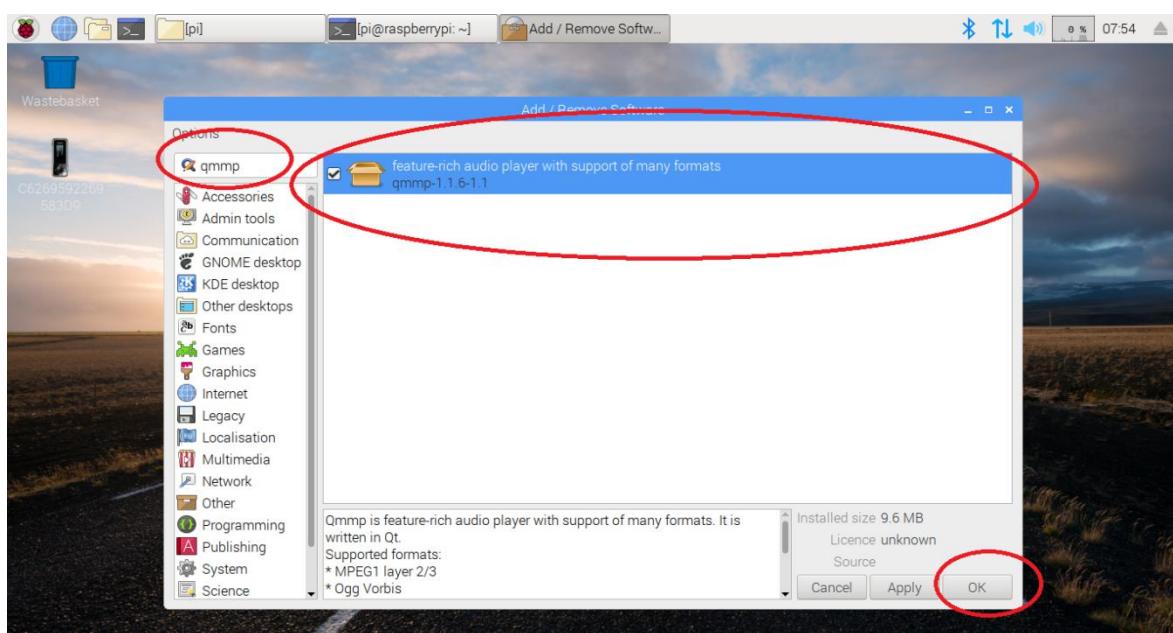
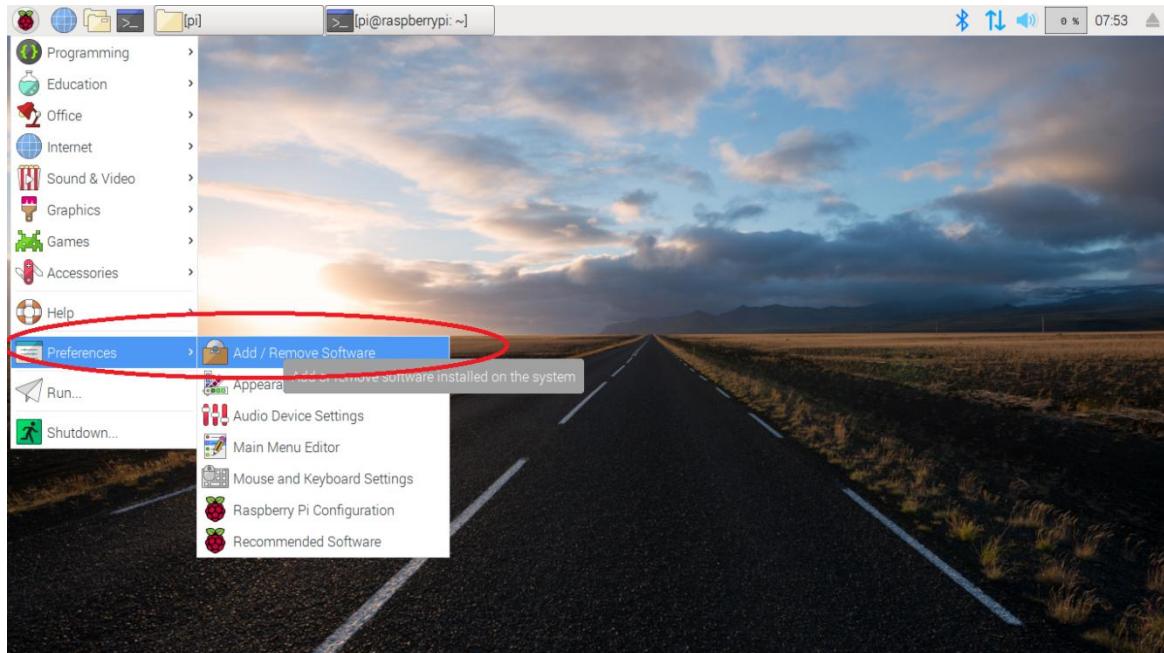
# Enable audio (loads snd_bcm2835)
dtparam=audio=on

dtoverlay=hifiberry-amp
```

3) Insert the TF card with volumio image into the Raspberry pi then power on. Default user name

is **pi**, and password is **raspberry**;

4) After login, Install the qmmp music player. Before that please make sure your raspberry already connected to the internet.

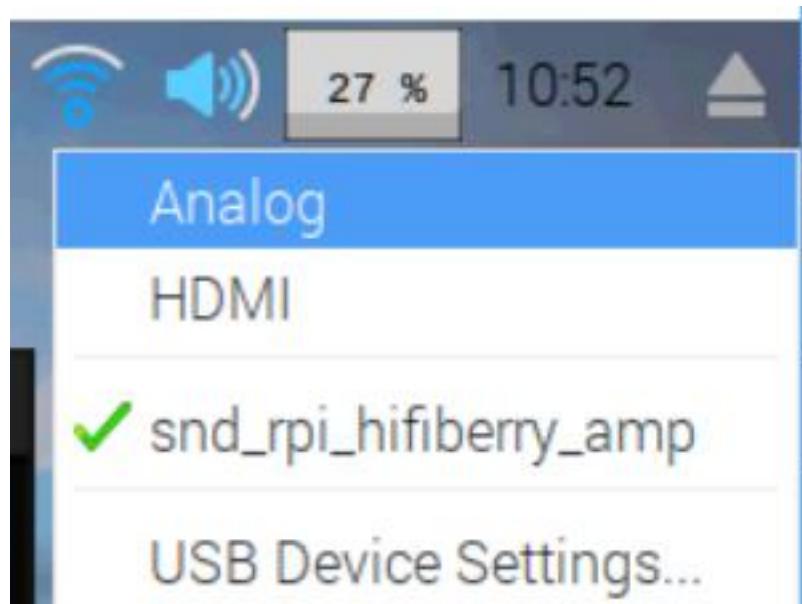


5) You can also install it by below command to setup qmmp.

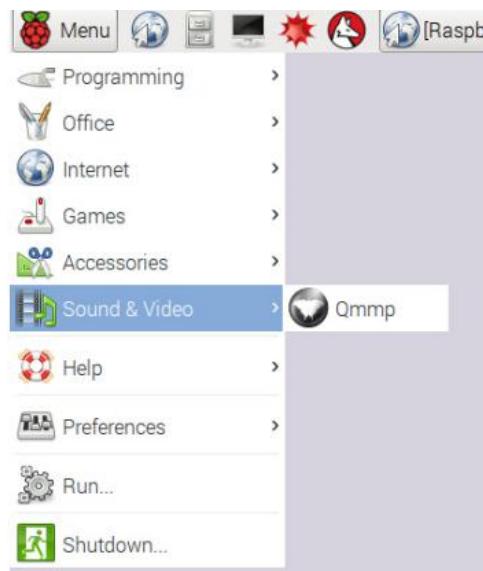
```
sudo apt-get install qmmp.
```

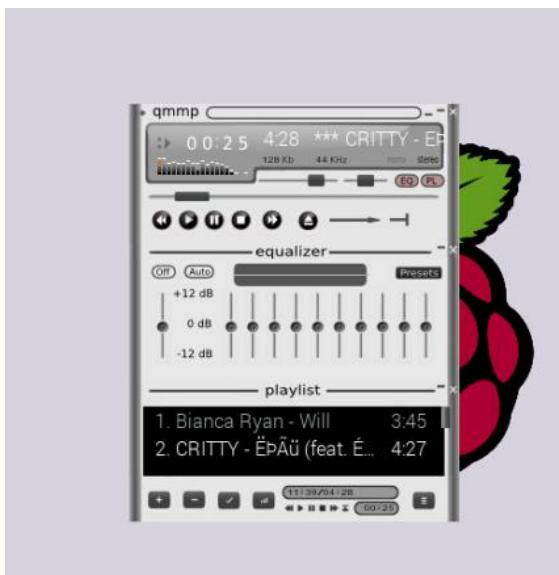
6)Right click the sound icon on the top right corner, set the raspberry pi audio output as Below.

This is an essential step, otherwise you can't hear anything.



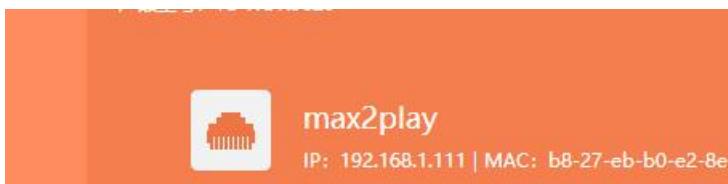
7)After the installation is,we can find the player under the menu bar. You can Install other linux music player as same step. Such as Rhythmbox, Amarok,VLC,Cmus and so on.



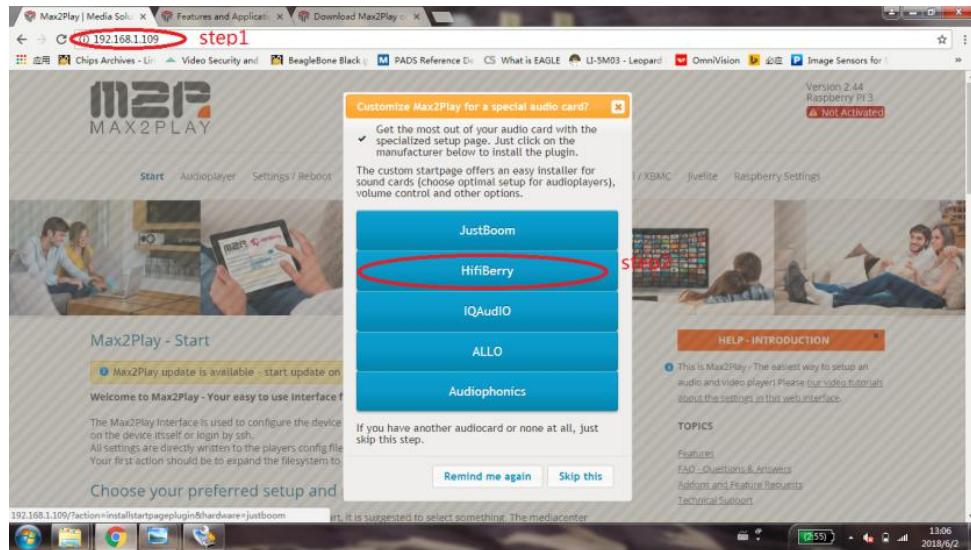


5.9 For Max2player

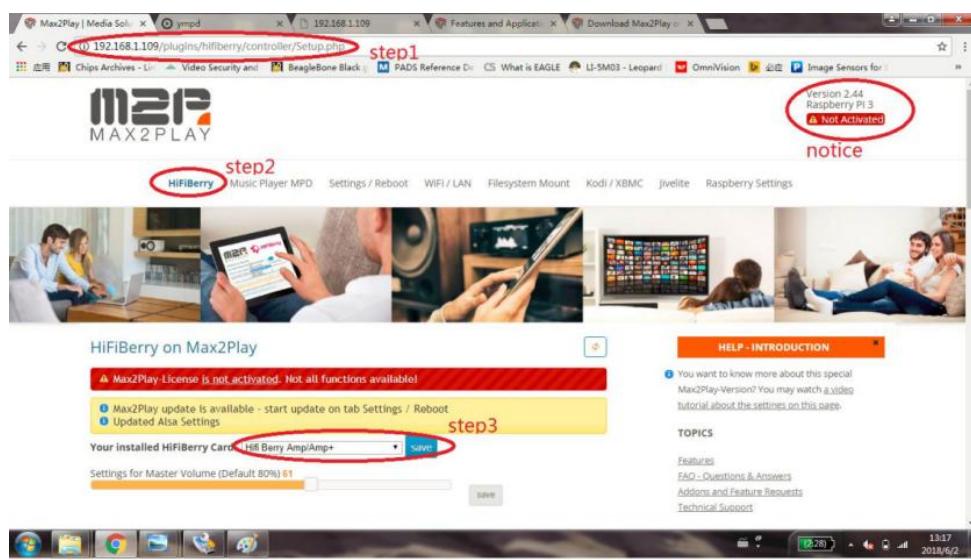
- 1) Insert the TF card with Max2player image into the Raspberry pi, and then connect to your router by LAN cable, Finally power on. Make sure your Raspberry Pi , Desktop (mobile phones, laptop, pad and so on) are in the same local area network(LAN). Get the IP address of Raspberry PI through check up the router or use some IP checker tools.



2) Choose the Card option as HifiBerry.



3) setup the audio card type as below, then save and reboot the system.



4) Setup your audio player.

Choose your preferred setup and purpose of Max2Play

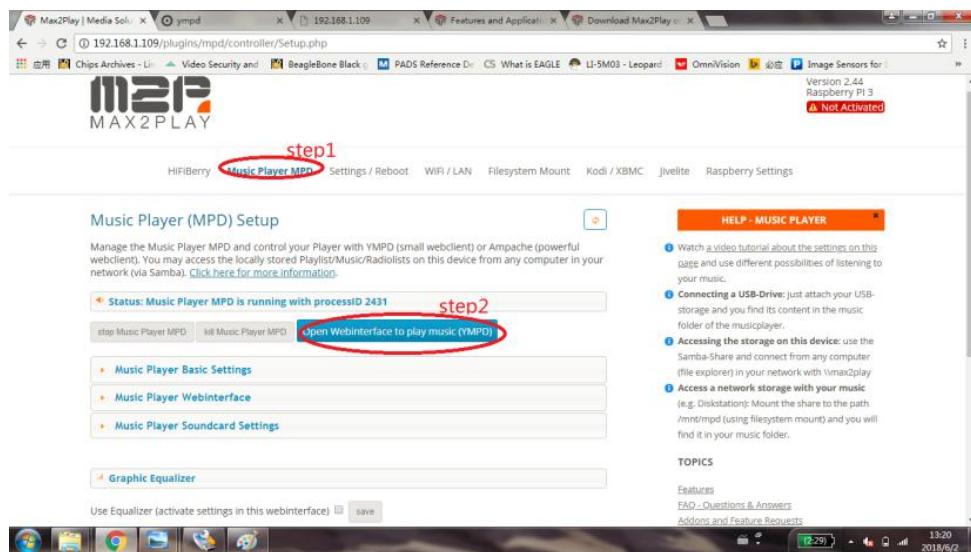
You may change all settings later, but for the first start, it is suggested to select something. The mediacenter Kodi is available and preinstalled in every setup.

- Starter: A simple audioplayer for internet radio and local music (mp3)
 - You want a simple way to play music from online radio streams and local sources (e.g. USB-drives or network storage)
 - + Easy and fast set up, no music server needed
 - + Choose from YMPD and Ampache as frontend, to control the music player
 - + Some Radiostations are preconfigured
 - + A network Share on this device will be automatically set up. You can connect to it from any network device to add local music and radio stations.
 - No synchronized audioplayers
 - No airplay with soundcards like HiFiBerry

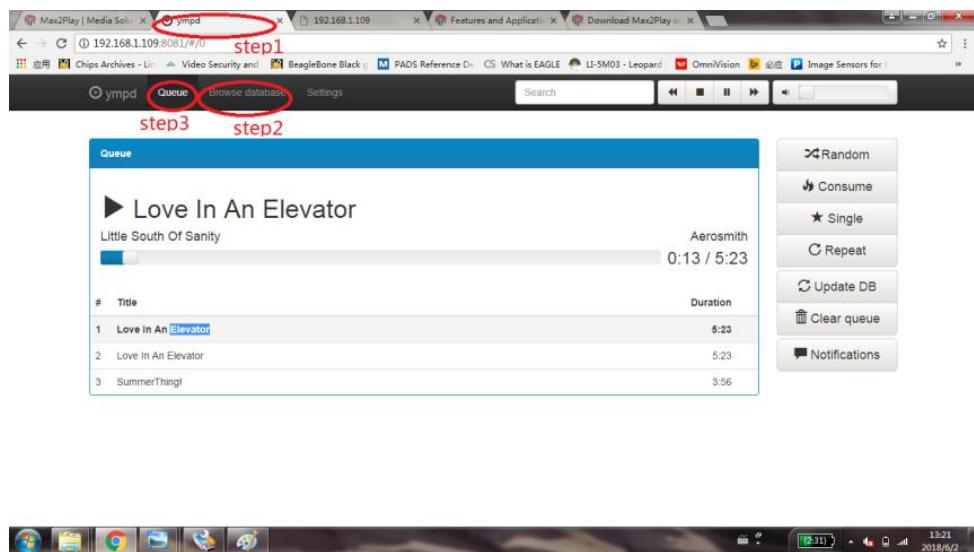
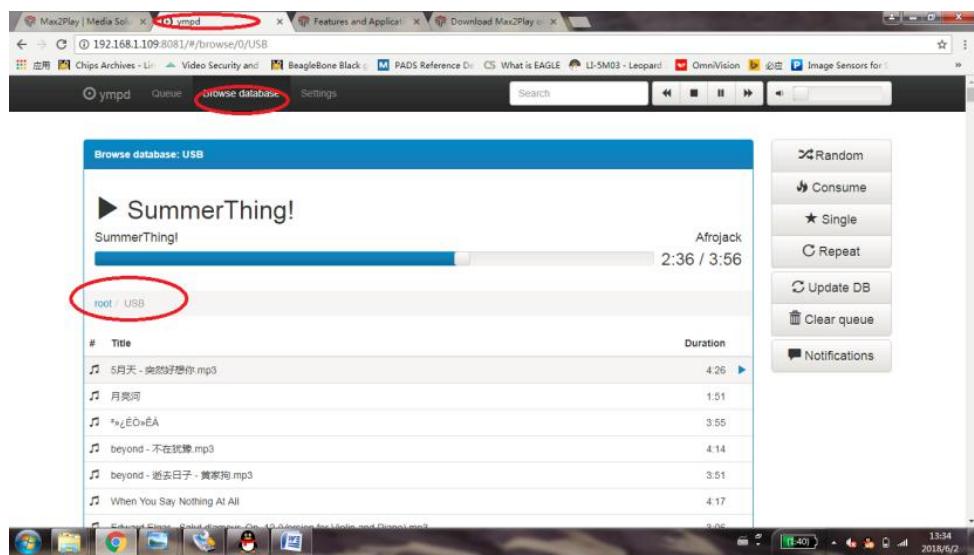
Select this setup!

setup your audioplayer

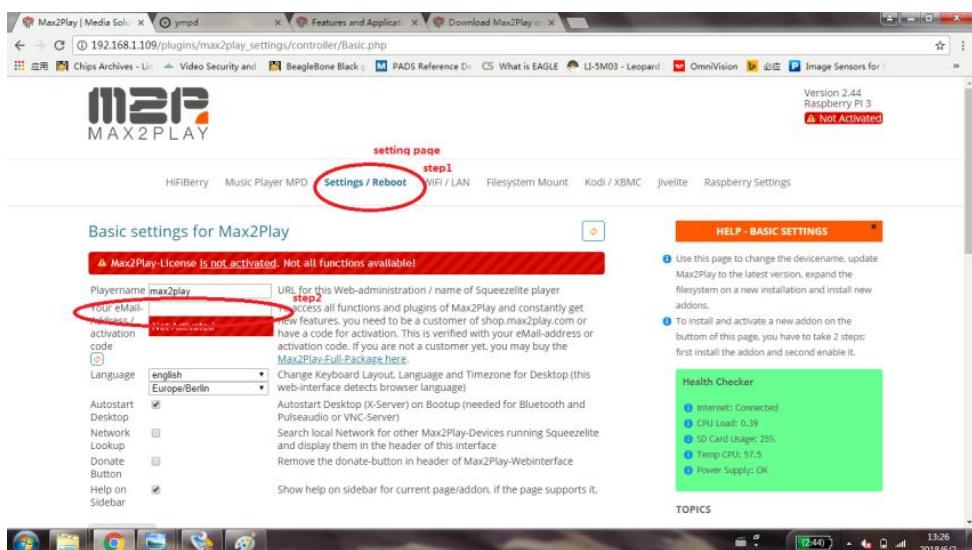
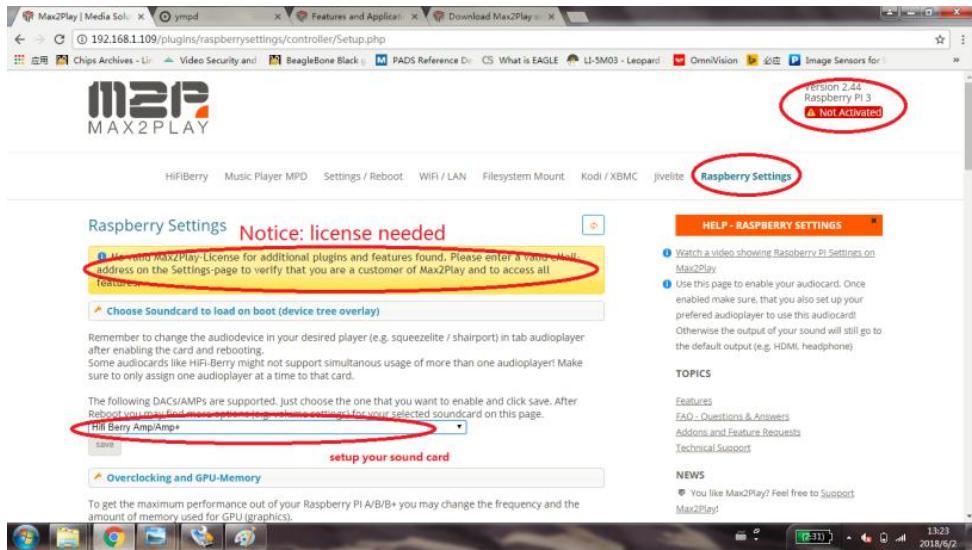
- > Advanced: A real multiroom audio player that integrates in a Squeezebox environment with powerful options for high-quality audio and a lot of features.
- > Simple Airplay: Apple Airplay Device that plays music streamed from iPhone, iPad or Mac.



5) Add music



6) Enjoy. By default Max2play License is not activated . not all functions available!



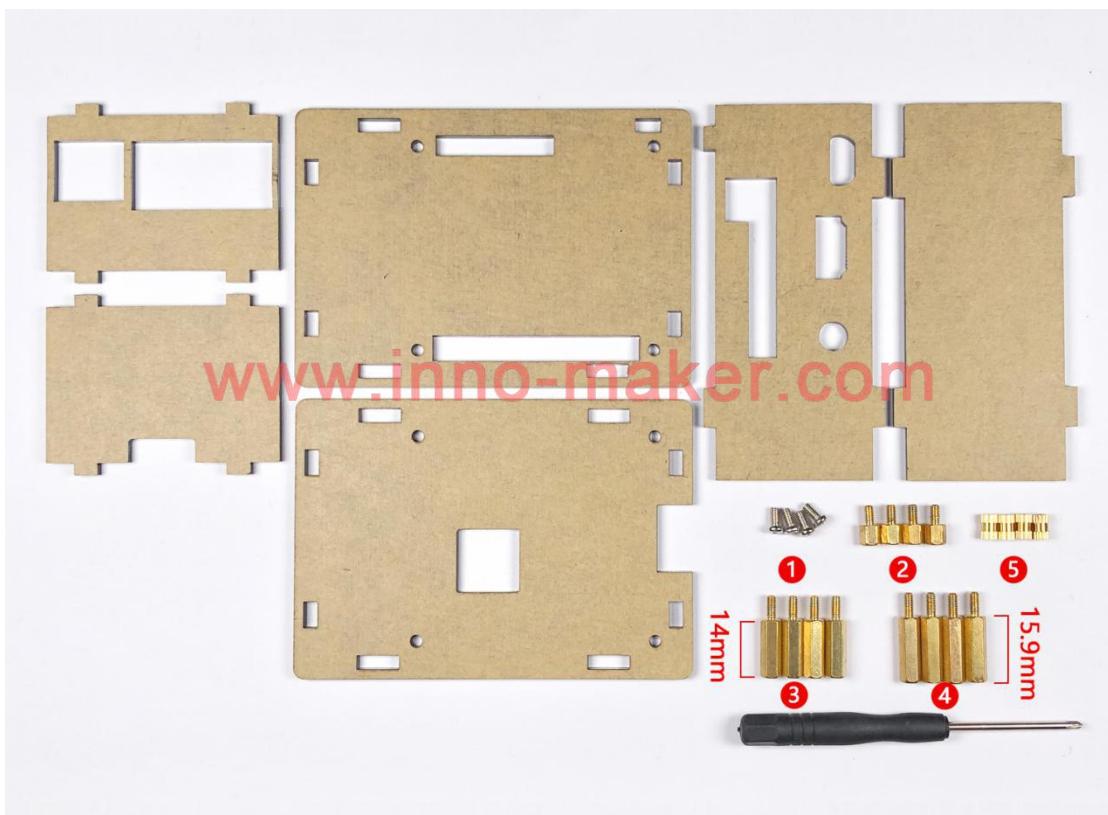
6. HIFI AMP Case Assembly

We provide case as an optional accessory if interested.

5.1 Unpack it.

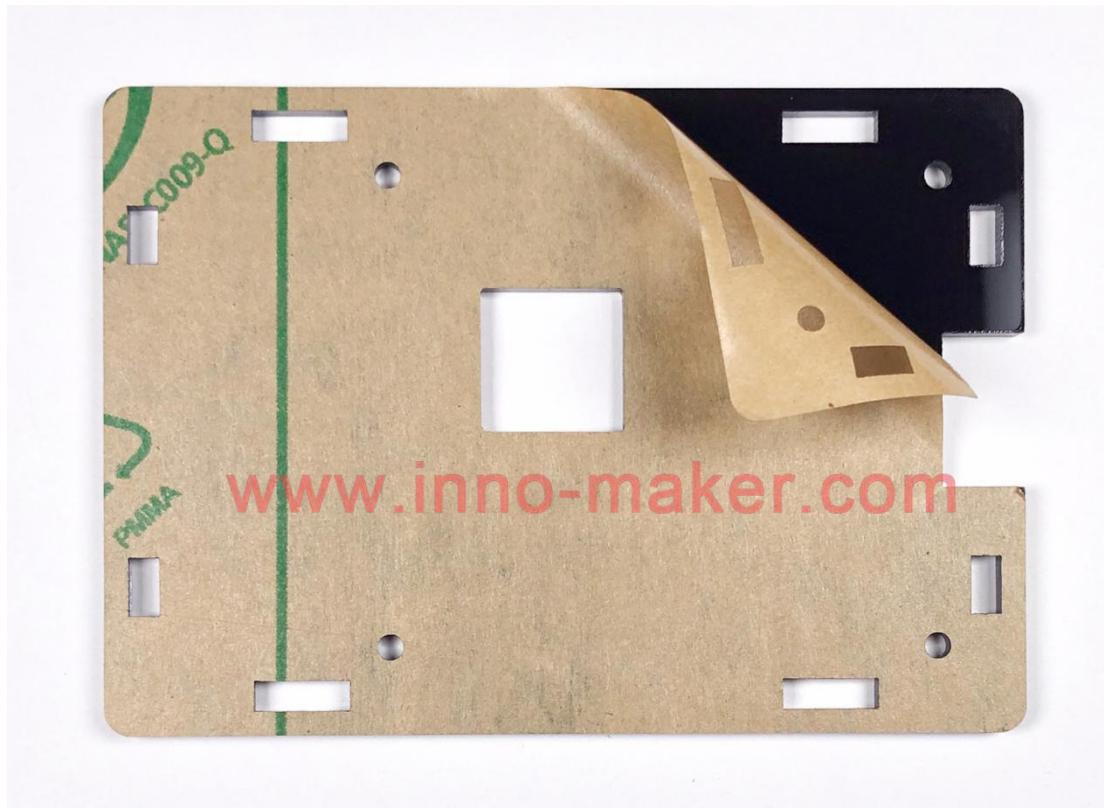
Package contain :

1. 6 pcs acrylic plate
2. 5 groups of screw
3. 1 screwdriver



5.2 Peel the protection film

There is a protection film on both sides of all acrylic plate. You need to peel it off before assembling the case.



5.3 Mount the RASPBERRY to the base plate. Please pay attention to the ground number.

Step: 1



Step: 2



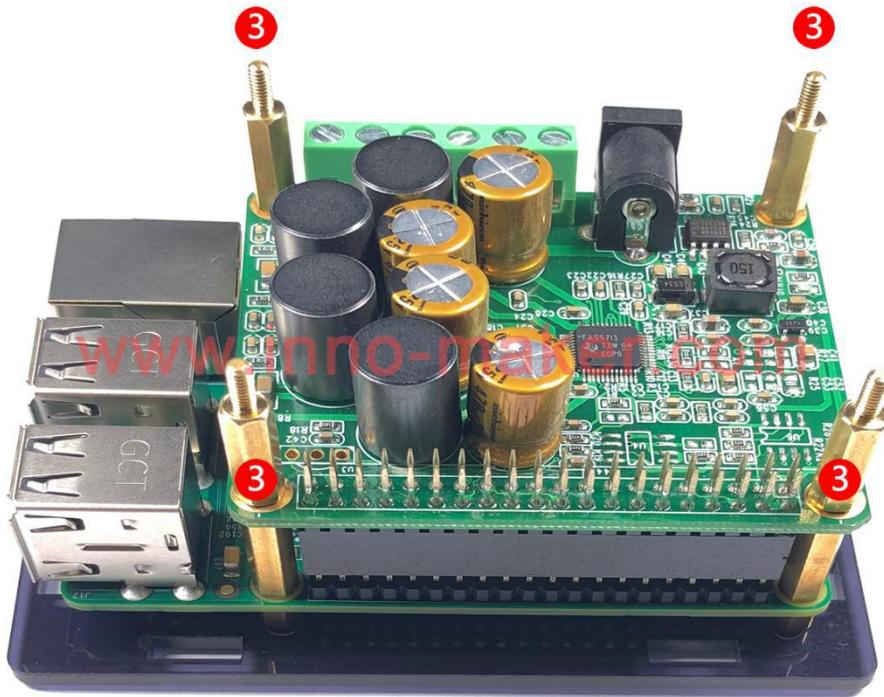
Step: 3

Mount the RASPBERRY to the base plate



Step: 2

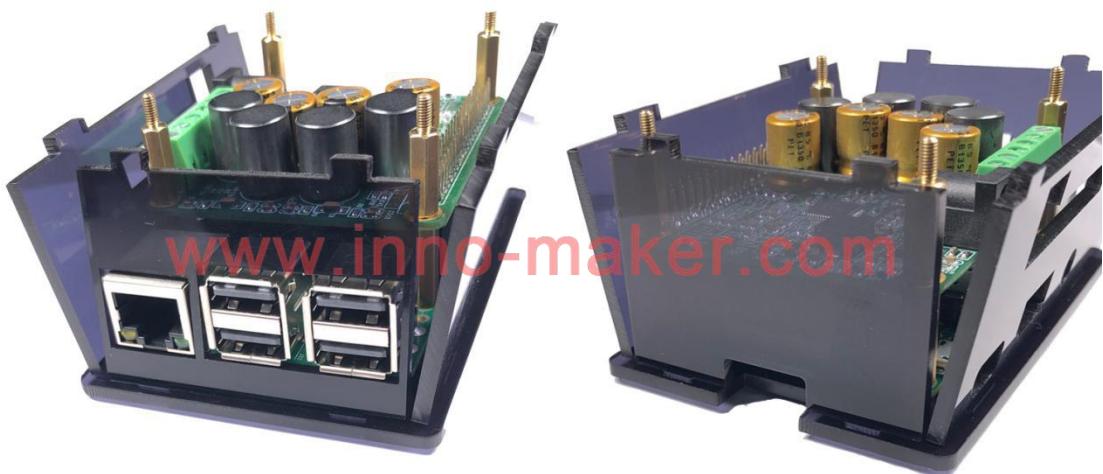


5.4 Plug the AMP module into the 40 pin GPIO head.

5.5 Add two long side plates.



5.6 Add two short side plates.



5.7 Add top plate and screw down.