

# Configure and Test Audio on Raspberry Pi

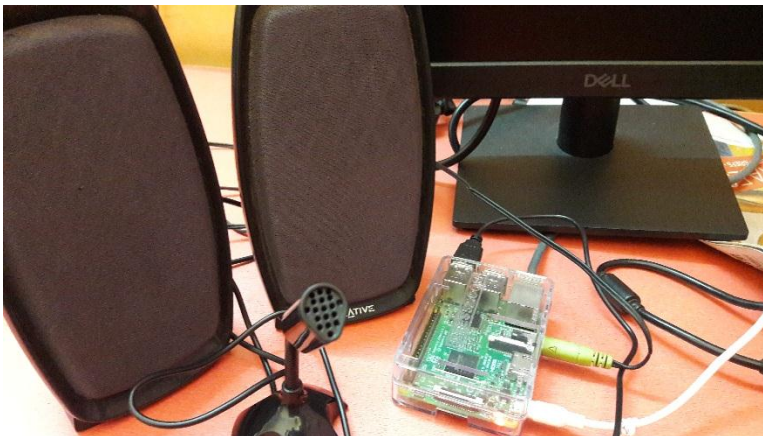
## Hardware Requirements

1. Raspberry Pi Model A/B/B+
2. SD Card
3. Ethernet Cable / Wi-Fi
4. Power Supply
5. USB Microphone
6. Speakers

## Software Requirements

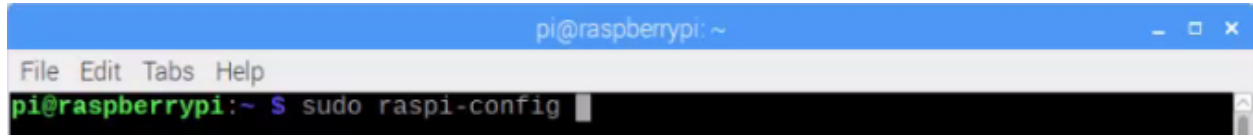
1. Raspbian Stretch OS

**Attach USB Microphone and Speakers to Raspberry Pi.**

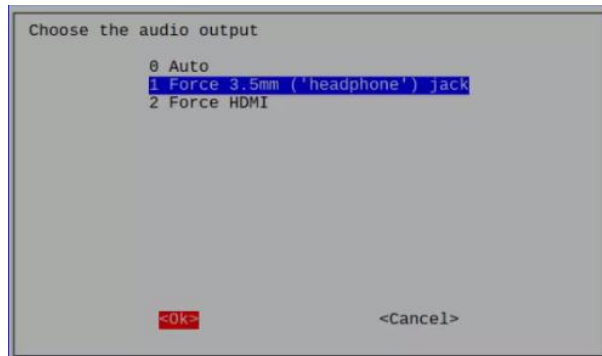


**I am using speakers with audio jack.**

## 1. Select Output device

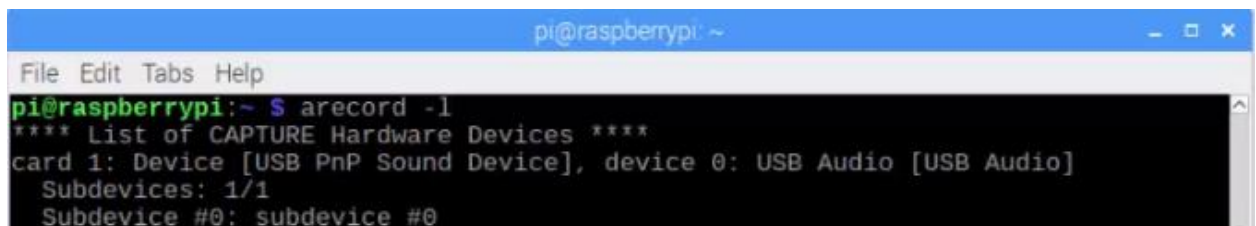


Advanced Options → Audio → Force 3.5 mm( 'headphone') jack



2. **Locate your USB microphone in the list of capture hardware devices.**  
(Write down the **card number** and **device number.**) (in my case its **1,0** respectively)

**\$ arecord -l**

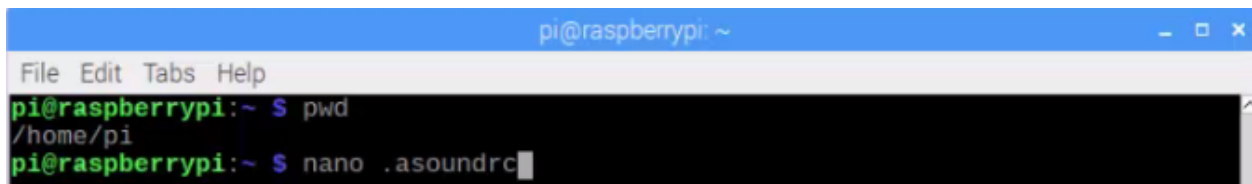


3. **Locate your speaker in the list of playback hardware devices.**  
(Write down the **card number** and **device number.**)  
**Note** that the **3.5mm-jack** is typically labeled **Analog** or **bcm2835 ALSA** (not bcm2835 IEC958/HDMI). (in my case its **0,0** respectively)

**\$ aplay -l**



#### 4. Create a new file named `.asoundrc` in the home directory (`/home/pi`)



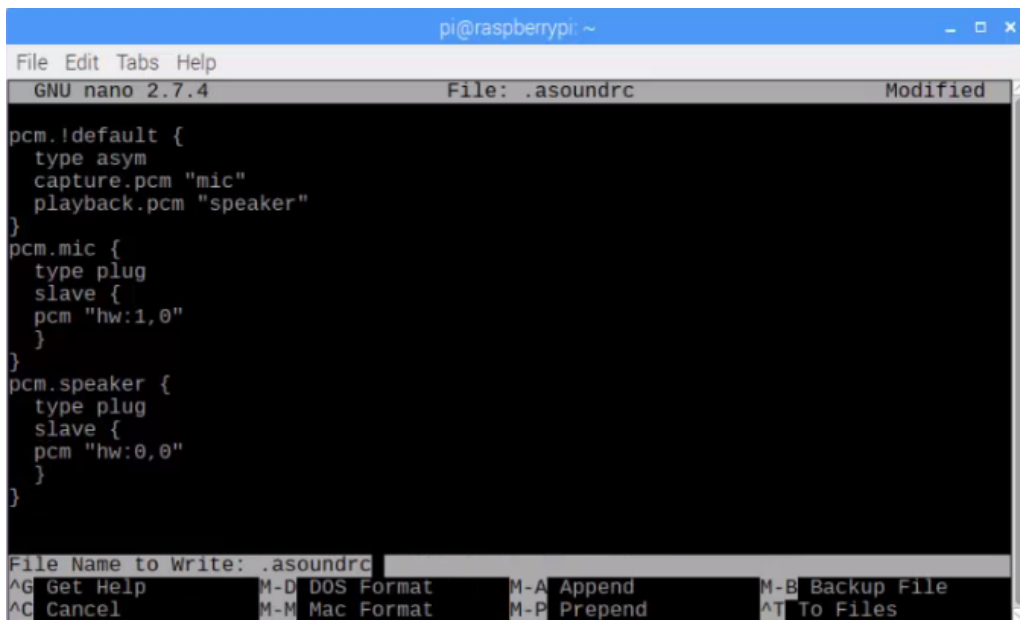
A terminal window titled 'pi@raspberrypi: ~' showing the command 'pwd' returning '/home/pi' and then 'nano .asoundrc' being executed to create a new file.

```
pi@raspberrypi:~ $ pwd
/home/pi
pi@raspberrypi:~ $ nano .asoundrc
```

Add following lines in it

```
pcm.!default {
    type asym
    capture.pcm "mic"
    playback.pcm "speaker"
}
pcm.mic {
    type plug
    slave {
        pcm "hw:<card number>,<device number>"
    }
}
pcm.speaker {
    type plug
    slave {
        pcm "hw:<card number>,<device number>"
    }
}
```

Replace `<card number>` and `<device number>` with the numbers you wrote down in the previous step. Do this for both `pcm.mic` and `pcm.speaker`.



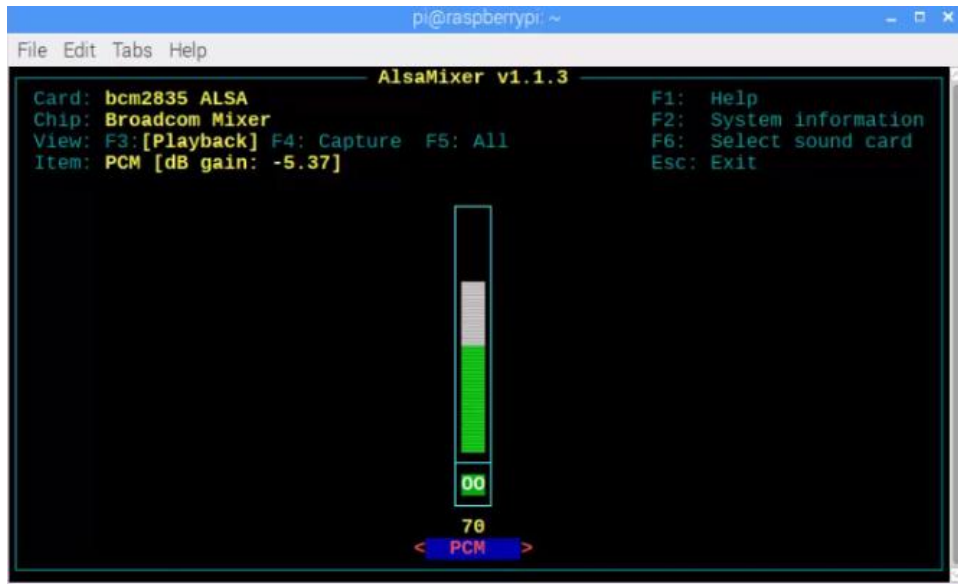
A terminal window showing the nano editor editing the file '.asoundrc'. The content of the file is the same as the previous code block, but with placeholders replaced by actual hardware IDs: 'hw:1,0' for mic and 'hw:0,0' for speaker. The bottom of the screen shows the nano status bar with file name and various shortcuts.

```
pi@raspberrypi: ~
File Edit Tabs Help
GNU nano 2.7.4 File: .asoundrc Modified
pcm.!default {
    type asym
    capture.pcm "mic"
    playback.pcm "speaker"
}
pcm.mic {
    type plug
    slave {
        pcm "hw:1,0"
    }
}
pcm.speaker {
    type plug
    slave {
        pcm "hw:0,0"
    }
}
File Name to Write: .asoundrc
^G Get Help M-D DOS Format M-A Append M-B Backup File
^C Cancel M-M Mac Format M-P Prepend ^T To Files
```

Save file with  
**Ctrl+O** and  
**Enter**

- Adjust the playback volume.  
Press the up arrow key to set the playback volume level to around 70.

**\$ alsamixer**



Press Esc to exit .

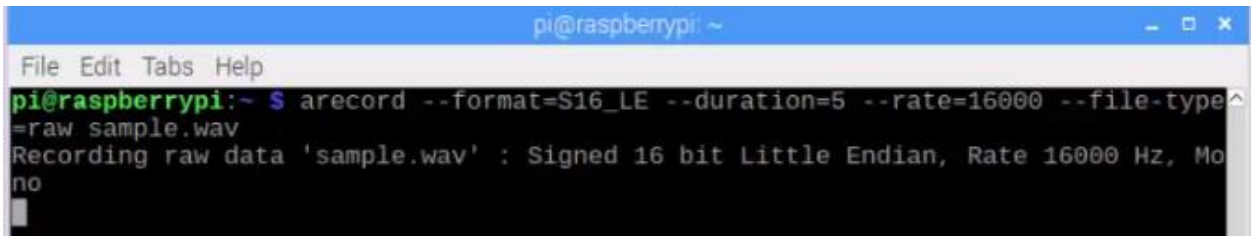
- Play a test sound (this will be a person speaking). Press Ctrl+C when done.  
If you don't hear anything when you run this, check your speaker connection.

**\$ speaker-test -t wav**

```
pi@raspberrypi:~ $ speaker-test -t wav
speaker-test 1.1.3
Playback device is default
Stream parameters are 48000Hz, S16_LE, 1 channels
WAV file(s)
Rate set to 48000Hz (requested 48000Hz)
Buffer size range from 512 to 65536
Period size range from 512 to 65536
Using max buffer size 65536
Periods = 4
was set period_size = 16384
was set buffer_size = 65536
 0 - Front Left
Time per period = 0.369303
 0 - Front Left
Time per period = 1.372140
 0 - Front Left
```

7. Record a short audio clip.

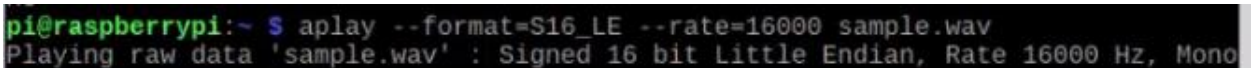
```
$ arecord --format=S16_LE --duration=5 --rate=16000 --file-type=raw sample.wav
```



```
pi@raspberrypi: ~  
File Edit Tabs Help  
pi@raspberrypi:~ $ arecord --format=S16_LE --duration=5 --rate=16000 --file-type=raw sample.wav  
Recording raw data 'sample.wav' : Signed 16 bit Little Endian, Rate 16000 Hz, Mono
```

8. Check the recording by replaying it

```
aplay --format=S16_LE --rate=16000 sample.wav
```



```
pi@raspberrypi:~ $ aplay --format=S16_LE --rate=16000 sample.wav  
Playing raw data 'sample.wav' : Signed 16 bit Little Endian, Rate 16000 Hz, Mono
```

**Note that...**

- If recording and playback are working, then you are done configuring audio.
- If not, check that the microphone and speaker are properly connected.
- If this is not the issue, then try a different microphone or speaker.

**That's all!!!**

**Thank you....**