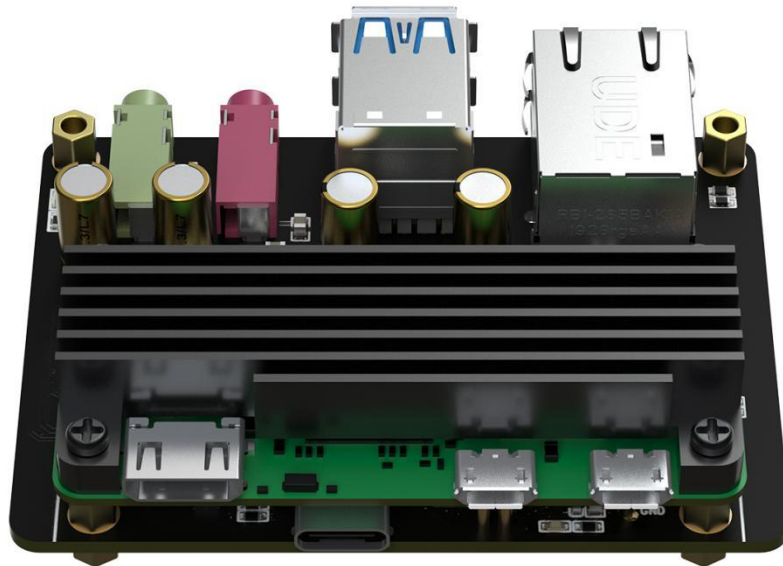


Pi Zero Serials Mate User Manual



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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 ethernet design.

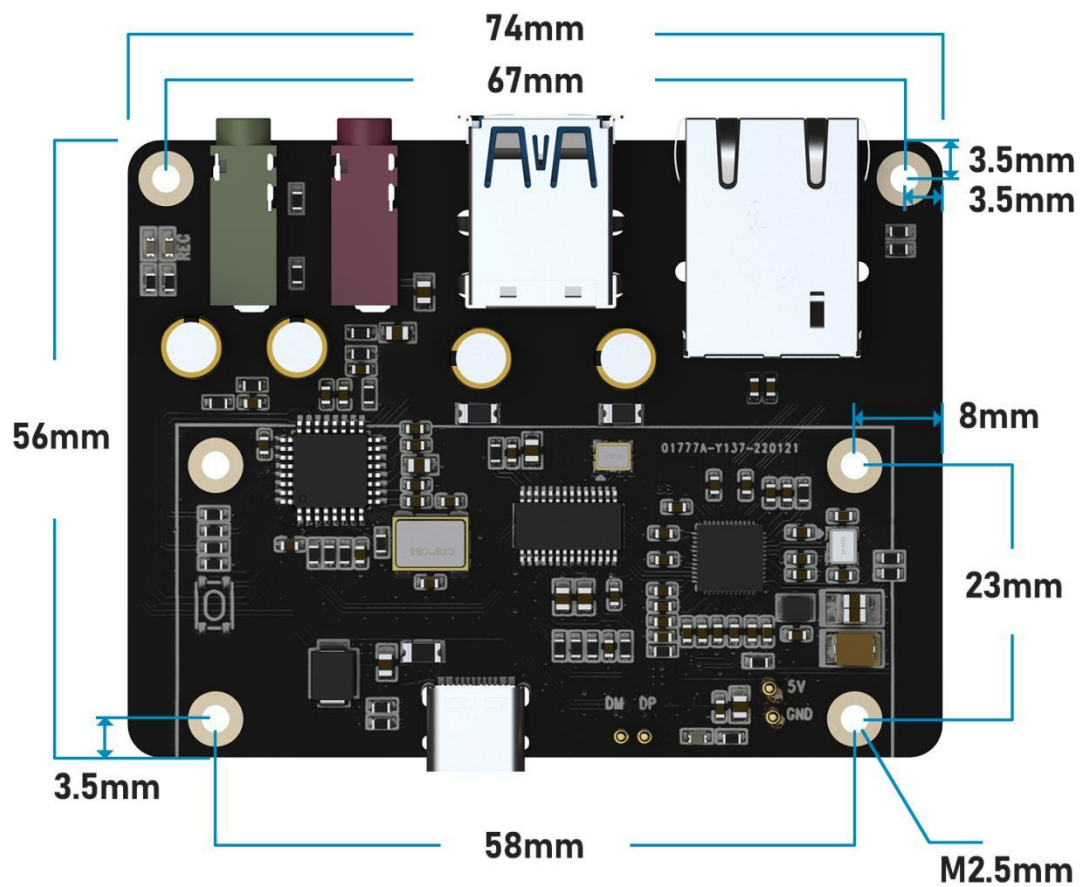
Extended High performance USB DAC Audio Sound Card, support stereoscopic headphone output and mono amplifier microphone input via 3.5mm jack. Support for Volumio, Moode, PiCorePlayer, LibreElec music player system.

2. Features

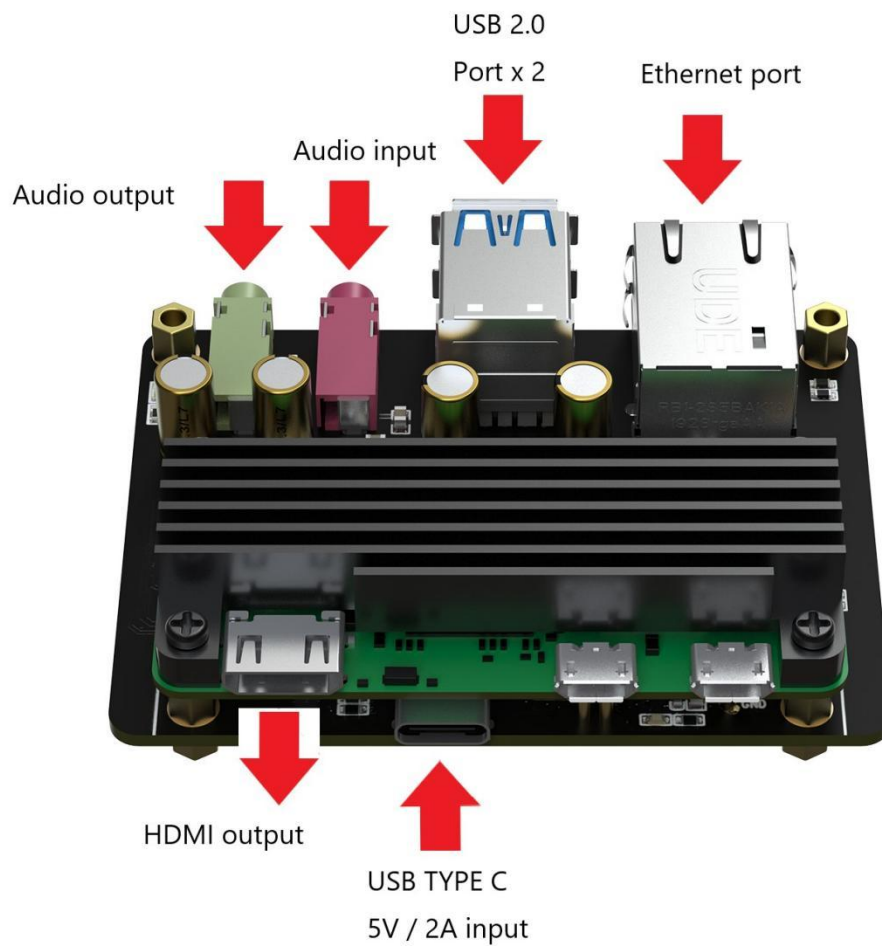
1. Compatibility with all Raspberry Pi Zero serials. Pi Zero, Pi Zero W ,Pi Zero 2W. Support all Raspberry Pi system.
2. Extended 2 x USB 2.0 port, 1x 1000 Mbps Ethernet port , 1 x Audio stereoscopic input, 1 x Audio stereoscopic Output, 1x Type C 5V/2A power input port.
3. Comes with a 10mm thickness 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 ethernet design.
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

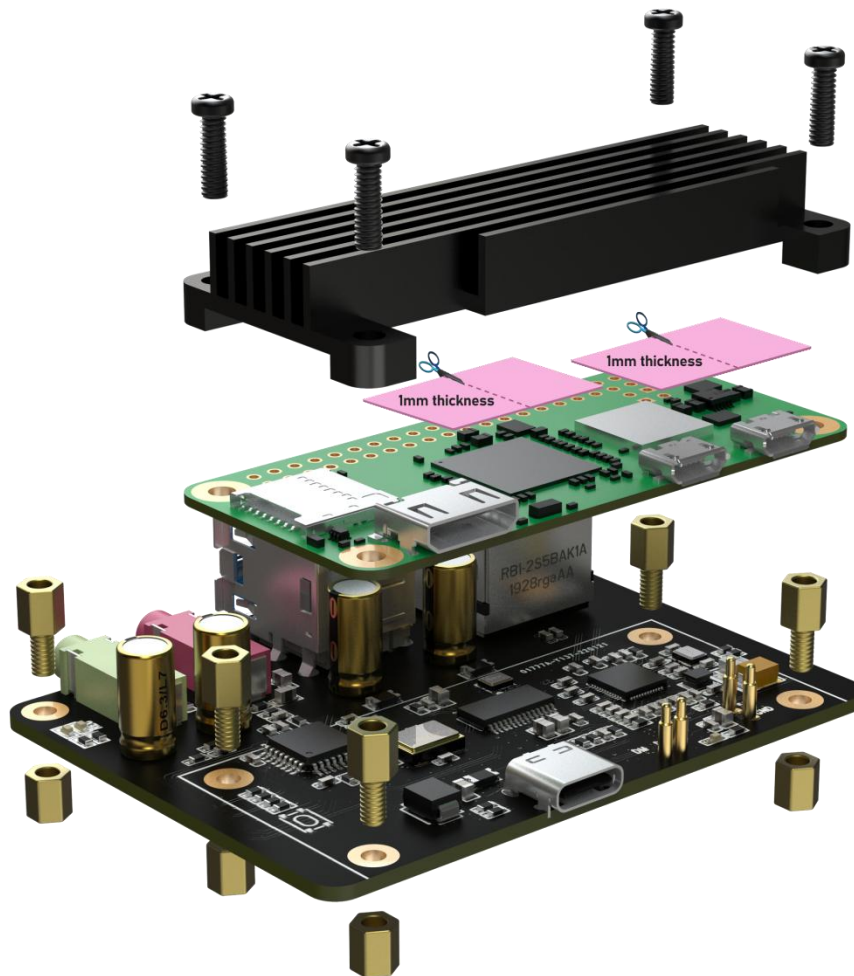


3.2 Interface

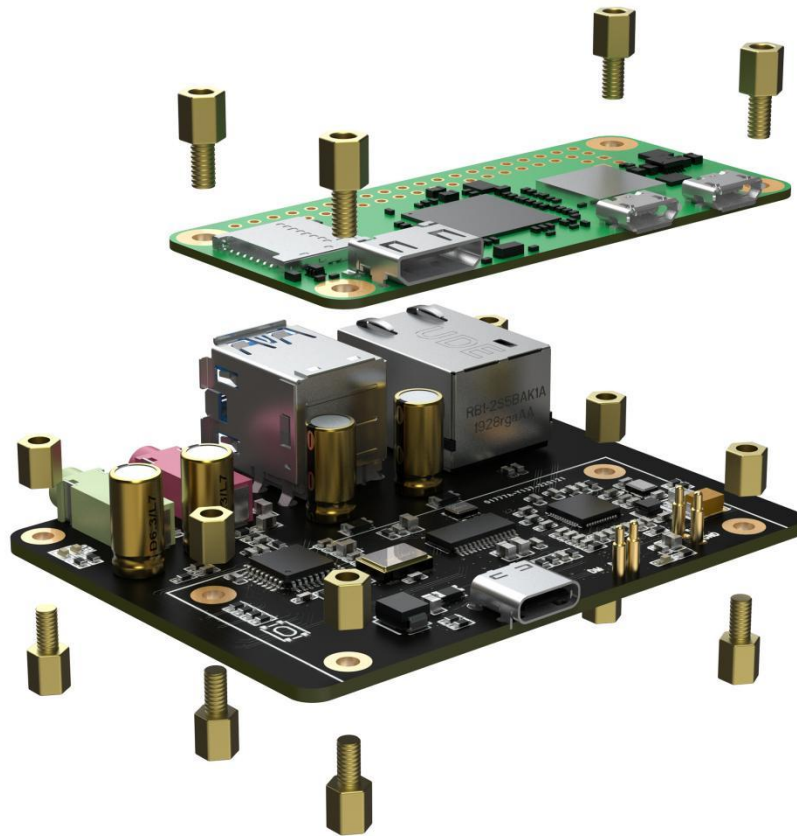


3.3 Assemble

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 serial 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 information about this tools, pls refer to below link:

<https://iperf.fr/>

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

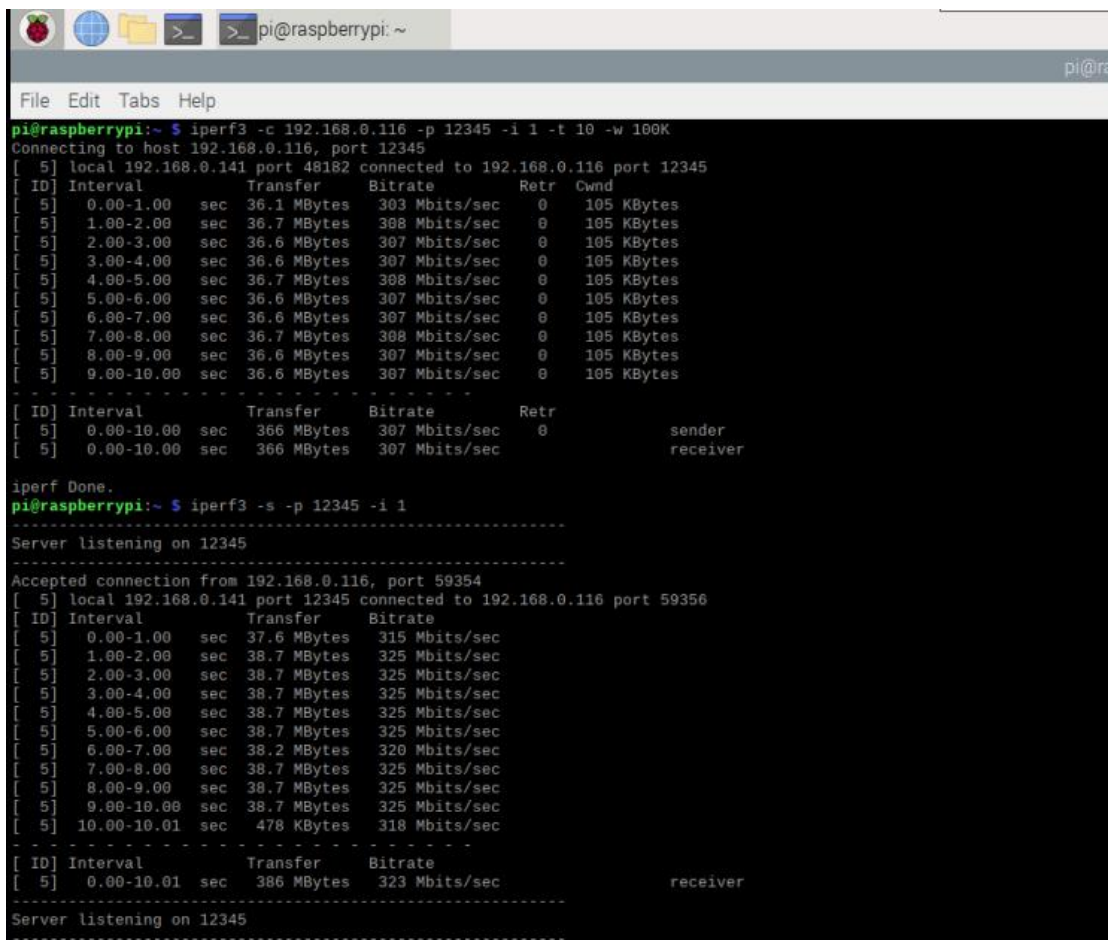
`apt-get install iperf3`

Run below command on Raspberry Pi 4

`iperf3 -s -p 12345 -i 1`

Run below command on Pi Zero serials mate

`iperf3 -c <serverIP address> -p 12345 -i 1 -t 10 -w 100K`



```

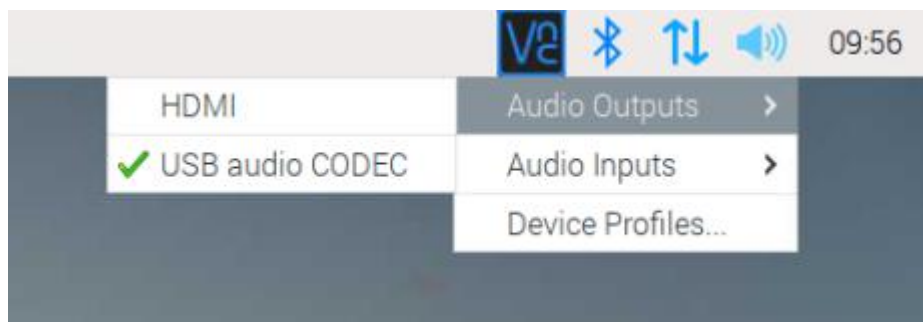
pi@raspberrypi:~$ iperf3 -c 192.168.0.116 -p 12345 -i 1 -t 10 -w 100K
Connecting to host 192.168.0.116, port 12345
[ 5] local 192.168.0.141 port 48182 connected to 192.168.0.116 port 12345
[ ID] Interval      Transfer    Bitrate    Retr  Cwnd
[ 5] 0.00-1.00    sec 36.1 MBytes 303 Mbits/sec  0   105 KBytes
[ 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
[ 5] 0.00-10.00   sec 366 MBytes 307 Mbits/sec  0
sender
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
-----

```

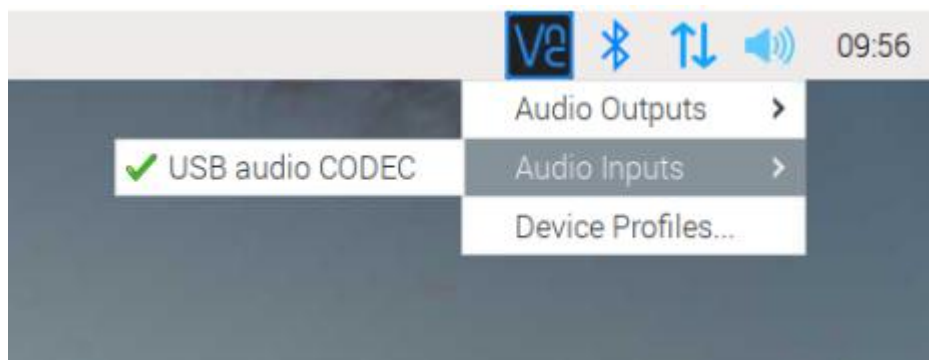
4.2 Audio Input/Output

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
cm.!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
```

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

```
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
```

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

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

[illegible]

4.2.3 Volumio Setup

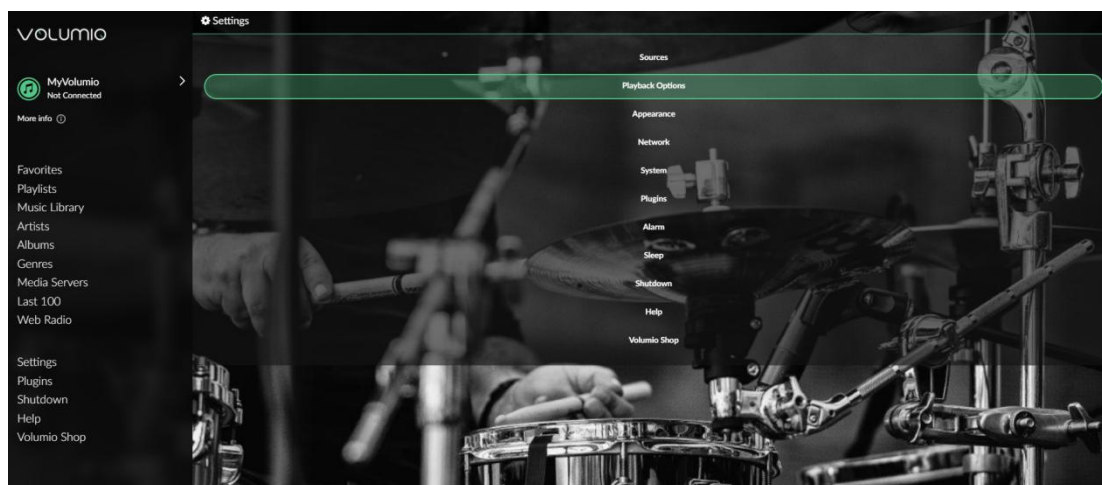
Volumio Image:

<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/>

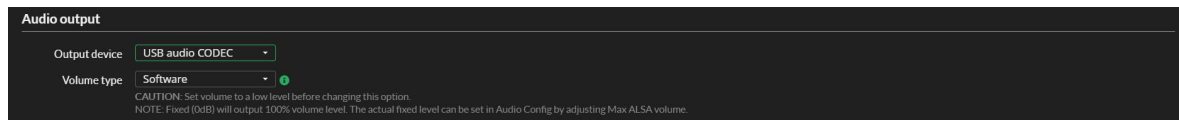
For more detail please refer to:

<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.