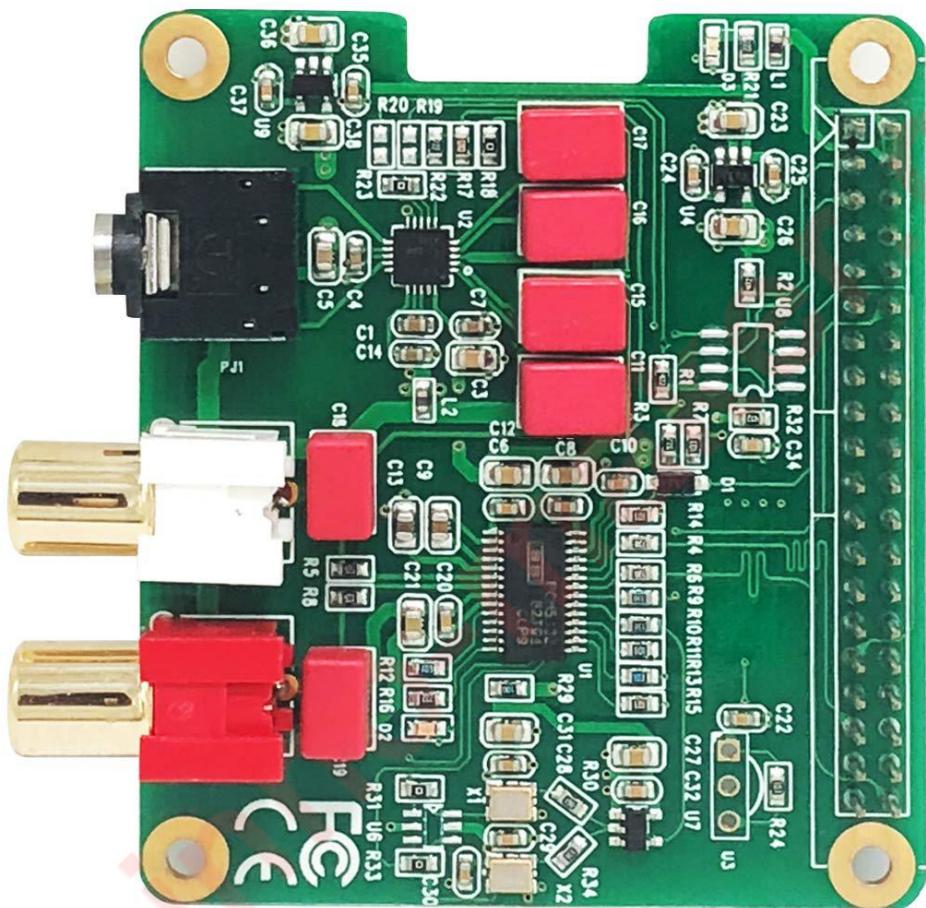


HIFI DAC HAT UserManual





www.inno-maker.com

Design Service,Production Service

1. General

The Innomaker HiFi DAC Hat is the best optimized partner for RPI audio output. Used on-board PCM5122 as the IIS clock master , instead of the clocks from RPI which comes with too much jitter. Added dual low jitter oscillators(45.158M and 49.152M) to support more exact sample rate clocks. No soldering, no additional cables. Just plug it in 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.

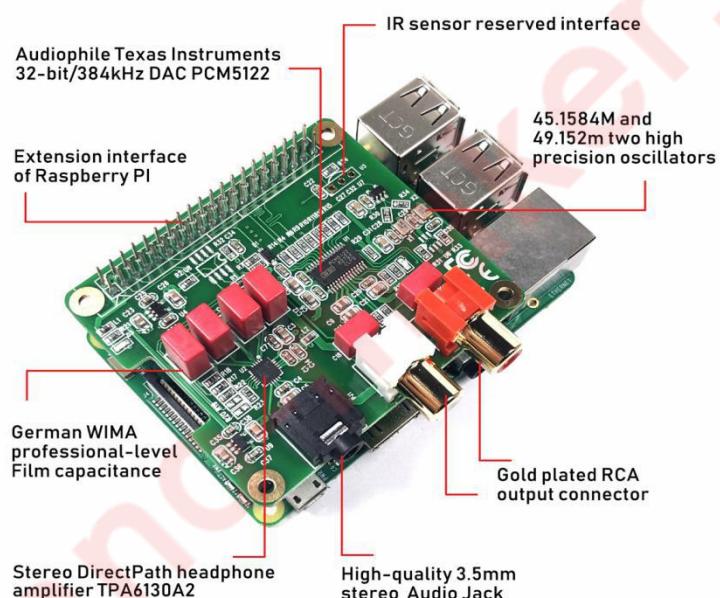
2. Features

1. Compatible with Raspberry Pi Zero,Zero W,3B,3B+with the 40-pin connector. Connects directly to the Raspberry Pi board, no additional cables required,no soldering. Easy to get more beautiful and fantastic sound by this RPI+DAC HIFI suits.
2. Absolutely perfect to support all Raspberry Pi music playback system ,such as OSMC, Max2Play, RuneAudio, Volumio, Moode, PiCorePlayer, PiMusicBox, OpenELEC, Debian, Ubuntu etc. Support play music from a hard disk or over the network. Support DSD over PCM(DOP)mode.
3. Class-leading stereo audio DAC PCM5122, sample rates up to 384-KHz/32-Bit. Paired with stereo high fidelity headphone amplifier TPA6133. Provides 2.1Vrms ground-centered outputs coupled with Film capacitor.
4. On-board a pair of gold plated RCA (LEFT &Right) jacks and a 3.5mm high-end headphone jack output, allow you free to play your music through Raspberry Pi to another terminals.
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).
6. On-board EEPROM and Infrared receiver extended function(Default no soldering)

3. Hardware Description

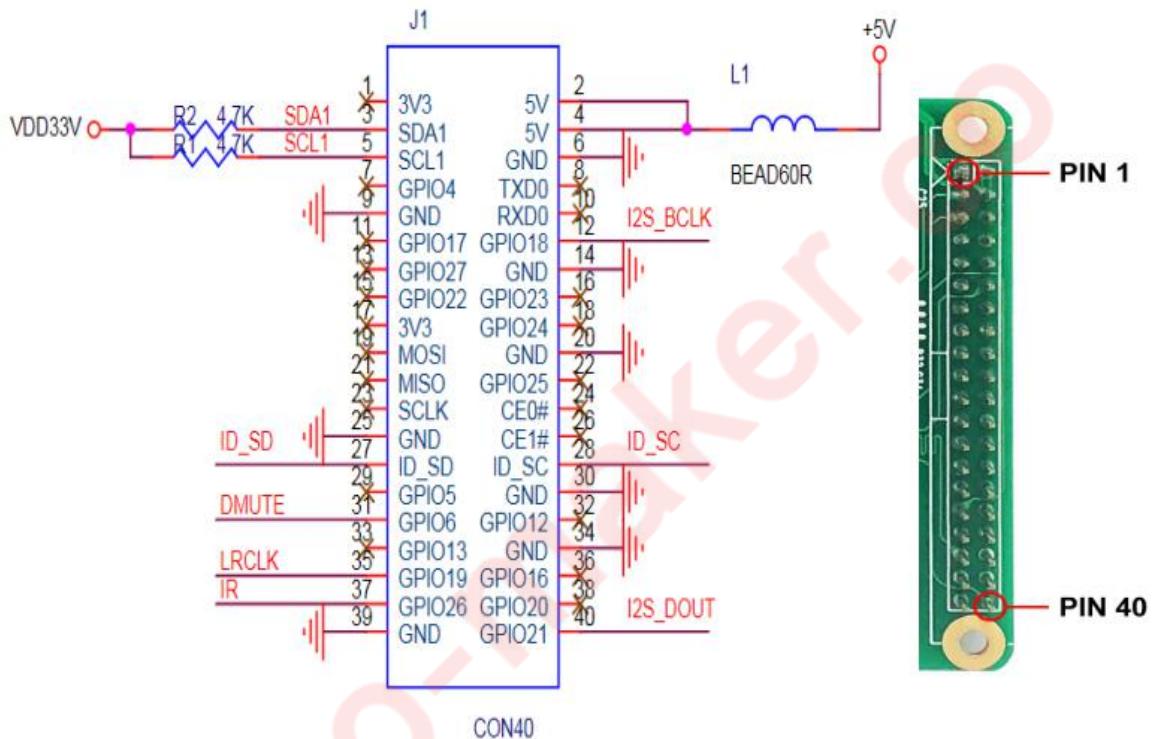
Connect the HIFI DAC HAT module and RPI with 40 pin connector .While installing the module attention to align the first leg of the raspberry pi and HIFI DAC HAT module.

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 DAC and EEPROM
5	SCL1	SCL Used for DAC and EEPROM
12	GPIO_18	IIS_BCLK
31	GPIO_6	Mute function control pin
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, 3 9	GND	Ground Pin, connected to the main system Ground of the Raspberry Pi
----------------------------------	-----	---

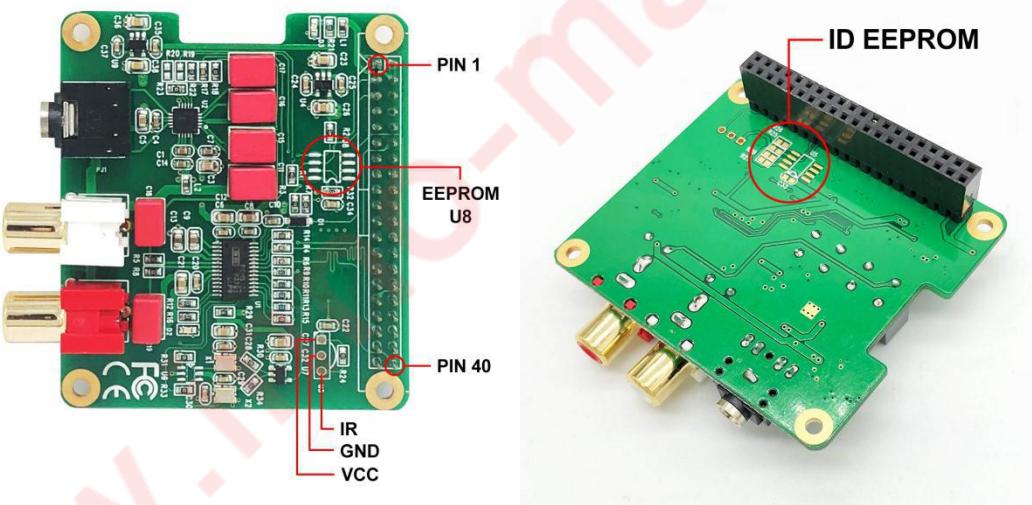
The remaining pins are unused, You can use them for your other hardware boards.

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

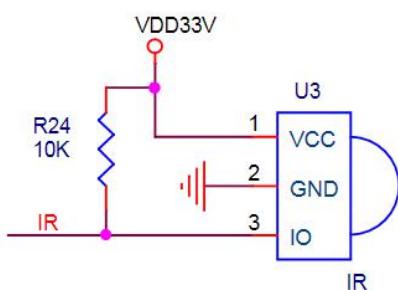
<https://www.raspberrypi-spy.co.uk/2012/06/simple-guide-to-the-rpi-gpio-header-and-pins/#prettyPhoto>

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

3.3 Extended Function

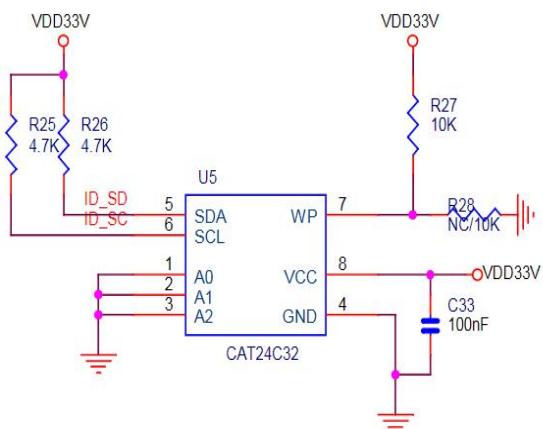


1) Infrared Receiver Function: (U3, No Soldering On-board)



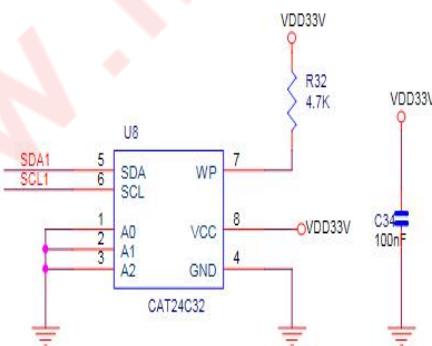
IR is connected to PIN37(GPIO_26) , But we have no software for it right now. We will release new software version after finish it. If you have any advices please feel free to E-mail to us.

2) ID EEPROM: (U5, 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: (U8 No soldering on-board)



It connected to the same IIC port with DAC. 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. Software Description

4.1 Overview

HIFI DAC 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 sound is loud of most system, it's will offensive your ears. So please turn down the volume before you enjoy it.
- 4) For some music systems that are not listed, you can try to set as below step. Many thanks to the friendly customer named '**HoweTechnical**' write it down on our Amazon review page.
 - a. SSH into your RPI (won't go into how to do that, Google it if you need)
 - b. Type "cd .." and press enter (no quotes)
 - c. Type "mount -o remount,rw /flash" (no quotes) to remount the flash directory as rewritable
 - d. Type "nano /flash/config.txt" (no quotes)
 - e. Arrow down to the bottom and type this at the end: dtoverlay=alio-boss-dac-pcm512x-audio
 - f. Press ctrl+x, choose y (for yes, to overwrite the file) and press enter
 - g. Type "reboot" (no quotes) to reboot the system
 - h. Now in Kodi, to into Settings - System Settings - Audio and choose the default output device of, "ALSA: Default (BossDAC Analog)

4.2 Download Image from website

Download the lastest image for Raspberry PI:



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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

4.3 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>

4.4 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

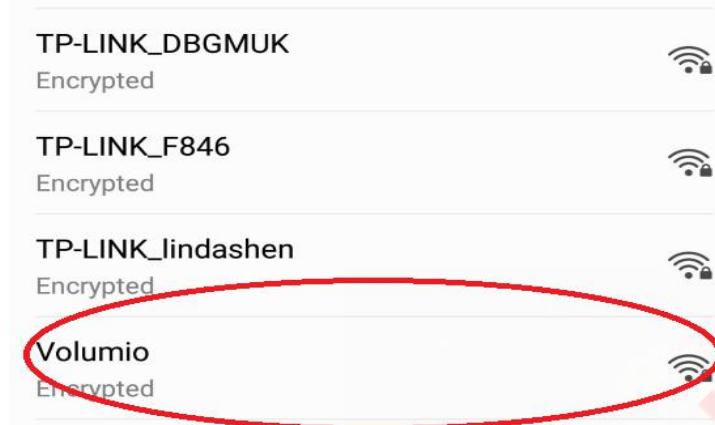
By flashing (installing) Volumio on any platforms, it will then become a headless Audiophile Music Player. Headless means that the only way to control it will be with another device, such as a Smartphone, Tablet, PC or anything that has a browser.

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

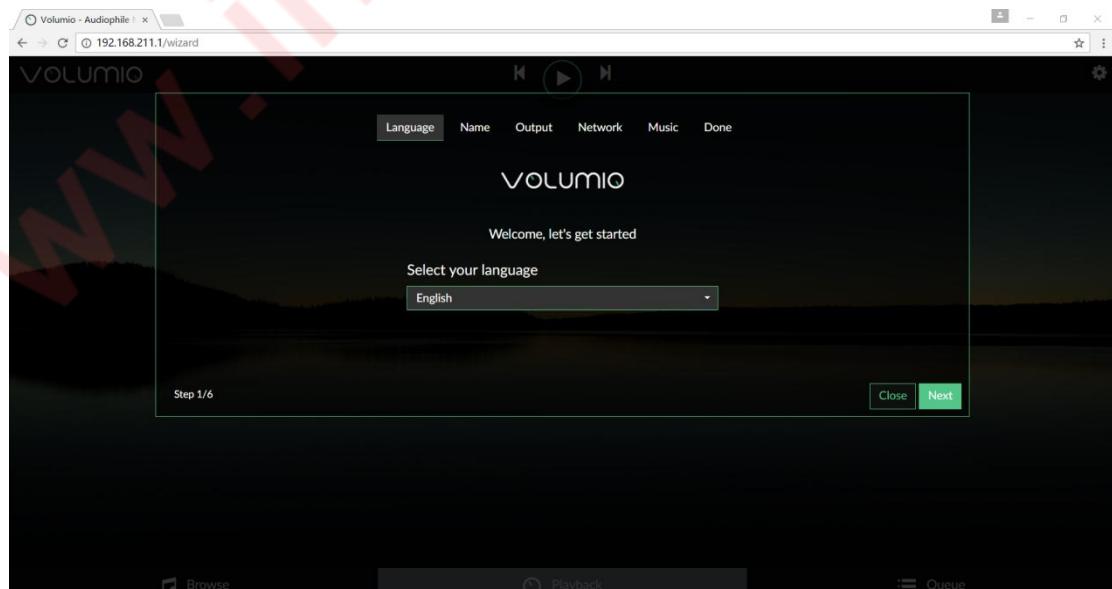
STEP:

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

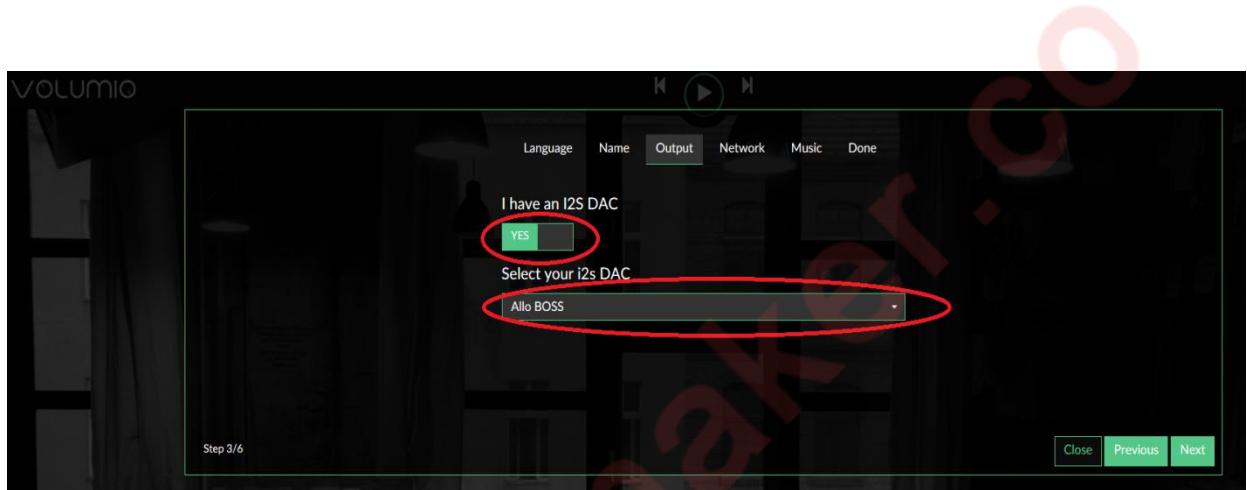
2) By using your smart phone, tablet or any device with WIFI and browser search for WIFI hotspots. You can see a 'Volumio' name in the search list. Connect this hotspot with password 'volumio2'. You can change your password after login.



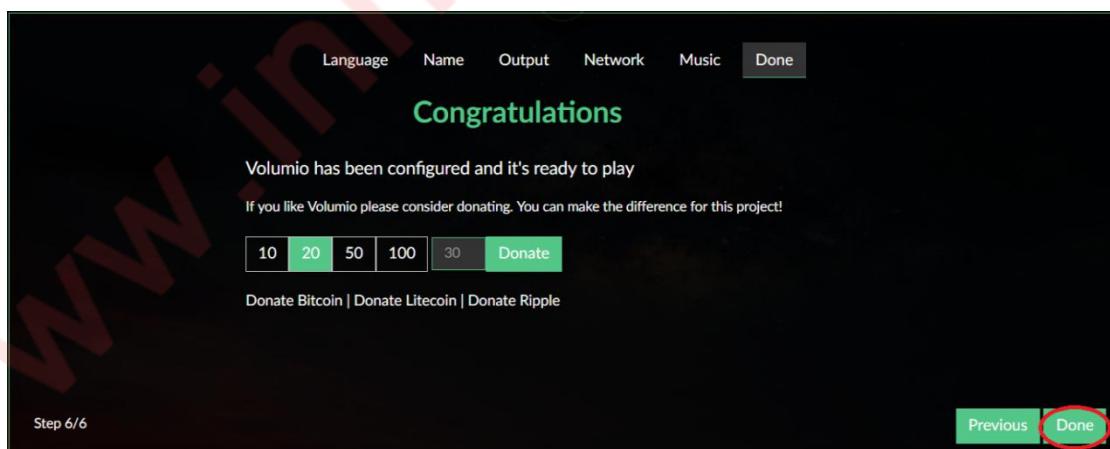
3)The browser will automatically eject playback software UI which is based on web interface (if you connect the hotspot successfully but for some reason browser can't pop up the playback page automatically, you can using <http://192.168.211.1> to login. You can see below wizard of Volumio. We only need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



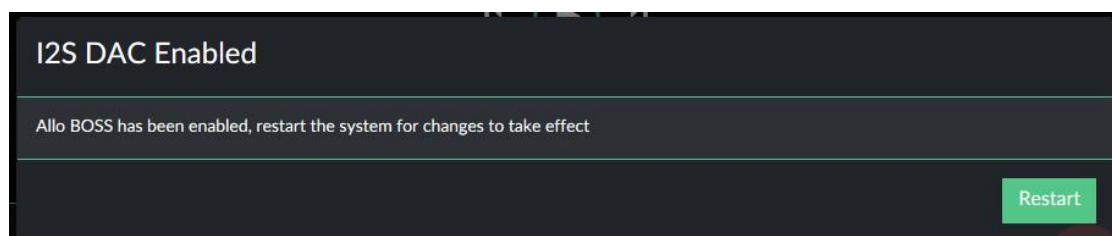
4) It should be noted that 'Output' page must set as below. This is an essential step, otherwise you can't hear anything.



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.

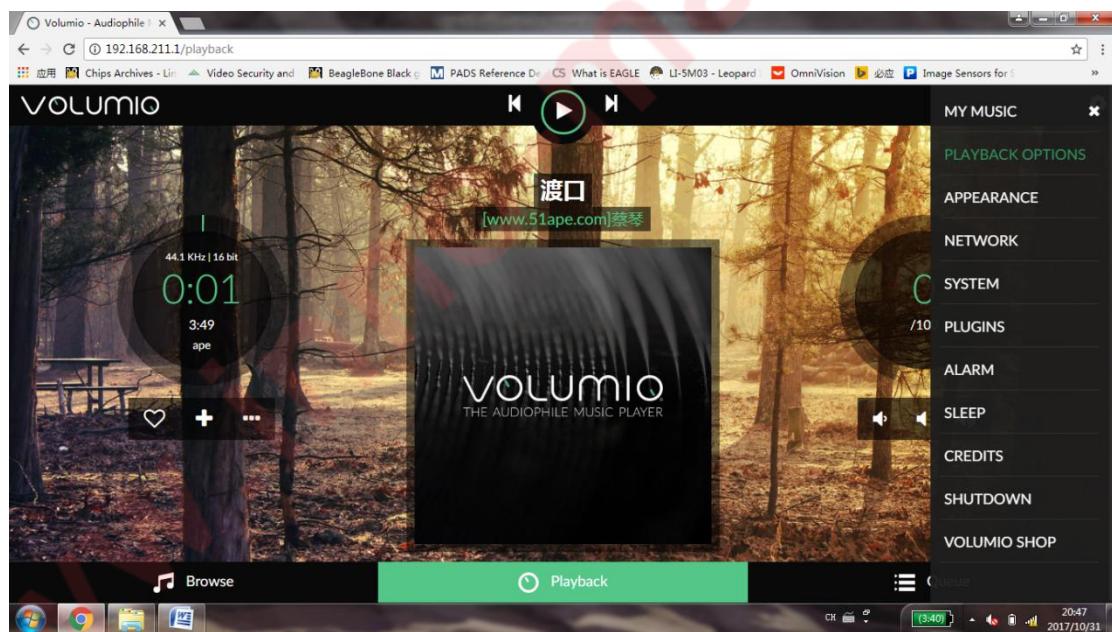


6) Click 'Done' to finish initialization of Volumio. And then restart Volumio.

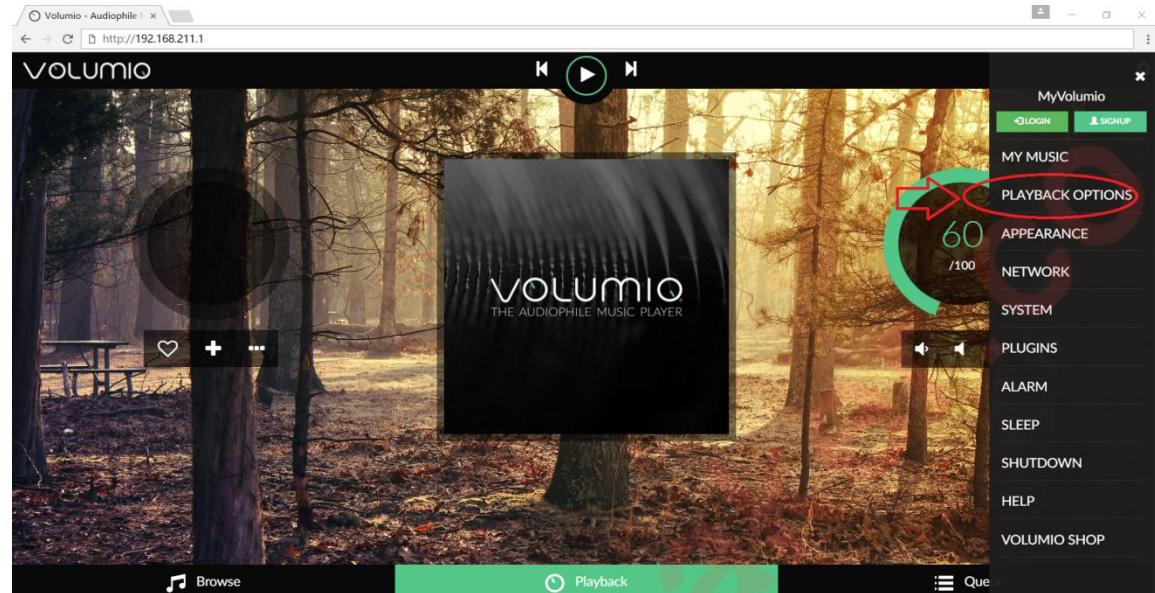


7) In this restart process, "Volumio" hotpot will turn off for a moment. Sometimes your mobile phone or Tablet or PC will automatically connect to other. You need to set back to 'Volumio' hotpot.

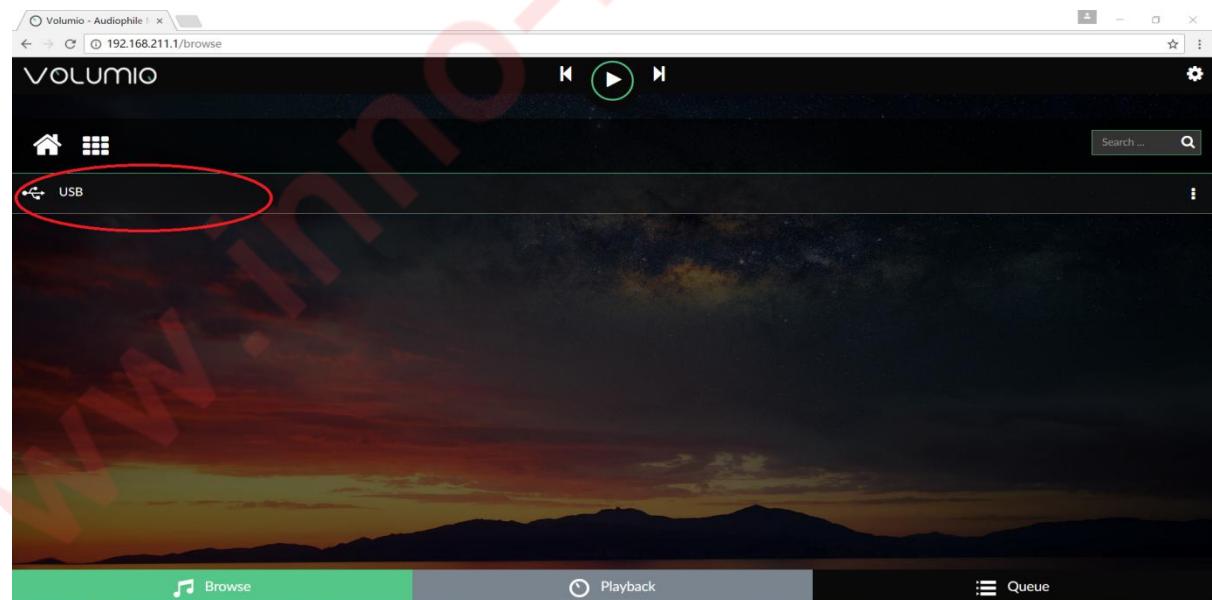
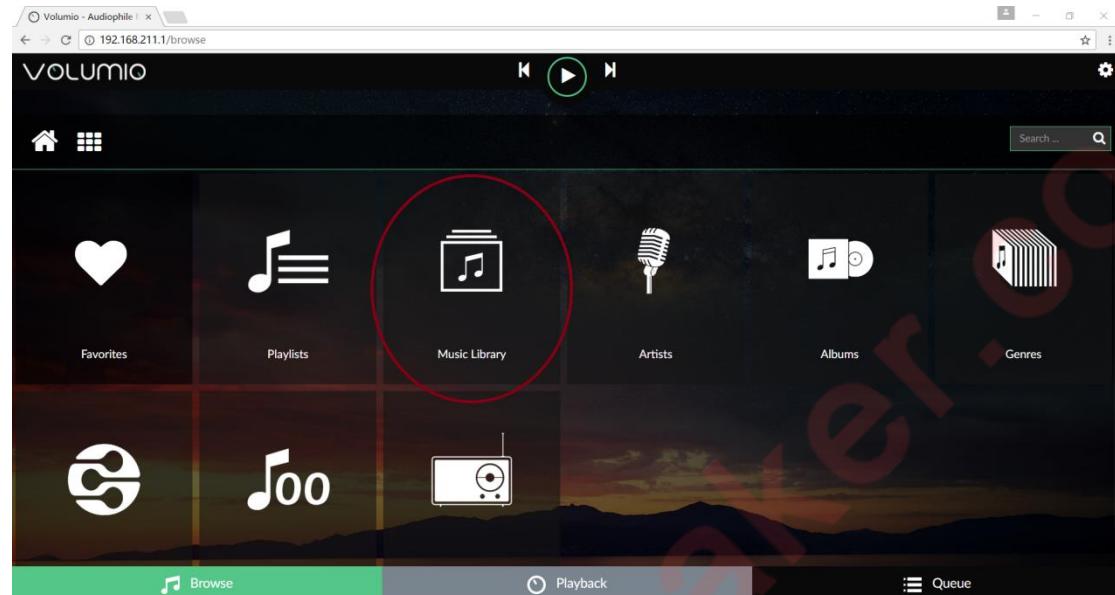
After restart you can see the main page of Volumio.



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” .



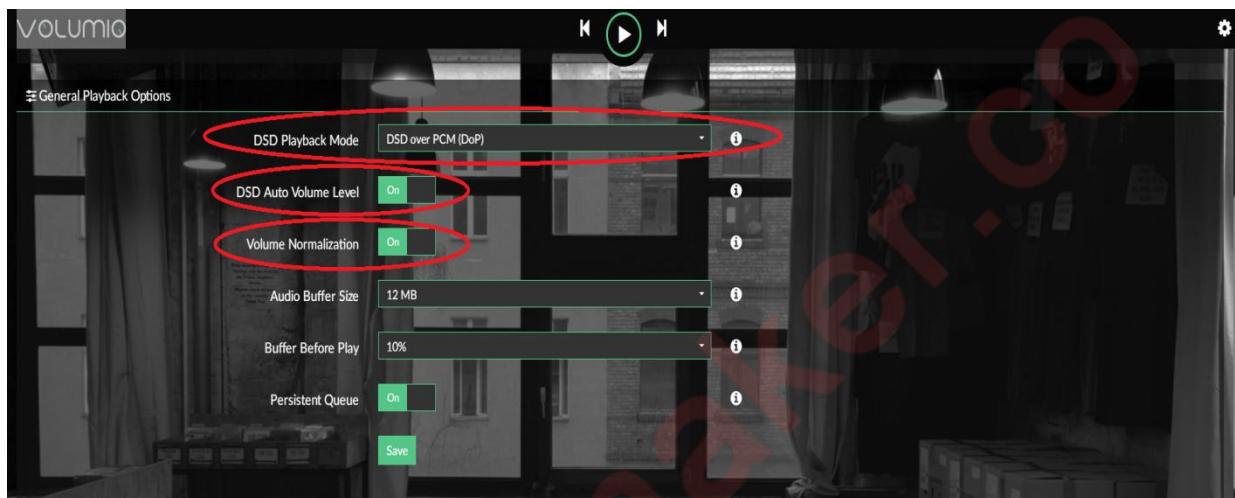
4.5 VOLUMIO Play DSD Music Files

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

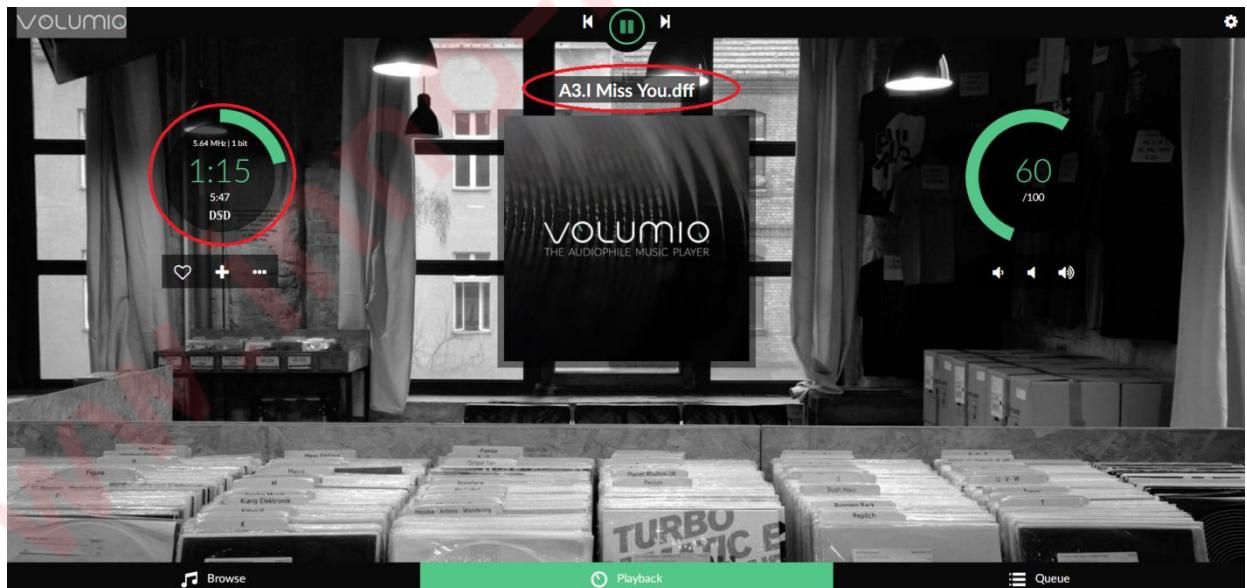
For more DSD information please refer to Volumio link:

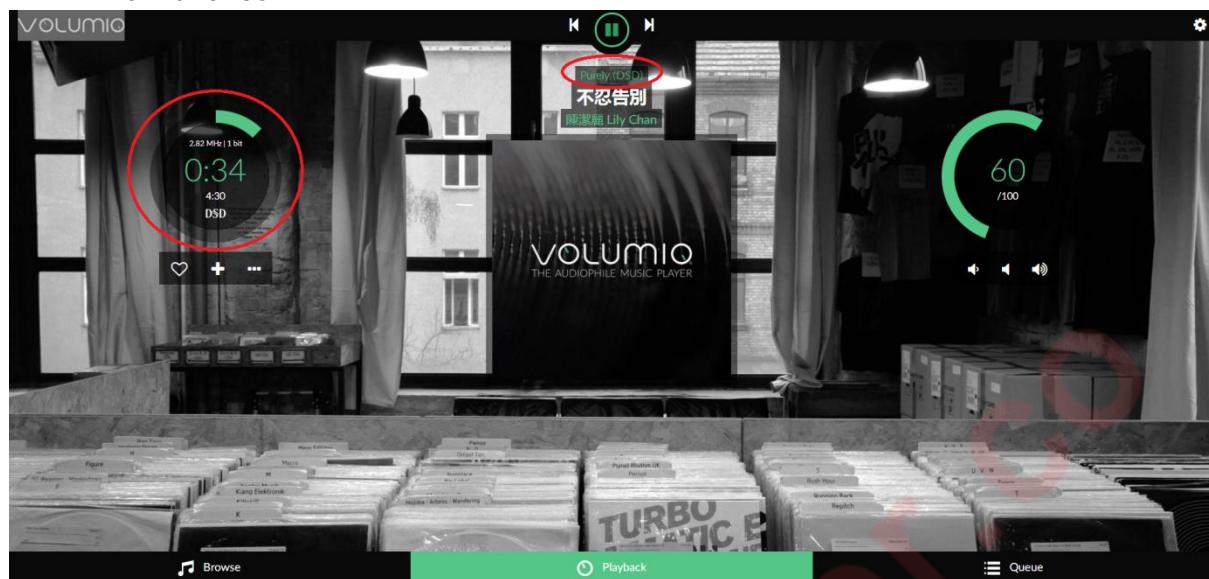
<https://volumio.org/direct-dsd-support-volumio-dsd512/>

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



Restart and enjoy DSD music.





4.6 MoOde Setup

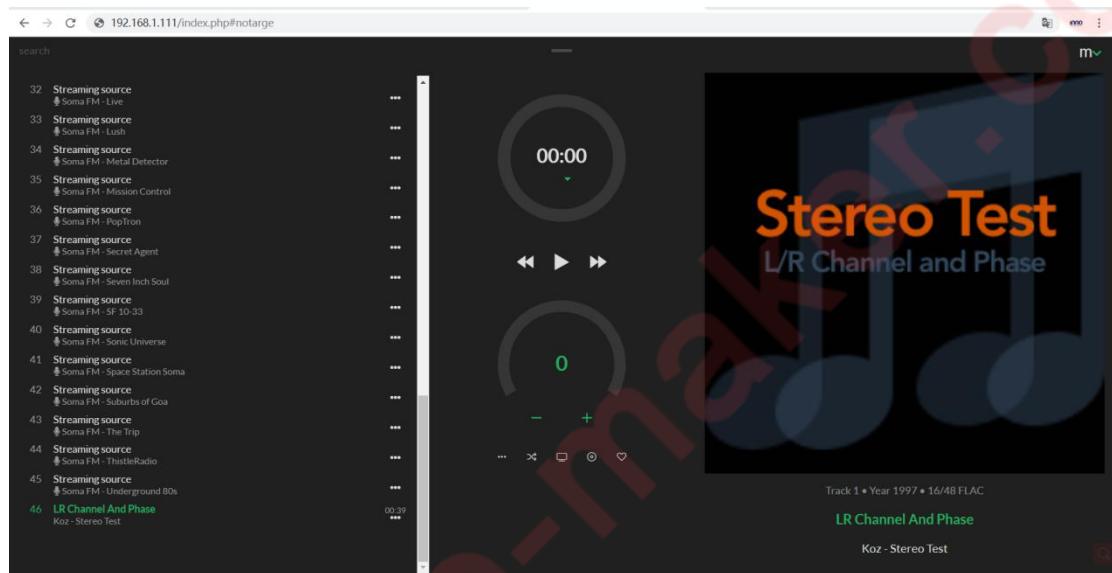
1) We just talk about the basics, for more information please read the official user manual:

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

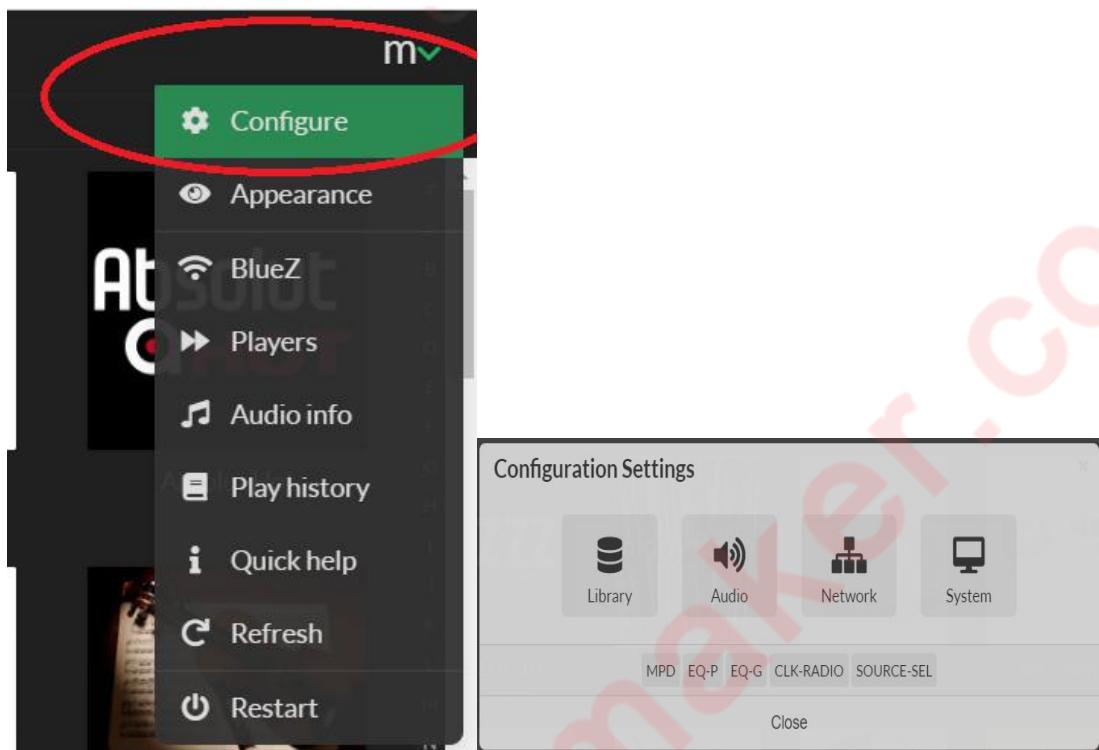
2) Insert the TF card with MoOde image into the Raspberry pi, and then connect to your router by LAN cable, Finally power on. Make sure your Raspberry Pi, Desktop (mobile phones, laptop, pad and so on) in the same local area network(LAN). Get the IP address of Raspberry PI through check up the router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



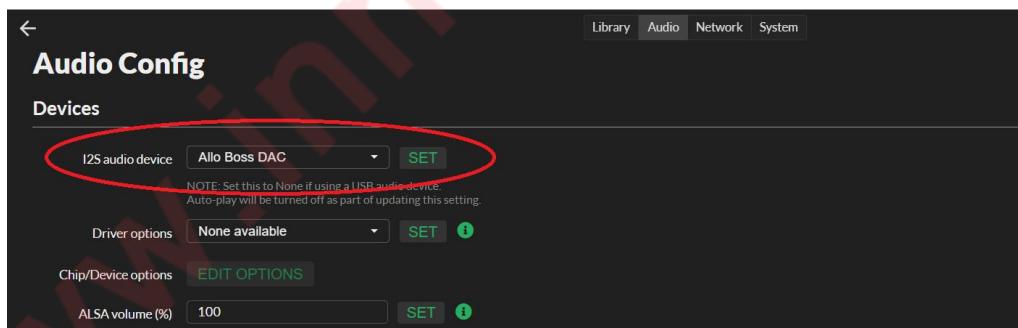
3) Connected the Raspberry Pi through browser. You get the display of Moode.

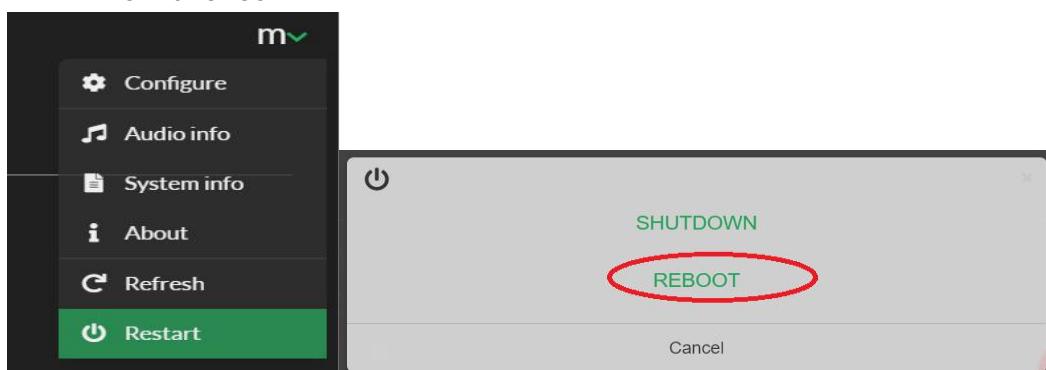


4) Click the icon in the upper right for setting the system.

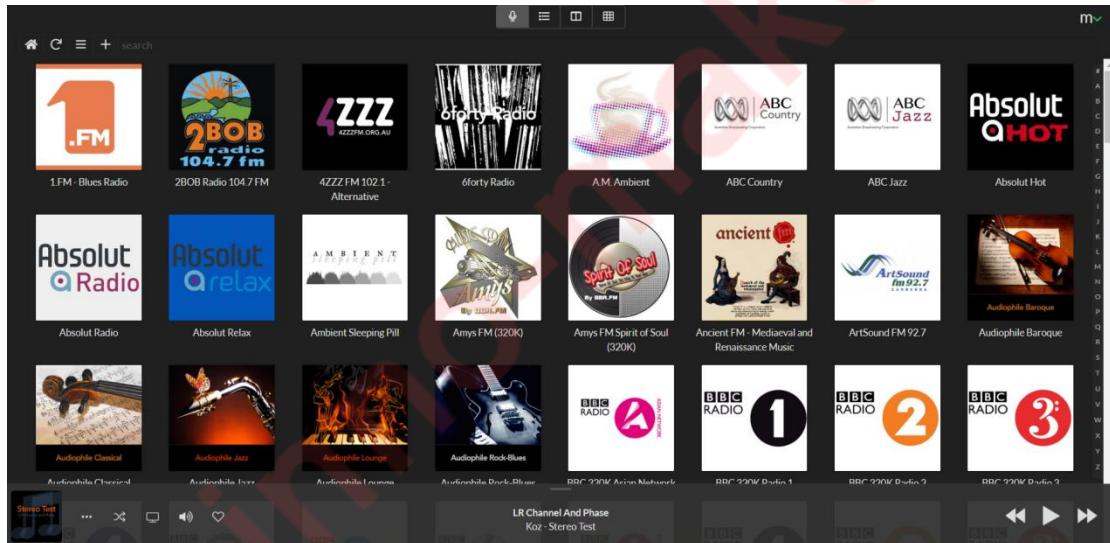


5) Click 'Audio', set as 'Allo Boss DAC' and save and restart. This is an essential step, otherwise you can't hear anything.

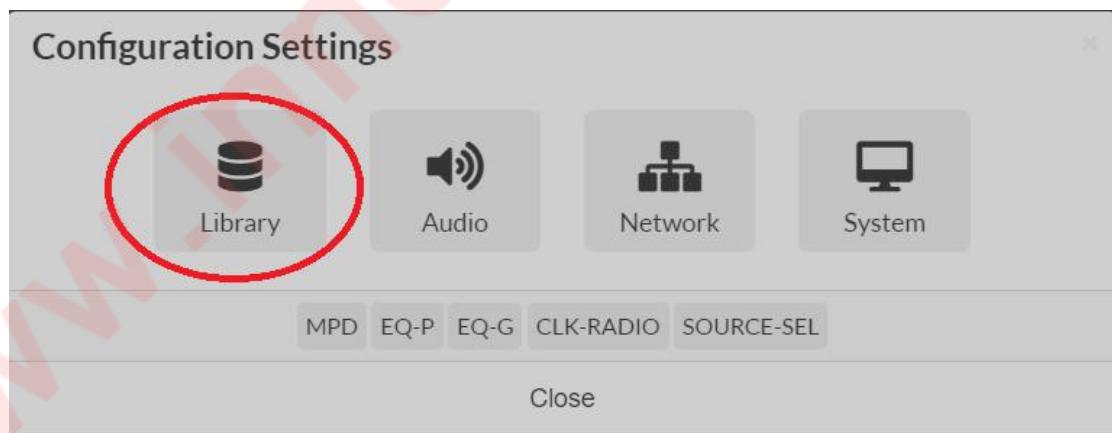
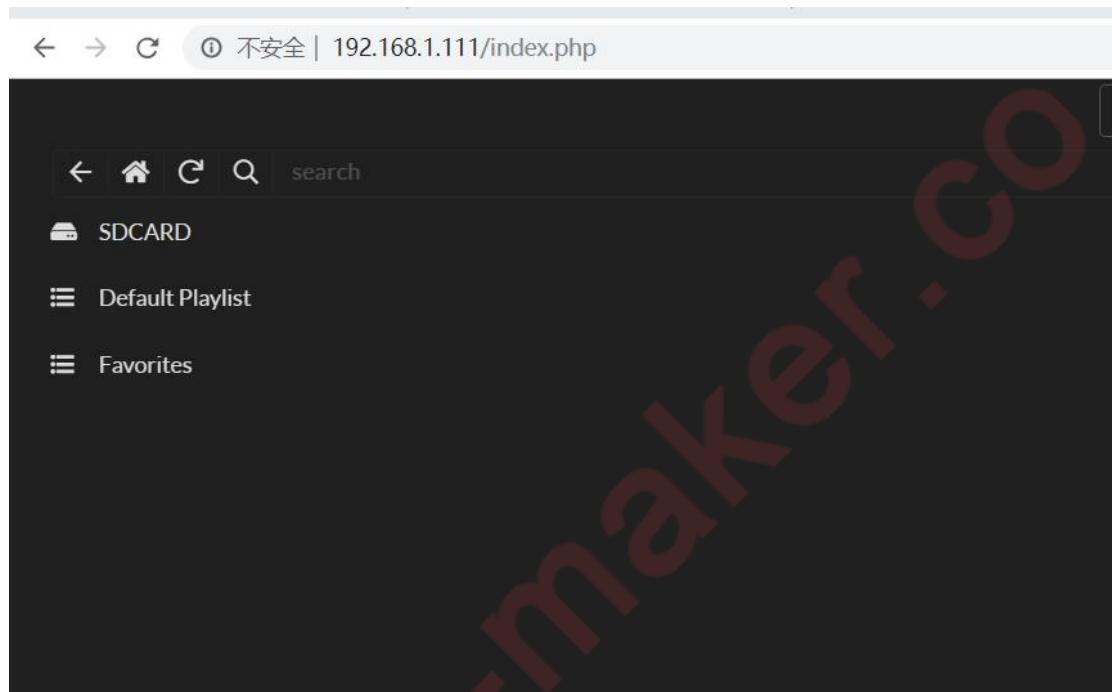


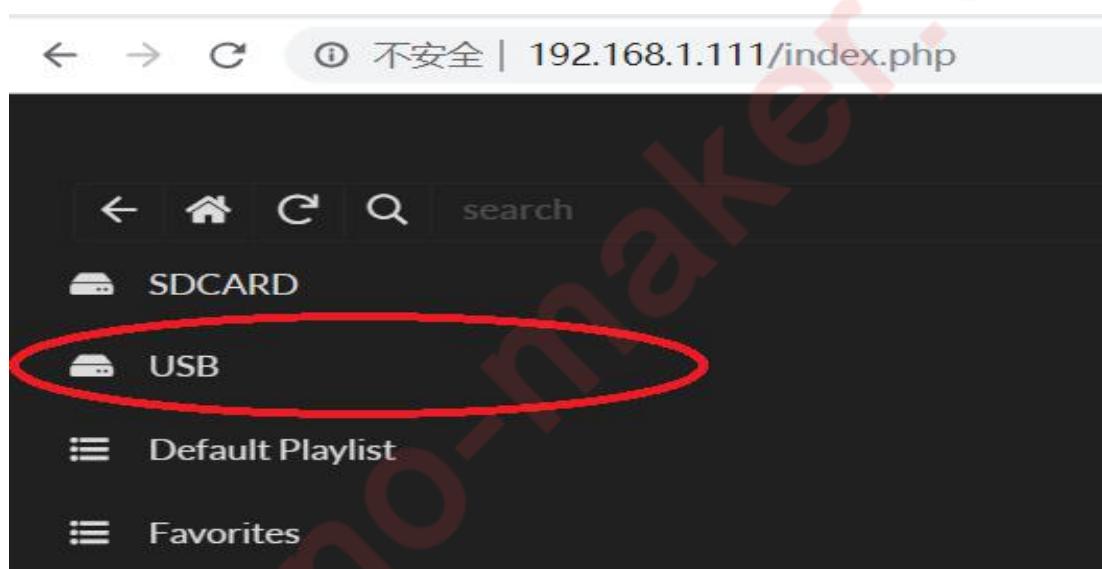
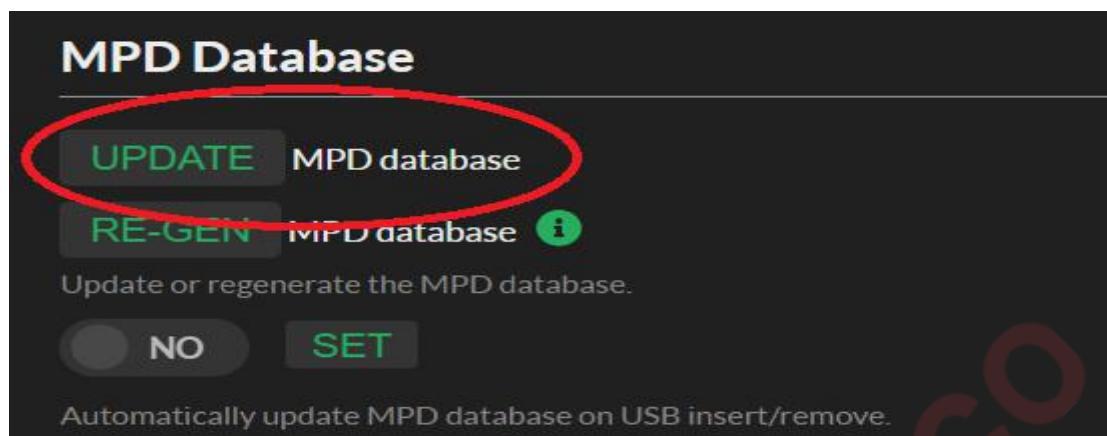


6) Now you can enjoy your music.



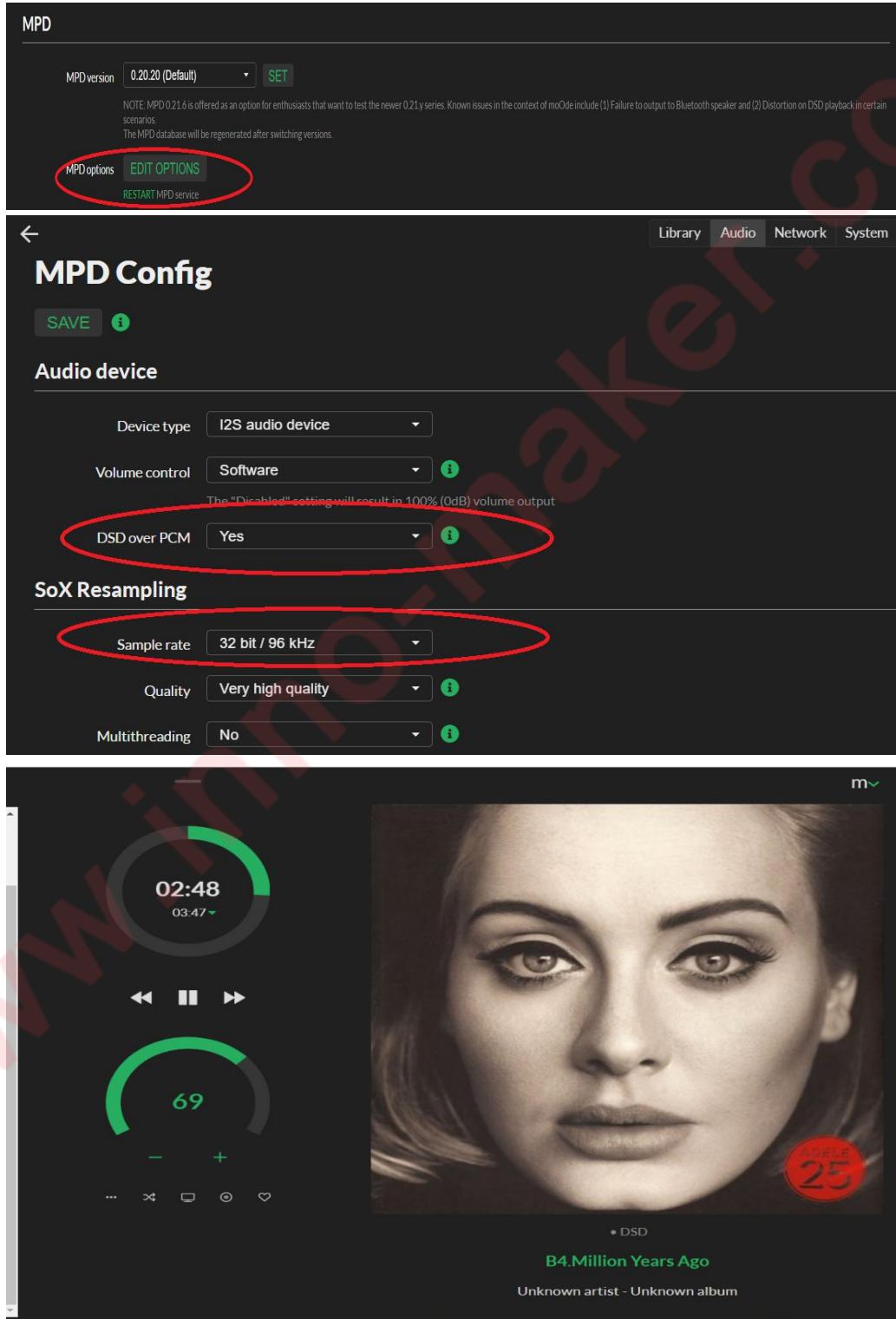
7) You can play music in the SD/MMC card, U disk which connected with Raspberry Pi. But Moodie may not automatic update disk default, so you need to update by yourself follow these steps.





4.7 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.



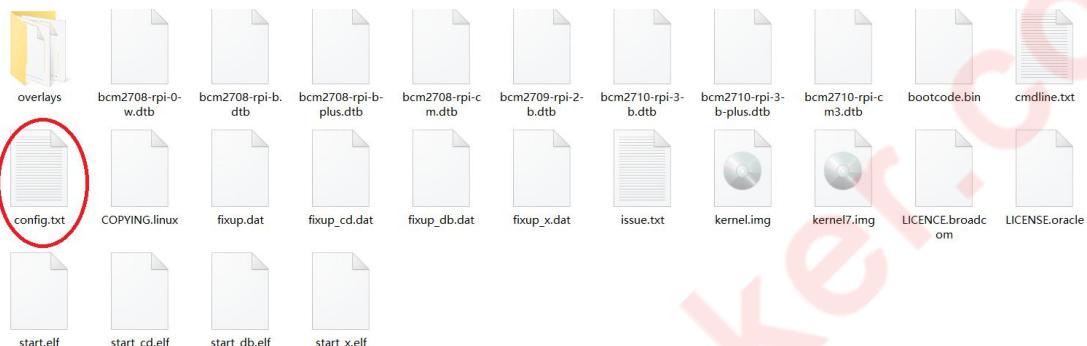
The screenshot shows the Moode application interface. At the top, there is a configuration window titled "MPD Config". It includes fields for "MPD version" (set to 0.20.20), "MPD options" (with a red oval around the "EDIT OPTIONS" button), and "RESTART MPD service". Below this, the main Moode interface is visible, featuring a dark theme with a portrait of a woman's face. The playback controls include a circular progress bar at the top left showing "02:48" and "03:47", and a volume slider below it with the number "69". To the right of the controls is a large album cover of a woman's face. Below the album cover, the text "• DSD" is displayed, followed by the song title "B4.Million Years Ago" and the artist information "Unknown artist - Unknown album".

4.8 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=allo-boss-dac-pcm512x-audio
-
# Uncomment some or all of these to enable the optional hardware interfaces
#dtparam=i2c_arm=on
#dtparam=i2s=on
#dtparam=spi=on

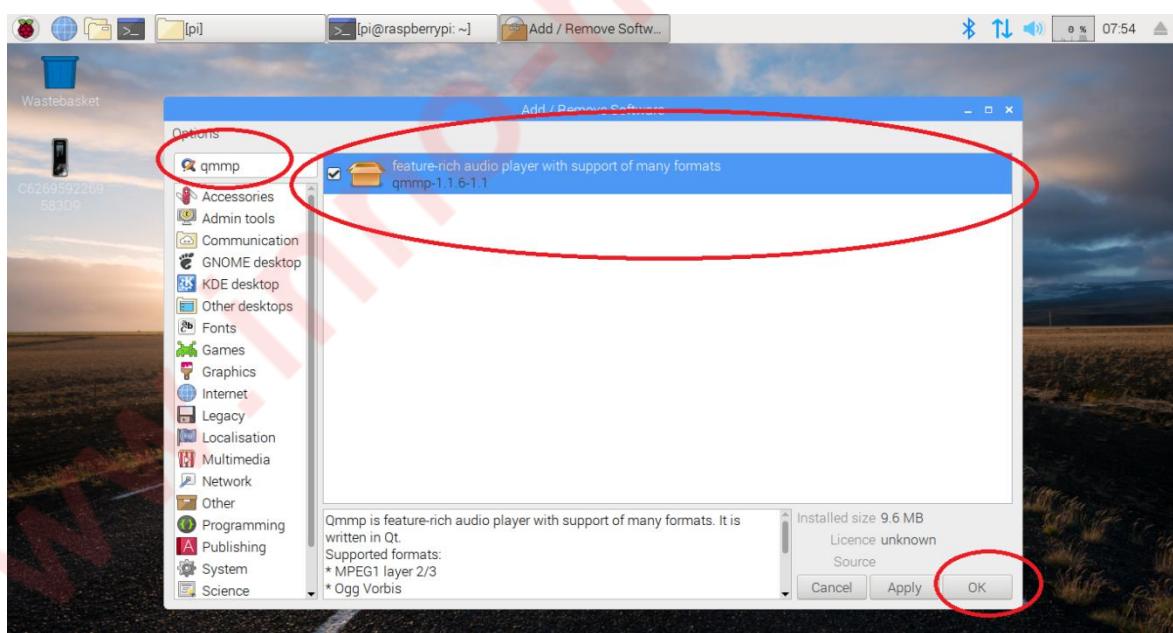
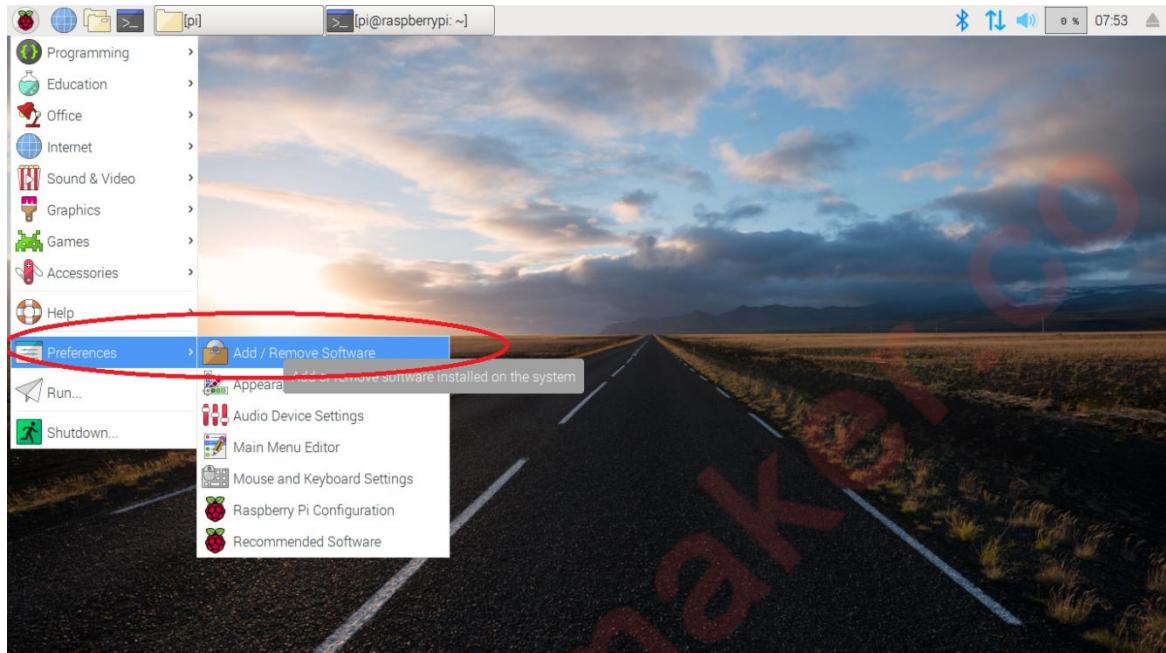
# Uncomment this to enable the lirc-rpi module
#dtoverlay=lirc-rpi

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

# Enable audio (loads snd_bcm2835)
dtparam=audio=on
dtoverlay=allo-boss-dac-pcm512x-audio
```

3) Insert the TF card with volumio image into the Raspberry pi then power on. Default user name is **pi**, and password is **raspberry**;

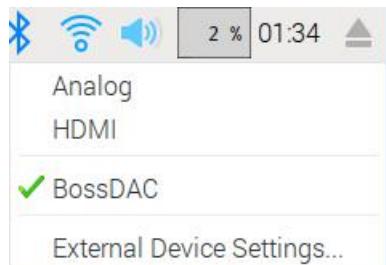
4) After login, Install the qmmp music player. Before that please make sure your raspberry already connected to the internet.



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

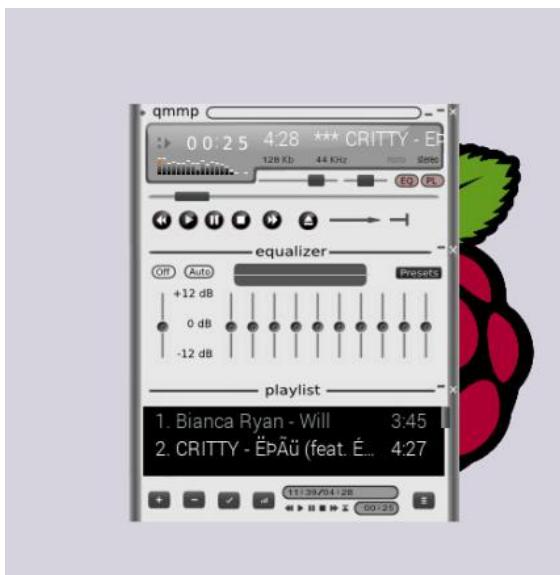
```
sudo apt-get install qmmp.
```

6)Right click the sound icon on the top right corner, set the raspberry pi audio output as 'BossDAC'. This is an essential step, otherwise you can't hear anything.



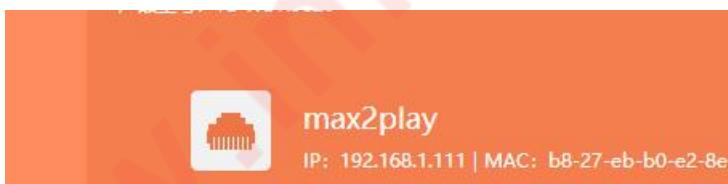
7)After the installation is,we can find the player under the menu bar. You can Install other linux music player as same step. Such as Rhythmbox, Amarok,VLC,Cmus and so on.



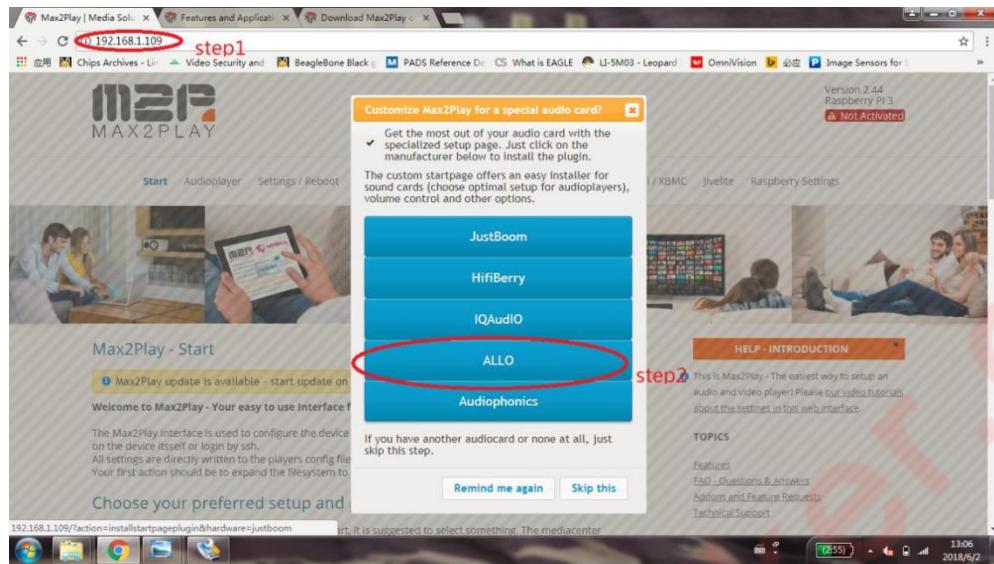


4.9 Max2player

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.



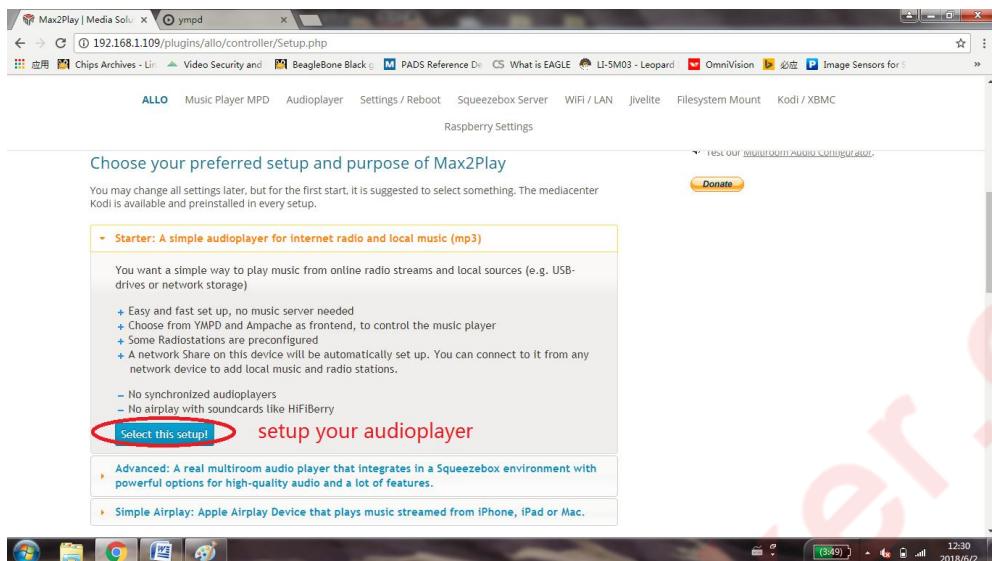
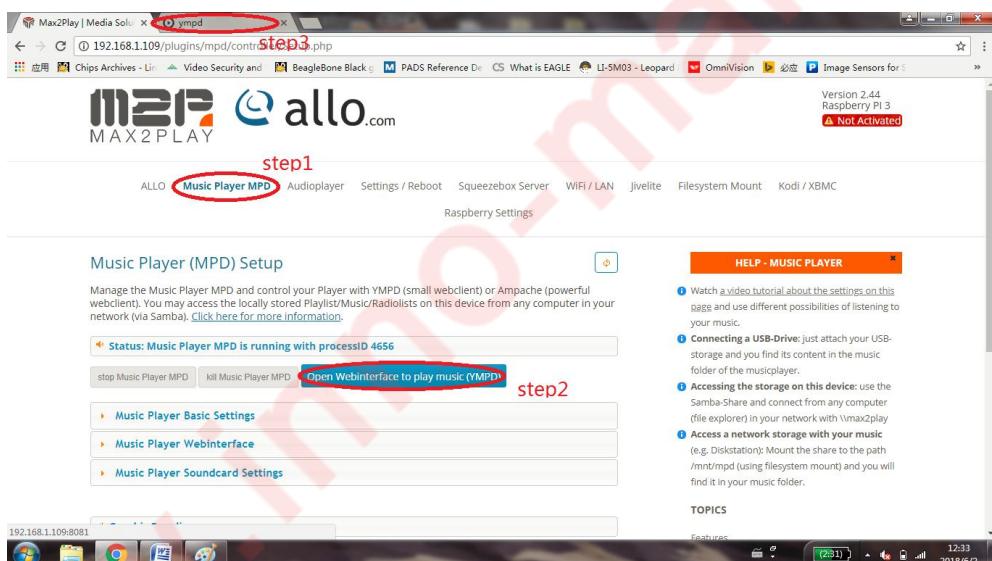
2) Choose the Card option as 'Allo'.



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

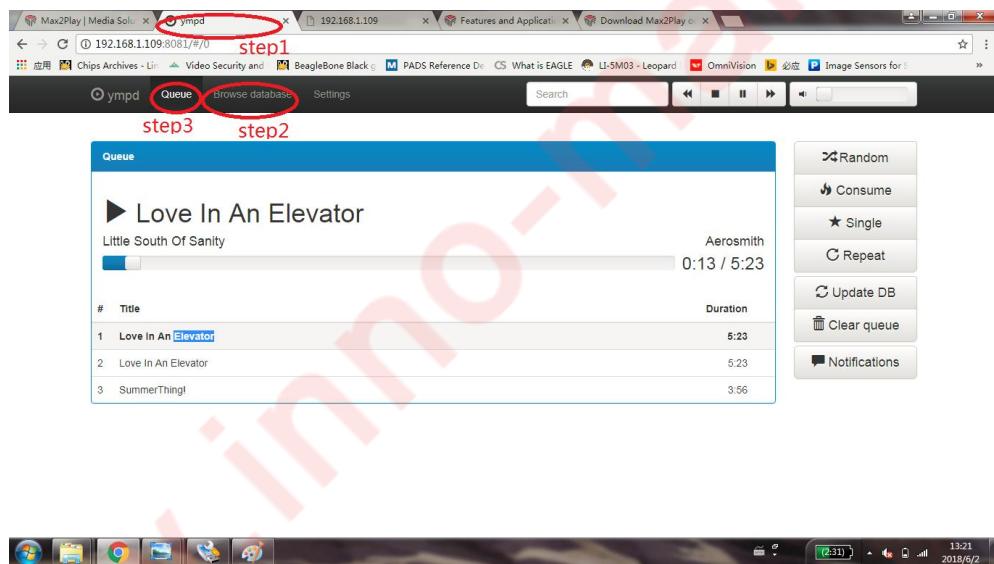
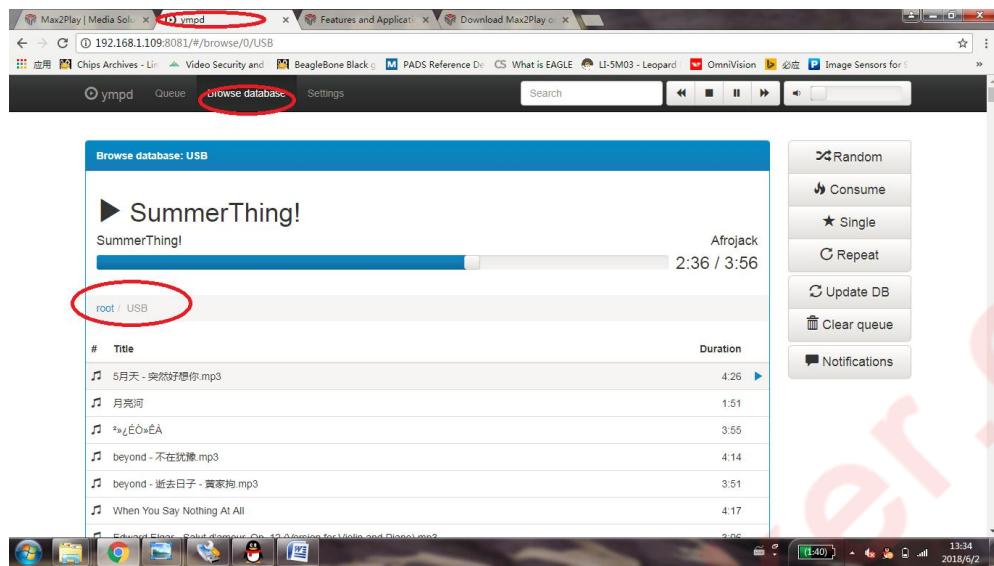


4) Setup your audio player.

The screenshot shows the "Music Player (MPD) Setup" section of the Max2Play interface. At the top, it says "step1" and "Music Player MPD". Below that, it says "Status: Music Player MPD is running with processID 4656". There is a button labeled "Open Webinterface to play music (YMPD)". A red circle highlights this button. To the right, there is a "HELP - MUSIC PLAYER" section with several tips and a "TOPICS" section at the bottom.

5) Add music file



6) Note

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

Active your license:



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The screenshot shows the Max2Play web administration interface. At the top, there's a navigation bar with links like ALLO, Music Player MPD, Audioplayer, Settings / Reboot (which is highlighted with a red oval), Squeezebox Server, WiFi / LAN, JiveLite, Filesystem Mount, and Kodi / XBMC. Below the navigation is a sub-menu titled 'step1' with a 'Raspberry Settings' link.

The main content area has a title 'Basic settings for Max2Play'. A prominent red box contains the message: 'Max2Play-License is not activated. Not all functions available!' Below this, there's a form field for 'Playername' set to 'max2play'. To the right of the form, a note says: 'For best all functions and plugins of Max2Play and constantly get new features, you need to be a customer of shop.max2play.com or have a code for activation. This is verified with your eMail-address or activation code. If you are not a customer yet, you may buy the Max2Play-Full-Package here.' Another red oval highlights the word 'Not Activated' in the note.

On the right side of the screen, there's a 'HELP - BASIC SETTINGS' panel with two sections: 'Use this page to change the devicename, update Max2Play to the latest version, expand the filesystem on a new installation and install new addons.' and 'To install and activate a new addon on the button of this page, you have to take 2 steps: first install the addon and second enable it.' Below these is a 'Health Checker' section with a green background and white text, listing various system status items like 'Internet: Connected', 'CPU Load: 0.29', etc.

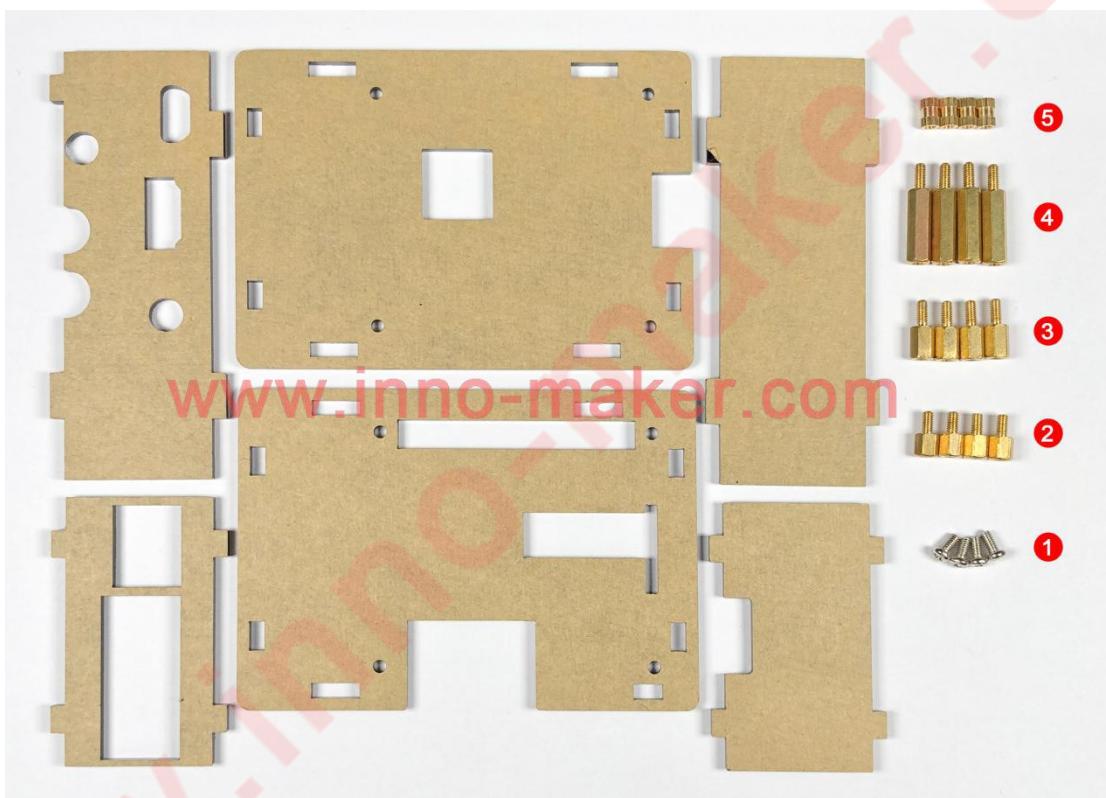
5. DAC CASE ASSEMBLY

Customer can also buy Case For HIFI DAC, customer can buy and assemble it as below: d

1) Unpack it.

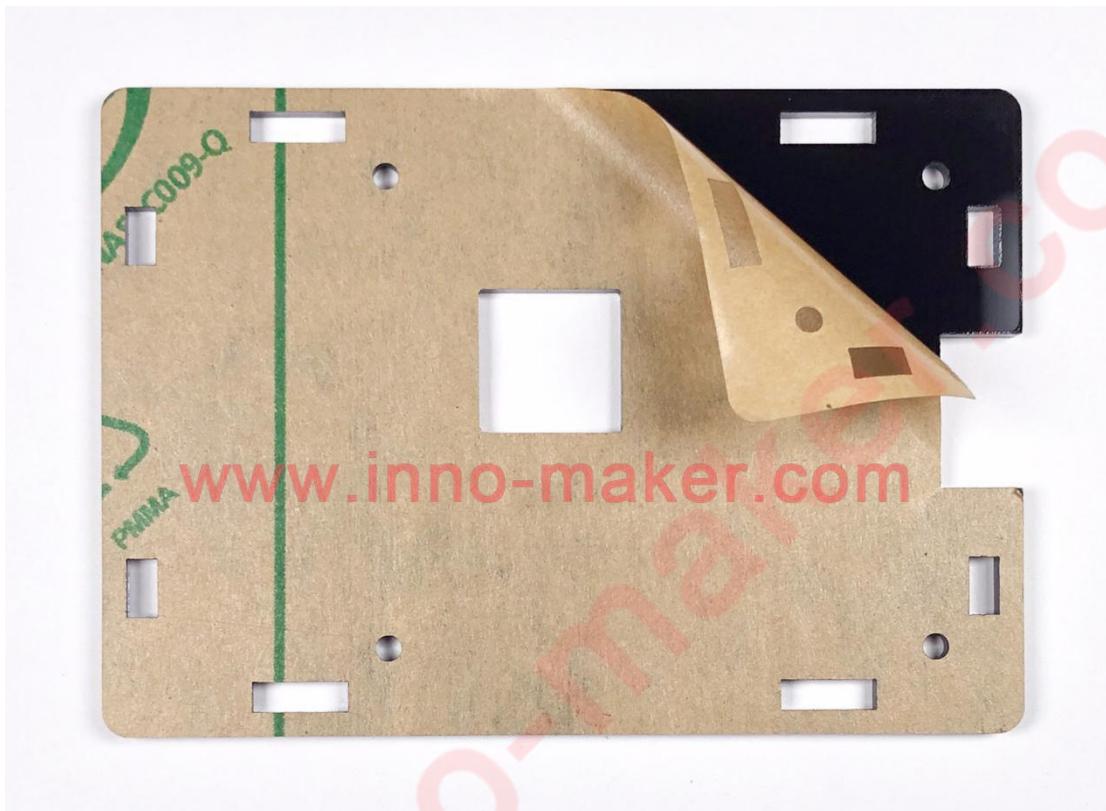
Package contain :

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



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.



3) Mount the RASPBERRY to the base plate. Please pay attention to the group number.

Step: 1



Step: 2

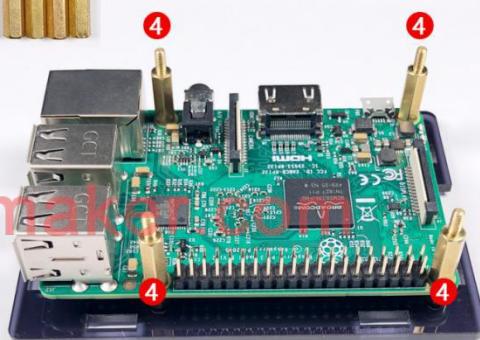


Step: 3

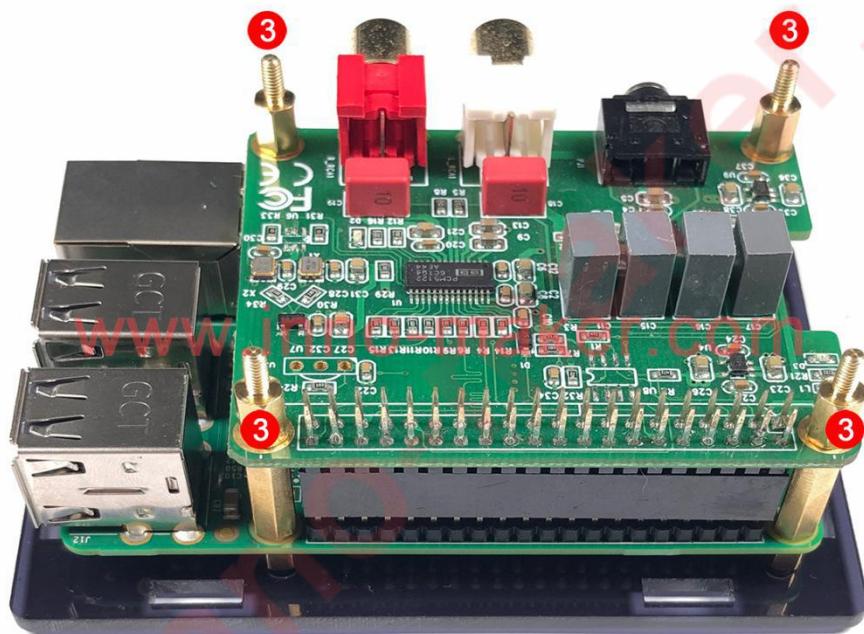
Mount the RASPBERRY to the base plate



Step: 2



4) Plug the AMP module into the 40 pin GPIO head.



5) Add two long side plates.



6) Add two short side plates.



7) Add top plate and screw down.

