Pi Zero Series Mate User Manual

Menu

1. General Description:

Raspberry Pi Zero are very well-received by user from around the world. We designed this board for player user more convenient to use the Pi Zero for various applications. .

Extended 2 x USB 2.0 port from the USB port Pi Zero. We use the USB3.0 connector, just to make it looks pretty.

Extended 1x 1000 Mbps Ethernet port, limited by the USB 2.0 speed of Pi Zero. Actual speed is around 320 Mbps. But much better than the 100Mbps ethernetdesgin.

Extended High performance USB DAC Audio Sound Card, support stereoscopic headphone output and mono amplifier microphone input via 3.5mm jack. Support for Volumio, Moode, PiCorePlayer, LibreElec music player system.

2. Features

1. Compatibility with all Raspberry Pi Zero series. Pi Zero, Pi Zero W ,Pi Zero 2W. Support all Raspberry Pi system.

2. Extended 2 x USB 2.0 port, 1x 1000 Mbps Ethernet port , 1 x Audio stereoscopic input, 1 x Audio stereoscopic Output, 1x Type C 5V/2A power input port.

3. Comes with a 10mm thickness aluminum black alloy heatsink, U-shaped groove design to speed up heat dissipation.

4. limited by the USB 2.0 speed of Pi Zero. The actual speed of 1000 Mbps ethernet port   is around 320Mbps. But much better than the 100Mbps ethernetdesgin.

5. On-board TI stereo audio Chip, Perfect playback of 44.1 kHz(CD quality) and 48 kHz. Support for Volumio, Moode, PiCorePlayer, LibreElec music player system.
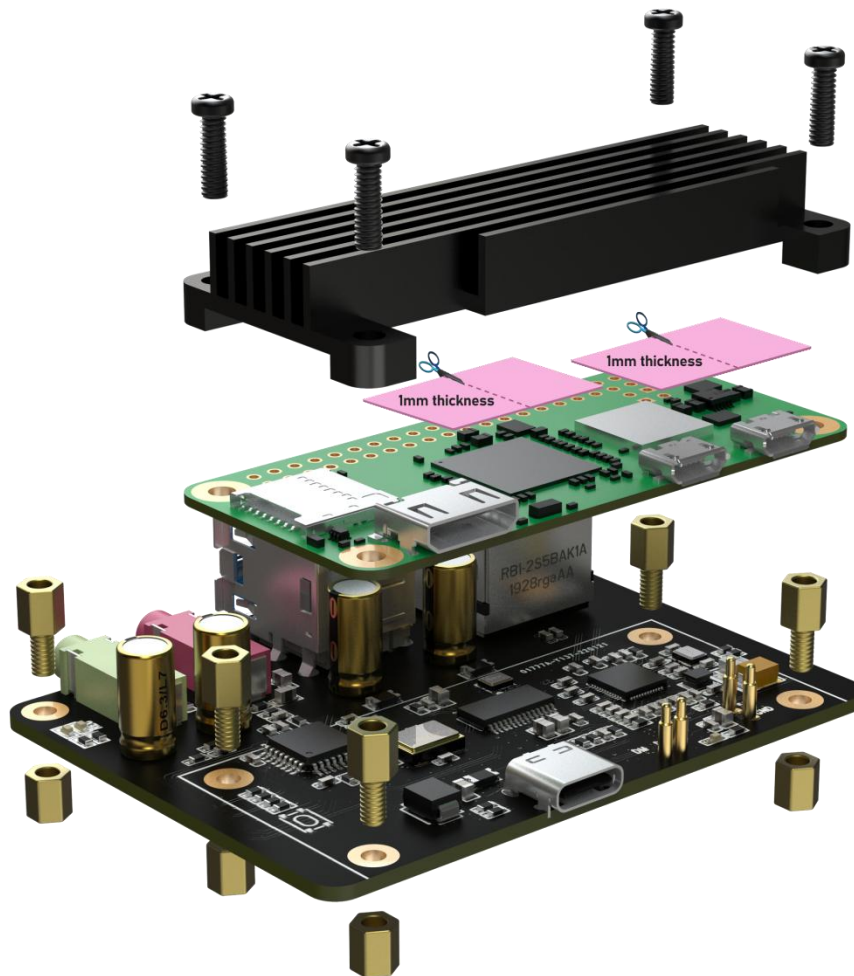
3. Hardware Description
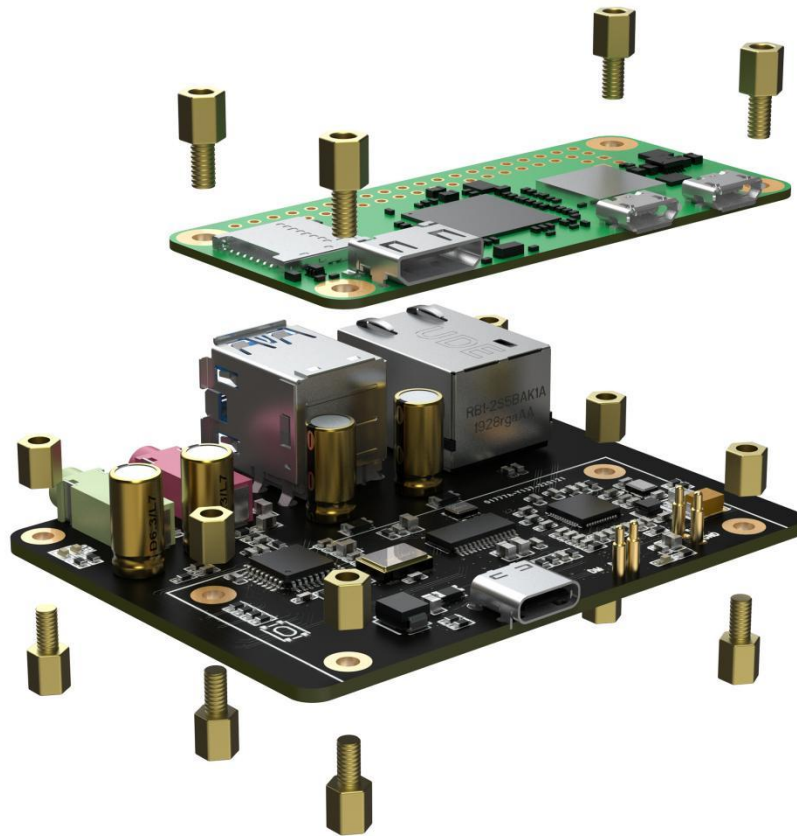
3.1 Dimensional Drawing
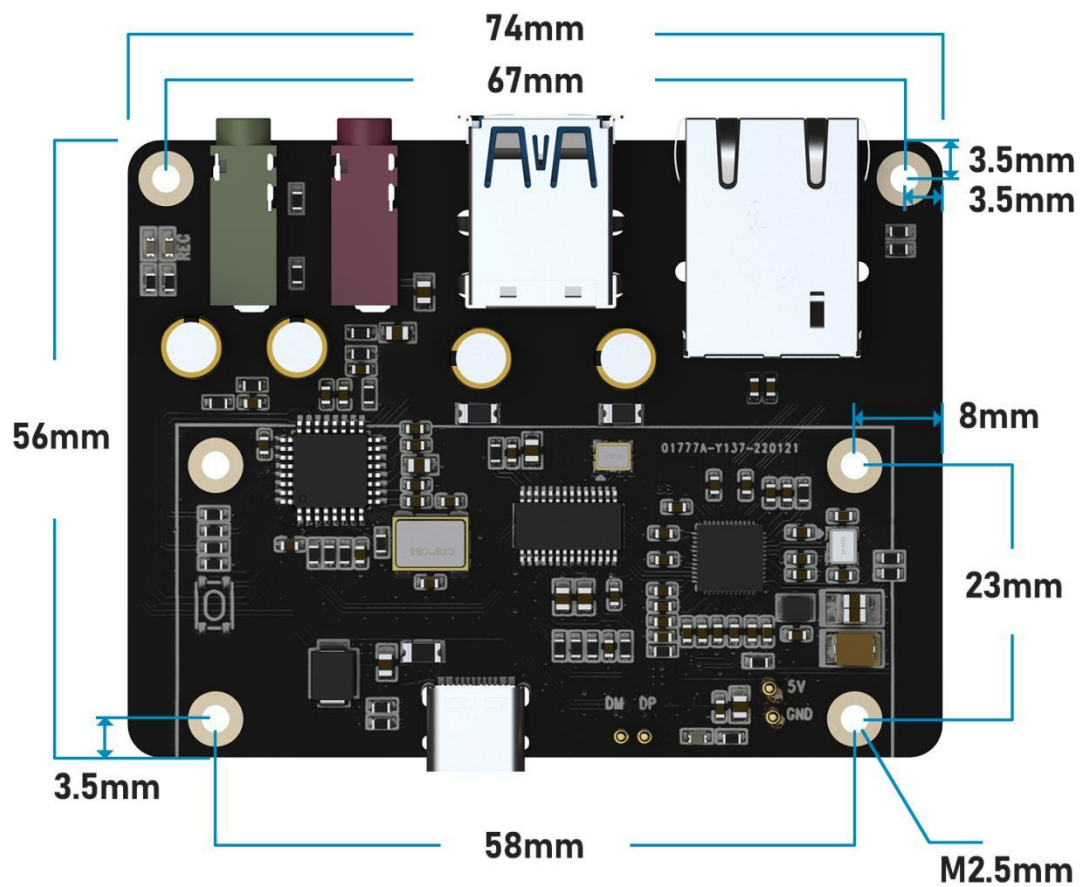
3.2 Interface
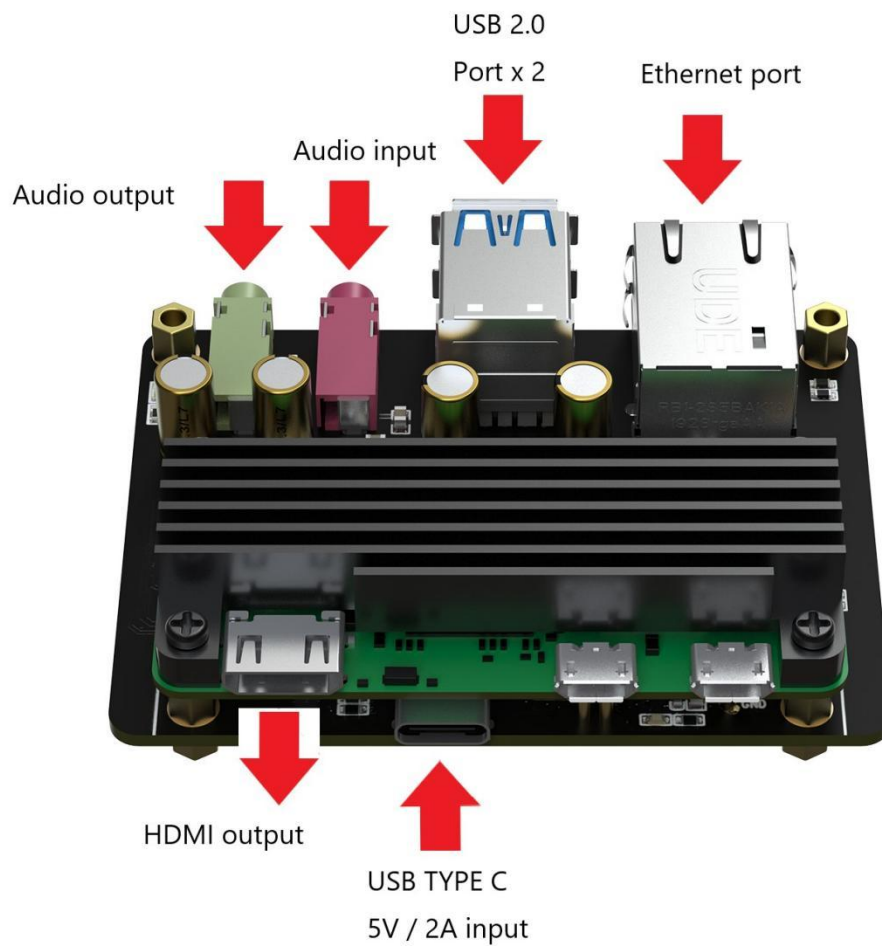
3.3 Assemble

3.3.1 assemble with the alloy heatsink

3.3.2 assemble without the alloy heatsink

4.Software Description

Regard to how to use the Raspberry Pi zero, please refer to the document of Raspberry Pi org. We are not done elaborated too much.

Pi Zero 2w:

https://www.raspberrypi.com/products/raspberry-pi-zero-2-w/

Pi Zero w:

https://www.raspberrypi.com/products/raspberry-pi-zero-w/

Pi Zero:

https://www.raspberrypi.com/products/raspberry-pi-zero/

Next we guide you how to use and set up the expansion interface

4.1 Ethernet Port

4.1.1 Check the status of network port

Just plug in the ethernet cable, the Pi Zero series mate can access the network. Not any configuration requirement. You can use the below command to check whether the eth0 is available in your system.

Ifconfig -a

```
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.0.140  netmask 255.255.255.0  broadcast 192.168.0.255
        inet6 fe80::10cf:205f:d72e:282c  prefixlen 64  scopeid 0x20<link>
        ether 32:45:3b:1d:f3:75  txqueuelen 1000  (Ethernet)
        RX packets 25562  bytes 2111720 (2.0 MiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 1755  bytes 315841 (308.4 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

4.1.2 Measured the maximum achievable bandwidth on IP networks.

We use to test. For more imfornation about this tools, pls refer to below link:

https://iperf.fr/

We connect one Raspberry Pi 4 and one Pi Zero series
  mate to a local area network via ethernet cable. Install the iperf3 tools on both boards by below command.
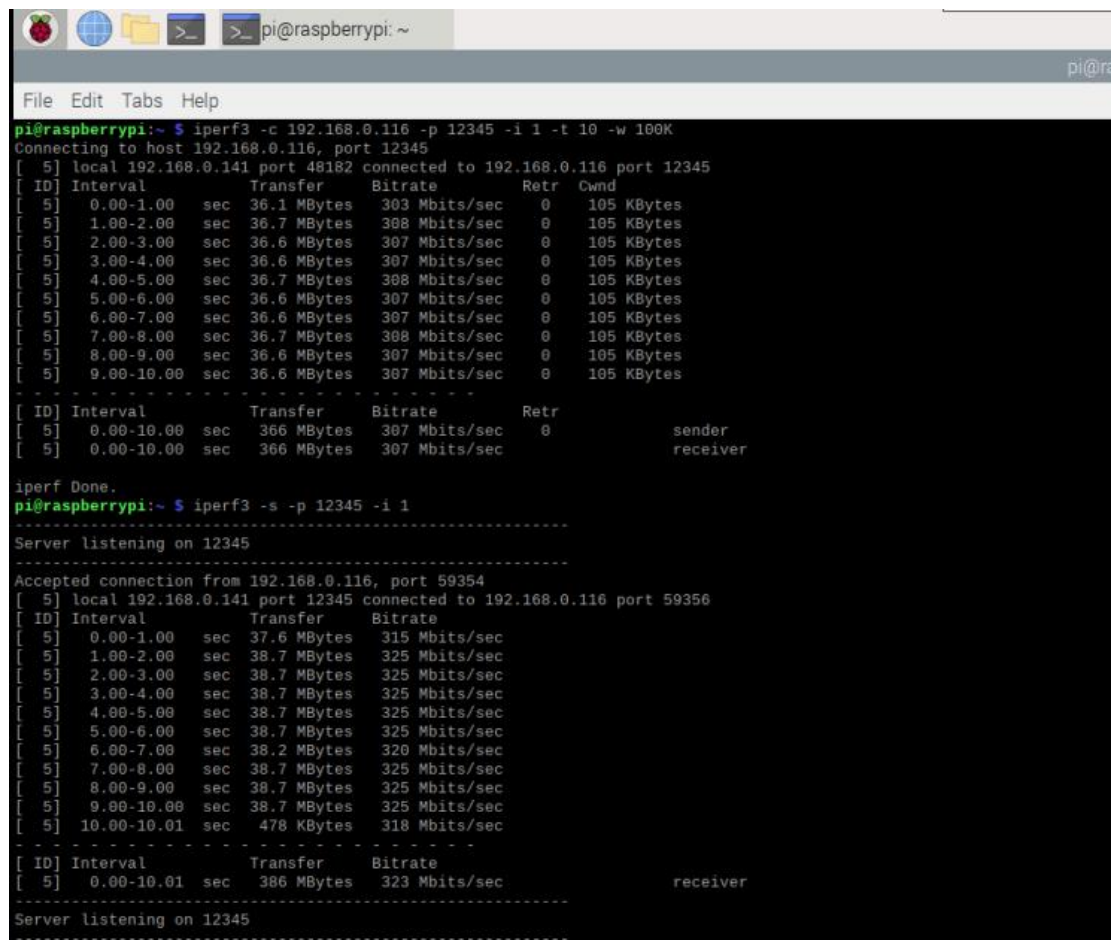
apt-get install iperf3

Run below command on Raspberry Pi 4
iperf3 -s -p 12345 -i 1

Run below command on Pi Zero series mate
  iperf3 -c <serverIP address> -p 12345 -i 1 -t 10 -w 100K

```
File  Edit  Tabs  Help
pi@raspberrypi:~ $ iperf3 -c 192.168.0.116 -p 12345 -i 1 -t 10 -w 100K
Connecting to host 192.168.0.116, port 12345
[  5] local 192.168.0.141 port 48182 connected to 192.168.0.116 port 12345
[ ID] Interval           Transfer     Bitrate         Retr  Cwnd
[  5]   0.00-1.00   sec  36.1 MBytes   303 Mbits/sec    0    105 KBytes
[  5]   1.00-2.00   sec  36.7 MBytes   308 Mbits/sec    0    105 KBytes
[  5]   2.00-3.00   sec  36.6 MBytes   307 Mbits/sec    0    105 KBytes
[  5]   3.00-4.00   sec  36.6 MBytes   307 Mbits/sec    0    105 KBytes
[  5]   4.00-5.00   sec  36.7 MBytes   308 Mbits/sec    0    105 KBytes
[  5]   5.00-6.00   sec  36.6 MBytes   307 Mbits/sec    0    105 KBytes
[  5]   6.00-7.00   sec  36.6 MBytes   307 Mbits/sec    0    105 KBytes
[  5]   7.00-8.00   sec  36.7 MBytes   308 Mbits/sec    0    105 KBytes
[  5]   8.00-9.00   sec  36.6 MBytes   307 Mbits/sec    0    105 KBytes
[  5]   9.00-10.00  sec  36.6 MBytes   307 Mbits/sec    0    105 KBytes
- - - - - - - - - - - - - - - - - - - - - - - - -
[ ID] Interval           Transfer     Bitrate         Retr
[  5]   0.00-10.00  sec   366 MBytes   307 Mbits/sec    0             sender
[  5]   0.00-10.00  sec   366 MBytes   307 Mbits/sec                  receiver

iperf Done.
pi@raspberrypi:~ $ iperf3 -s -p 12345 -i 1
-----------------------------------------------------------
Server listening on 12345
-----------------------------------------------------------
Accepted connection from 192.168.0.116, port 59354
[  5] local 192.168.0.141 port 12345 connected to 192.168.0.116 port 59356
[ ID] Interval           Transfer     Bitrate
[  5]   0.00-1.00   sec  37.6 MBytes   315 Mbits/sec
[  5]   1.00-2.00   sec  38.7 MBytes   325 Mbits/sec
[  5]   2.00-3.00   sec  38.7 MBytes   325 Mbits/sec
[  5]   3.00-4.00   sec  38.7 MBytes   325 Mbits/sec
[  5]   4.00-5.00   sec  38.7 MBytes   325 Mbits/sec
[  5]   5.00-6.00   sec  38.7 MBytes   325 Mbits/sec
[  5]   6.00-7.00   sec  38.2 MBytes   320 Mbits/sec
[  5]   7.00-8.00   sec  38.7 MBytes   325 Mbits/sec
[  5]   8.00-9.00   sec  38.7 MBytes   325 Mbits/sec
[  5]   9.00-10.00  sec  38.7 MBytes   325 Mbits/sec
[  5]  10.00-10.01  sec   478 KBytes   318 Mbits/sec
- - - - - - - - - - - - - - - - - - - - - - - - -
[ ID] Interval           Transfer     Bitrate
[  5]   0.00-10.01  sec   386 MBytes   323 Mbits/sec                  receiver
-----------------------------------------------------------
Server listening on 12345
-----------------------------------------------------------
```
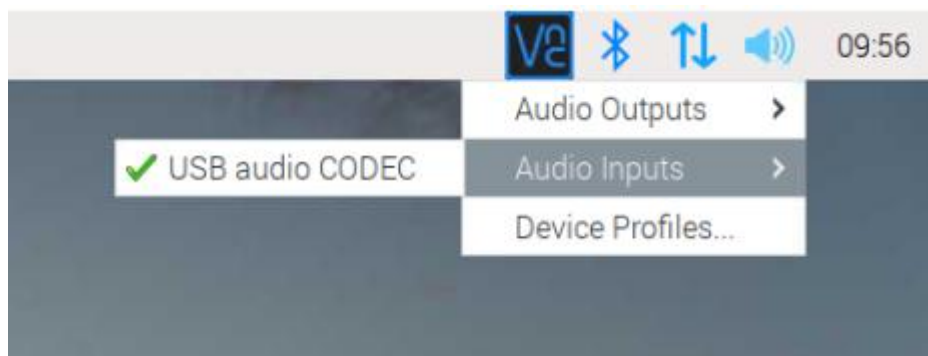
4.2 Audio Input/Output

4.2.1 Raspberry Pi OS With Desktop Setup

(1) Audio Output:

(2) Audio Input:

4.2.2 Raspberry Pi OS Lite Setup

(1) Check audio device.

Type in the commands that are shown below. You can see the USB audio CODEC, the card **1** is the dac device number.

aplay -l

cat /proc/asound/cards

```
pi@raspberrypi:~ $ aplay -l
**** List of PLAYBACK Hardware Devices ****
card 0: vc4hdmi [vc4-hdmi], device 0: MAI PCM i2s-hifi-0 [MAI PCM i2s-hifi-0]
  Subdevices: 1/1
  Subdevice #0: subdevice #0
card 1: CODEC [USB audio CODEC], device 0: USB Audio [USB Audio]
  Subdevices: 1/1
  Subdevice #0: subdevice #0
pi@raspberrypi:~ $ cat /proc/asound/cards
 0 [vc4hdmi        ]: vc4-hdmi - vc4-hdmi
                      vc4-hdmi
 1 [CODEC          ]: USB-Audio - USB audio CODEC
                      Burr-Brown from TI USB audio CODEC at usb-3f980000.usb-1.2, full speed
pi@raspberrypi:~ $ 
```

(2) Set as default sound card.

sudo nano /etc/asound.conf

Type in the following content and then press "ctrl+x" and press "Enter" to save the file. Reboot again. card 1 is the DAC module device number.

```
  GNU nano 5.4                /etc/asound.conf
pcm.!default {
  type hw card 1
}
ctl.!default {
  type hw card 1
}




                         [ Read 6 lines ]
^G Help      ^O Write Out ^W Where Is  ^K Cut       ^T Execute   ^C Locati
^X Exit      ^R Read File ^\ Replace   ^U Paste     ^J Justify   ^  Go To
```
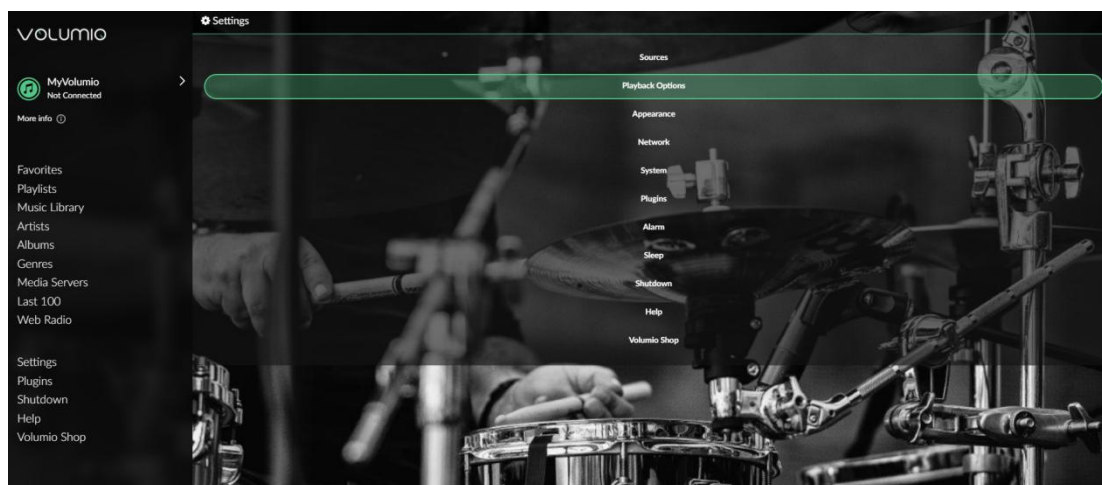
(3) Record and Play

Type in the commands that are shown below to start recod. For more information, please use command arecord -help. Press "ctrl+x" to finish record.

sudo arecord --device=hw1:0 --format S16_LE --rate 44100 -c1 test.wav

```
pi@raspberrypi:~ $ sudo arecord --device=hw:1,0 --format S16_LE --rate 44100 -c1
 test.wav
Recording WAVE 'test.wav' : Signed 16 bit Little Endian, Rate 44100 Hz, Mono
```

Type in the commands that are shown below to start play the record.

aplay test.wav

```
pi@raspberrypi:~ $ aplay test.wav
Playing WAVE 'test.wav' : Signed 16 bit Little Endian, Rate 44100 Hz, Mono
```

(4) Alsamixer

Type in the commands that are shown below, you can use the alsamixer tool to set alsamixer

4.2.3 Volumio Setup

Volumio Image:
http://volumio.org/get-started/

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

Select USB: USB audio CODEC for Output Device.

Enable the USB DAC: Settings → Playback → Output Device


4.2.4 Moode Setup

MoOde Image:
http://www.moodeaudio.org/

For more detail please refer to:

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

https://www.headphonesty.com/2021/09/introduction-to-moode-audio/

Select USB: USB audio CODEC for Output Device.
Enable a USB DAC: m → Configure → Audio → MPD Options → MPD Settings → Edit →
Audio Output → Output Device → Change from the Pi Headphone Jack to the USB DAC.
(moOde default is to output via the headphone jack)
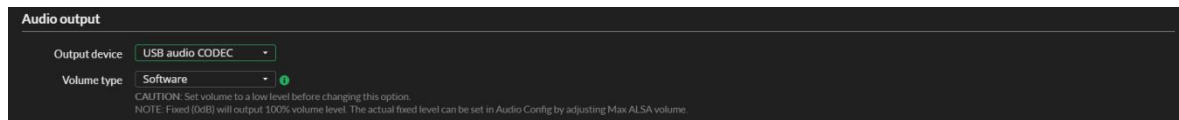
5.User Manual Version Descriptions

Version	Description	Date	E-mail
V1.0		2022.03.09	support@inno-maker.com sales@inno-maker.com calvin@inno-maker.com

If you have any suggestions, ideas, codes and tools please feel free to email to me. I will update the user manual and record your name and E-mail in list. Look forward to your letter and kindly share.