



USB Audio Cards with a Raspberry Pi

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<https://learn.adafruit.com/usb-audio-cards-with-a-raspberry-pi>

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Instructions



The Raspberry Pi has an on-board audio jack, which is super handy for all kinds of sound effects and speech, just plug and go! However, for when you want better audio for music playback, a USB audio card can greatly improve the sound quality and volume, this tutorial will show you how.

This guide will also show you how to record audio via the headphone jack on the adapter

Pre-requisites

First up, you will need a fully set up Raspberry Pi that is otherwise working and you can log into. [We have tons of tutorials on that front \(https://adafru.it/ckb\)](https://adafru.it/ckb), so [get your SD card loaded with Raspbian \(https://adafru.it/aWq\)](https://adafru.it/aWq) (that's what we're using in this tutorial), and either [ssh \(https://adafru.it/aUB\)](https://adafru.it/aUB) in, log in with a monitor and keyboard, or [a USB console cable \(https://adafru.it/aUA\)](https://adafru.it/aUA)

Just a reminder, this tutorial is only known good for the USB audio card in the Adafruit shop. Audio cards all use different chipsets so if you have another card, it may not work here! You'll have to figure out what's different for your model.

Figure out your chipset

Figure out your chipset

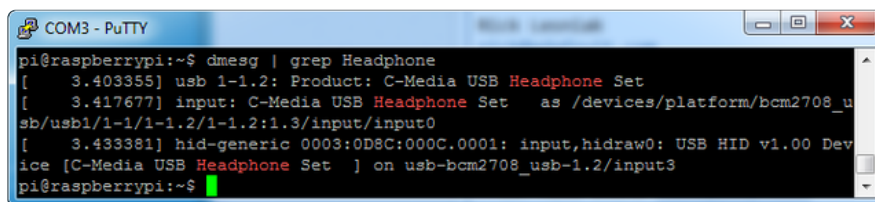
Start by having your Raspi **turned off/shutdown** (perform a clean shutdown!) and then plugging in your USB audio card. Then boot the Pi as normal.

Once you log in, type **dmesg | grep cm109** to look at the boot messages. You should either see some lines about **cm109** if you have a **CM109** chipset

(<https://adafru.it/dgh>)

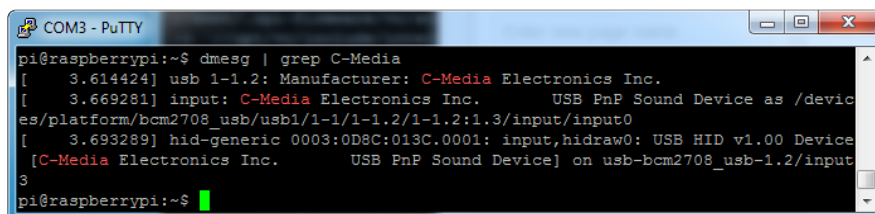
[raspberrypi_grepcm109.png](#) (<https://adafru.it/kD1>)

or if nothing comes up, try **dmesg | grep Headphone** you will see the **C-Media USB Headphone Set** driver. This means its a **CM-headphone**



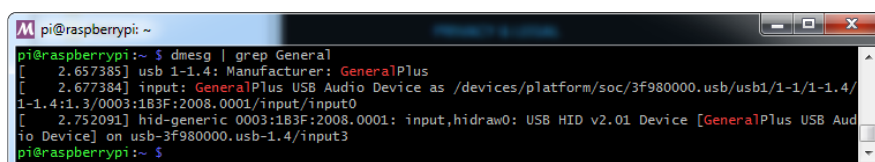
```
COM3 - PuTTY
pi@raspberrypi:~$ dmesg | grep Headphone
[ 3.403355] usb 1-1.2: Product: C-Media USB Headphone Set
[ 3.417677] input: C-Media USB Headphone Set as /devices/platform/bcm2708_
usb/usb1/1-1/1-1.2/1-1.2:1.3/input/input0
[ 3.433381] hid-generic 0003:0D8C:000C.0001: input,hidraw0: USB HID v1.00 Dev
ice [C-Media USB Headphone Set ] on usb-bcm2708_usb-1.2/input3
pi@raspberrypi:~$
```

or if nothing comes up, try **dmesg | grep C-Media** you will see some C-Media notes but no mention of the cm109 driver. This means its a **CM108 or PCM2902**



```
COM3 - PuTTY
pi@raspberrypi:~$ dmesg | grep C-Media
[ 3.614424] usb 1-1.2: Manufacturer: C-Media Electronics Inc.
[ 3.669281] input: C-Media Electronics Inc. USB PnP Sound Device as /devic
es/platform/bcm2708_usb/usb1/1-1/1-1.2/1-1.2:1.3/input/input0
[ 3.693289] hid-generic 0003:0D8C:013C.0001: input,hidraw0: USB HID v1.00 Device
[C-Media Electronics Inc. USB PnP Sound Device] on usb-bcm2708_usb-1.2/input
3
pi@raspberrypi:~$
```

or if nothing comes up, try **dmesg | grep General** you will see mention of GeneralPlus. This means it's a **GeneralPlus**

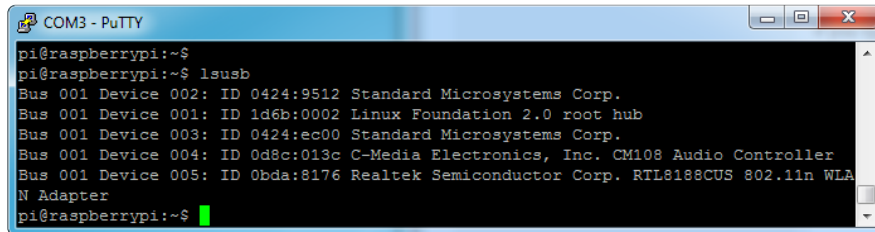


```
pi@raspberrypi: ~
pi@raspberrypi:~$ dmesg | grep General
[ 2.657385] usb 1-1.4: Manufacturer: GeneralPlus
[ 2.677384] input: GeneralPlus USB Audio Device as /devices/platform/soc/3f980000.usb/usb1/1-1/1-1.4/
1-1.4:1.3/0003:1B3F:2008.0001/input/input0
[ 2.752091] hid-generic 0003:1B3F:2008.0001: input,hidraw0: USB HID v2.01 Device [GeneralPlus USB Aud
io Device] on usb-3f980000.usb-1.4/input3
pi@raspberrypi:~$
```

CM108 Type

If you have CM108

If you type in `lsusb` you should see a reference to **C-Media Electronics, Inc. CM108 Audio Adapter** or **Texas Instruments PCM2902 Audio Codec**

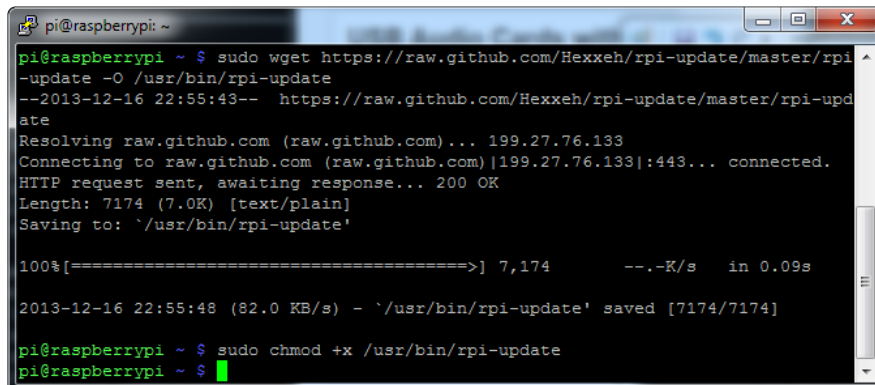
A terminal window titled 'COM3 - PuTTY' showing the output of the 'lsusb' command on a Raspberry Pi. The output lists several USB devices, including a C-Media Electronics, Inc. CM108 Audio Controller.

```
pi@raspberrypi:~$  
pi@raspberrypi:~$ lsusb  
Bus 001 Device 002: ID 0424:9512 Standard Microsystems Corp.  
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub  
Bus 001 Device 003: ID 0424:ec00 Standard Microsystems Corp.  
Bus 001 Device 004: ID 0d8c:013c C-Media Electronics, Inc. CM108 Audio Controller  
Bus 001 Device 005: ID 0bda:8176 Realtek Semiconductor Corp. RTL8188CUS 802.11n WLAN Adapter  
pi@raspberrypi:~$
```

We'll need to update the firmware, this requires Internet access but only takes 15 minutes or so. You might want to run `sudo apt-get update` first if you haven't lately. Then run the following commands in order:

```
sudo apt-get update  
sudo apt-get upgrade  
sudo reboot
```

You may see a lot of stuff happening like the below:

A terminal window showing the execution of 'sudo wget' to download a script from GitHub and 'sudo chmod' to make it executable.

```
pi@raspberrypi: ~  
pi@raspberrypi ~ $ sudo wget https://raw.githubusercontent.com/Hexxeh/rpi-update/master/rpi-update -O /usr/bin/rpi-update  
--2013-12-16 22:55:43-- https://raw.githubusercontent.com/Hexxeh/rpi-update/master/rpi-update  
Resolving raw.githubusercontent.com (raw.githubusercontent.com)... 199.27.76.133  
Connecting to raw.githubusercontent.com (raw.githubusercontent.com)|199.27.76.133|:443... connected.  
HTTP request sent, awaiting response... 200 OK  
Length: 7174 (7.0K) [text/plain]  
Saving to: '/usr/bin/rpi-update'  
  
100%[=====>] 7,174 --.-K/s in 0.09s  
  
2013-12-16 22:55:48 (82.0 KB/s) - '/usr/bin/rpi-update' saved [7174/7174]  
  
pi@raspberrypi ~ $ sudo chmod +x /usr/bin/rpi-update  
pi@raspberrypi ~ $
```

```
pi@raspberrypi: ~  
*** Raspberry Pi firmware updater by Hexxeh, enhanced by Andrews  
*** Performing self-update  
--2013-12-16 22:56:33-- https://github.com/Hexxeh/rpi-update/raw/master/rpi-upd  
ate  
Resolving github.com (github.com)... 192.30.252.130  
Connecting to github.com (github.com)|192.30.252.130|:443... connected.  
HTTP request sent, awaiting response... 302 Found  
Location: https://raw.githubusercontent.com/Hexxeh/rpi-update/master/rpi-update [following]  
--2013-12-16 22:56:38-- https://raw.githubusercontent.com/Hexxeh/rpi-update/master/rpi-upd  
ate  
Resolving raw.githubusercontent.com (raw.githubusercontent.com)... 199.27.75.133  
Connecting to raw.githubusercontent.com (raw.githubusercontent.com)|199.27.75.133|:443... connected.  
HTTP request sent, awaiting response... 200 OK  
Length: 7174 (7.0K) [text/plain]  
Saving to: '/usr/bin/rpi-update.tmp'  
  
100%[=====>] 7,174 --.-K/s in 0.03s  
  
2013-12-16 22:56:44 (234 KB/s) - '/usr/bin/rpi-update.tmp' saved [7174/7174]  
  
*** Relaunching after update  
*** Raspberry Pi firmware updater by Hexxeh, enhanced by Andrews  
*** ARM/GPU split is now defined in /boot/config.txt using the gpu_mem option!  
*** We're running for the first time  
*** Setting up firmware (this may take a few minutes)  
Cloning into '/root/.rpi-firmware'...  
remote: Counting objects: 3200, done.  
remote: Compressing objects: 100% (2674/2674), done.  
Receiving objects: 74% (2383/3200), 33.73 MiB | 46 KiB/s  
Receiving objects: 74% (2383/3200), 35.76 MiB | 78 KiB/s
```

```
pi@raspberrypi: ~  
s.h' -> '//opt/vc/include/interface/vmcs_host/vc_imageconv_defs.h'  
'/root/.rpi-firmware/vc/sdk/opt/vc/include/interface/vmcs_host/vc_vchi_filesys.  
h' -> '//opt/vc/include/interface/vmcs_host/vc_vchi_filesys.h'  
'/root/.rpi-firmware/vc/sdk/opt/vc/include/interface/vmcs_host/vc_hdmi_property  
.h' -> '//opt/vc/include/interface/vmcs_host/vc_hdmi_property.h'  
'/root/.rpi-firmware/vc/sdk/opt/vc/include/interface/vmcs_host/vcilcs_common.h'  
-> '//opt/vc/include/interface/vmcs_host/vcilcs_common.h'  
'/root/.rpi-firmware/vc/sdk/opt/vc/include/interface/vmcs_host/vc_vchi_fileserv  
ice_defs.h' -> '//opt/vc/include/interface/vmcs_host/vc_vchi_fileservice_defs.h'  
'/root/.rpi-firmware/vc/sdk/opt/vc/include/interface/vmcs_host/vc_gencmd_defs.h'  
' -> '//opt/vc/include/interface/vmcs_host/vc_gencmd_defs.h'  
'/root/.rpi-firmware/vc/sdk/opt/vc/include/interface/vmcs_host/vc_vchi_bufman.h'  
' -> '//opt/vc/include/interface/vmcs_host/vc_vchi_bufman.h'  
'/root/.rpi-firmware/vc/sdk/opt/vc/include/interface/vmcs_host/vc_dispmanx_type  
s.h' -> '//opt/vc/include/interface/vmcs_host/vc_dispmanx_types.h'  
'/root/.rpi-firmware/vc/sdk/opt/vc/include/interface/vmcs_host/vc_dispservice_x  
_defs.h' -> '//opt/vc/include/interface/vmcs_host/vc_dispservice_x_defs.h'  
'/root/.rpi-firmware/vc/sdk/opt/vc/include/interface/vmcs_host/vc_cecservice.h'  
-> '//opt/vc/include/interface/vmcs_host/vc_cecservice.h'  
'/root/.rpi-firmware/vc/sdk/opt/vc/include/interface/vmcs_host/vc_dispmanx.h' -  
> '//opt/vc/include/interface/vmcs_host/vc_dispmanx.h'  
'/root/.rpi-firmware/vc/sdk/opt/vc/include/interface/vmcs_host/vc_vchi_bufman_d  
efs.h' -> '//opt/vc/include/interface/vmcs_host/vc_vchi_bufman_defs.h'  
*** Running ldconfig  
*** Storing current firmware revision  
*** Syncing changes to disk  
*** If no errors appeared, your firmware was successfully setup  
*** A reboot is needed to activate the new firmware  
pi@raspberrypi ~ $  
pi@raspberrypi ~ $
```

Now you can go down to the [update alsa module options \(https://adafru.it/xEo\)](https://adafru.it/xEo) section

CM-Headphone Type

Type `dmesg` to look at the boot messages. You should see a bunch of lines that talk about **C-Media USB Headphone Set**


```
[ 2.993089] usb 1-1.1: New USB device found, idVendor=0424, idProduct=ec00
[ 3.002111] usb 1-1.1: New USB device strings: Mfr=0, Product=0, SerialNumber=0
[ 3.014482] smsc95xx v1.0.4
[ 3.077293] smsc95xx 1-1.1:1.0: eth0: register 'smc95xx' at usb-bcm2708_usb-1.1, smsc95xx USB 2.0 Ethernet, b8:27:eb:2f:00:de
[ 3.202748] usb 1-1.2: new full-speed USB device number 4 using dwc_otg
[ 3.314093] usb 1-1.2: New USB device found, idVendor=0d8c, idProduct=000c
[ 3.323324] usb 1-1.2: New USB device strings: Mfr=0, Product=1, SerialNumber=0
[ 3.332805] usb 1-1.2: Product: C-Media USB Headphone Set
[ 3.349470] input: C-Media USB Headphone Set as /devices/platform/bcm2708_usb/usb1/1-1/1-1.2/1-1.2:1.3/input/input0
[ 3.364944] hid-generic 0003:0D8C:000C.0001: input,hidraw0: USB HID v1.00 Device [C-Media USB Headphone Set] on usb-bcm2708_usb-1.2/input3
[ 4.010505] udevd[154]: starting version 175
[ 5.153447] Registered led device: led0
[ 6.853675] usbcore: registered new interface driver snd-usb-audio
[ 9.557858] EXT4-fs (mmcblk0p2): re-mounted. Opts: (null)
[ 10.058643] EXT4-fs (mmcblk0p2): re-mounted. Opts: (null)
[ 21.695373] Adding 102396k swap on /var/swap. Priority:-1 extents:2 across:507900k SS
[ 717.088373] smsc95xx 1-1.1:1.0: eth0: link up, 100Mbps, full-duplex, lpa 0xC5E1
[ 973.008887] smsc95xx 1-1.1:1.0: eth0: link down
pi@raspberrypi:~$
```

And if you type in `lsusb` you should see a reference to **C-Media Electronics Audio Adapter** but no mention of **CM108** and the VID/PID is 0x0d8c:0x00c

```
pi@raspberrypi:~$ lsusb
Bus 001 Device 002: ID 0424:9512 Standard Microsystems Corp.
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 001 Device 003: ID 0424:ec00 Standard Microsystems Corp.
Bus 001 Device 004: ID 0d8c:000c C-Media Electronics, Inc. Audio Adapter
pi@raspberrypi:~$
```

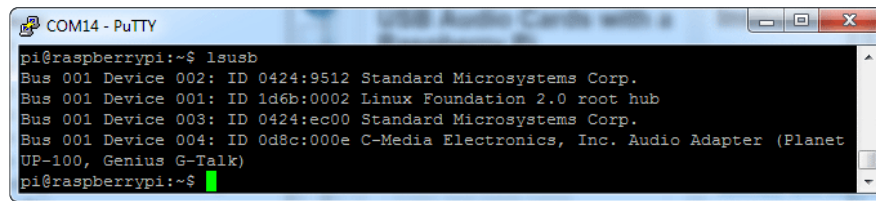
Nothing special needs to be done! Hurray! Continue on to the **Updating ALSA Config** section

CM109 Type

Type `dmesg` to look at the boot messages. You should see a bunch of lines that talk about **cm109**

```
[ 3.093287] usb 1-1.1: New USB device found, idVendor=0424, idProduct=ec00
[ 3.110532] usb 1-1.1: New USB device strings: Mfr=0, Product=0, SerialNumber=0
[ 3.124959] smsc95xx v1.0.4
[ 3.197339] smsc95xx 1-1.1:1.0: eth0: register 'smc95xx' at usb-bcm2708_usb-1.1, smsc95xx USB 2.0 Ethernet, b8:27:eb:2f:80:de
[ 3.312807] usb 1-1.3: new full-speed USB device number 4 using dwc_otg
[ 3.433998] usb 1-1.3: New USB device found, idVendor=0d8c, idProduct=000e
[ 3.446497] usb 1-1.3: New USB device strings: Mfr=0, Product=1, SerialNumber=0
[ 3.457478] usb 1-1.3: Product: Generic USB Audio Device
[ 4.012806] udevd[154]: starting version 175
[ 5.223877] Registered led device: led0
[ 5.336888] cm109: Keymap for Komunikate KIP1000 phone loaded
[ 5.526225] input: CM109 USB driver as /devices/platform/bcm2708_usb/usb1/1-1/1-1.3/1-1.3:1.3/input/input0
[ 5.943698] usbcore: registered new interface driver cm109
[ 6.157830] cm109: CM109 phone driver: 20080805 (C) Alfred E. Heggstad
[ 6.812515] usbcore: registered new interface driver snd-usb-audio
[ 9.397960] EXT4-fs (mmcblk0p2): re-mounted. Opts: (null)
[ 9.864203] EXT4-fs (mmcblk0p2): re-mounted. Opts: (null)
[ 24.877659] Adding 102396k swap on /var/swap. Priority:-1 extents:2 across:507900k SS
pi@raspberrypi:~$
```

And if you type in `lsusb` you should see a reference to **C-Media Electronics Audio Adapter** but no mention of **CM108**



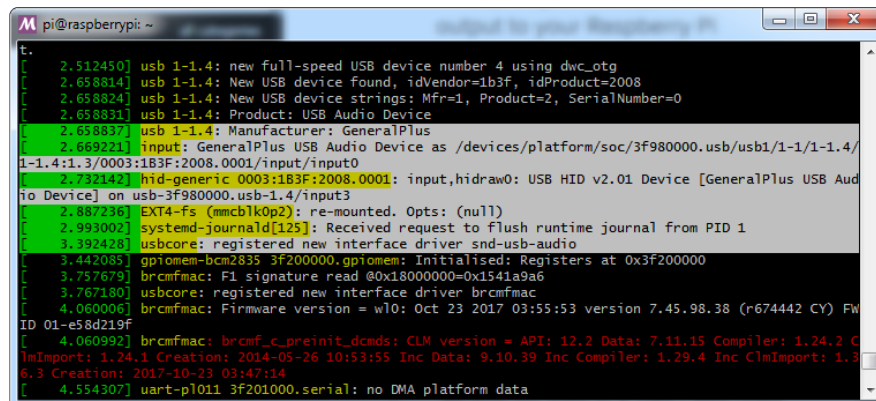
```
pi@raspberrypi:~$ lsusb
Bus 001 Device 002: ID 0424:9512 Standard Microsystems Corp.
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 001 Device 003: ID 0424:ec00 Standard Microsystems Corp.
Bus 001 Device 004: ID 0d8c:000e C-Media Electronics, Inc. Audio Adapter (Planet
UP-100, Genius G-Talk)
pi@raspberrypi:~$
```

(<https://adafru.it/dgj>)

Nothing special needs to be done! Hurray! Continue on to the next section

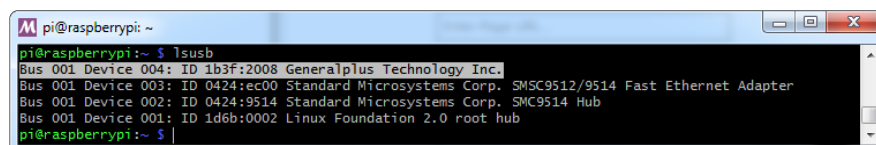
GeneralPlus

Type `dmesg` to look at the boot messages. You should see a bunch of lines that talk about **GeneralPlus**



```
pi@raspberrypi: ~
t. 2.512450] usb 1-1.4: new full-speed USB device number 4 using dwc_otg
2.658814] usb 1-1.4: New USB device found, idVendor=1b3f, idProduct=2008
2.658824] usb 1-1.4: New USB device strings: Mfr=1, Product=2, SerialNumber=0
2.658831] usb 1-1.4: Product: USB Audio Device
2.658837] usb 1-1.4: Manufacturer: GeneralPlus
2.669221] input: GeneralPlus USB Audio Device as /devices/platform/soc/3f980000.usb/usb1/1-1.4/
1-1.4:1.3/0003:1B3F:2008.0001/input/input0
2.732142] hid-generic 0003:1B3F:2008.0001: input,hidraw0: USB HID v2.01 Device [GeneralPlus USB Aud
io Device] on usb-3f980000.usb-1.4/input3
2.887236] EXT4-fs (mmcblk0p2): re-mounted. Opts: (null)
2.993002] systemd-journald[125]: Received request to flush runtime journal from PID 1
3.392428] usbcore: registered new interface driver snd-usb-audio
3.442085] gpiomem-bcm2835 3f200000.gpiomem: Initialised: Registers at 0x3f200000
3.757679] brcmfmac: F1 signature read @0x18000000=0x1541a9a6
3.767180] usbcore: registered new interface driver brcmfmac
4.060006] brcmfmac: Firmware version = w10: Oct 23 2017 03:55:53 version 7.45.98.38 (r674442 CY) FW
ID 01-e58d219f
4.060992] brcmfmac: brcmf_c_preinit_dcnds: CLM version = API: 12.2 Data: 7.11.15 Compiler: 1.24.2 C
lmImport: 1.24.1 Creation: 2014-05-26 10:53:55 Inc Data: 9.10.39 Inc Compiler: 1.29.4 Inc ClmImport: 1.3
6.3 Creation: 2017-10-23 03:47:14
4.554307] uart-pl101 3f201000.serial: no DMA platform data
```

And if you type in `lsusb` you should see a reference to **Generalplus Technology** with ID **1b3f:2008**



```
pi@raspberrypi:~$ lsusb
Bus 001 Device 004: ID 1b3f:2008 Generalplus Technology Inc.
Bus 001 Device 003: ID 0424:ec00 Standard Microsystems Corp. SMC9512/9514 Fast Ethernet Adapter
Bus 001 Device 002: ID 0424:9514 Standard Microsystems Corp. SMC9514 Hub
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
pi@raspberrypi:~$
```

Nothing special needs to be done! Hurray! Continue on to the next section

Updating ALSA Config

Raspbian Bullseye - Updating alsa options

First make sure you can see the alsa card for the USB audio device with


```
cat /proc/asound/cards
```

And look for something that says "USB Audio" or similar

Depending on whether you are running a Pi 4 or other, it may be device 1, 2 or 3.

```
root@devpi:/home/pi# cat /proc/asound/cards
0 [Headphones ]: bcm2835_headpho - bcm2835 Headphones
                  bcm2835 Headphones
1 [vc4hdmi0   ]: vc4-hdmi - vc4-hdmi-0
                  vc4-hdmi-0
2 [vc4hdmi1   ]: vc4-hdmi - vc4-hdmi-1
                  vc4-hdmi-1
3 [Device     ]: USB-Audio - USB PnP Sound Device
                  C-Media Electronics Inc. USB PnP Sound Device at usb-0000:01:00.0-1.1, full spe
root@devpi:/home/pi#
```

we used to recommend manually setting the device number to be your USB audio card but that turned out to be fragile because the HDMI audio device numbers would change.

So now we suggest just disabling the built in headphone jack audio, and letting the USB audio card be 'first'

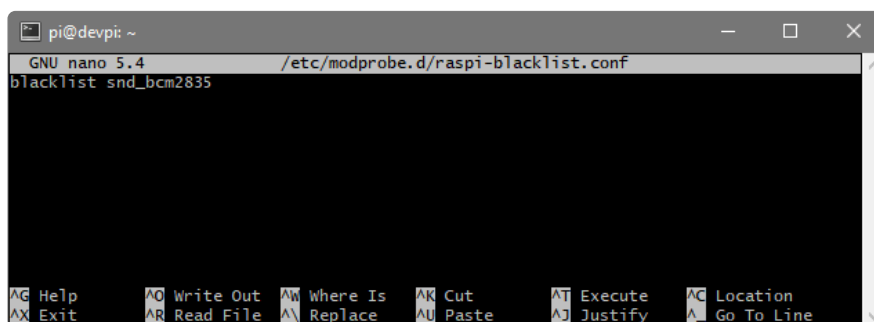
Start by disabling the built-in headphone jack with

```
sudo nano /etc/modprobe.d/raspi-blacklist.conf
```

and typing in

```
blacklist snd_bcm2835
```

hit return, then save with **Control-X** then **Y** then **Return** (to save)



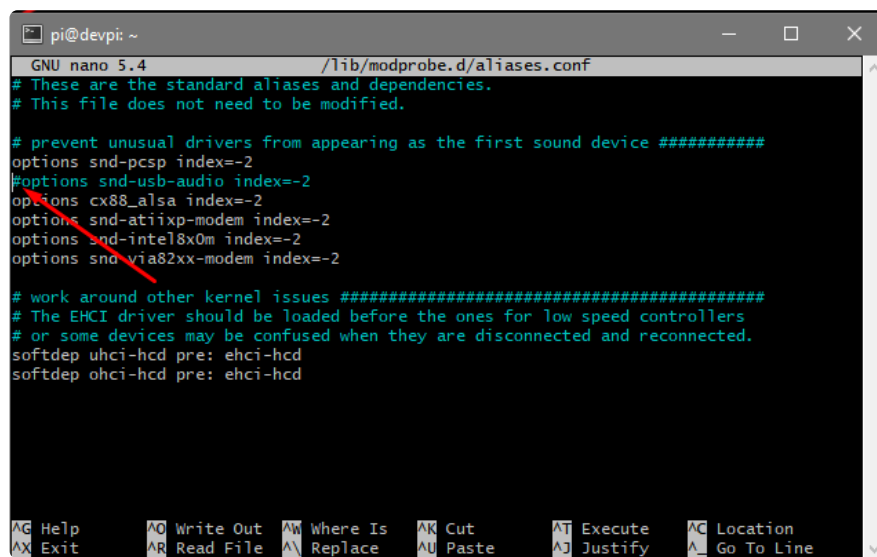
Then enable the USB audio card with

```
sudo nano /lib/modprobe.d/aliases.conf
```

find the line with

```
options snd-usb-audio index=-2
```

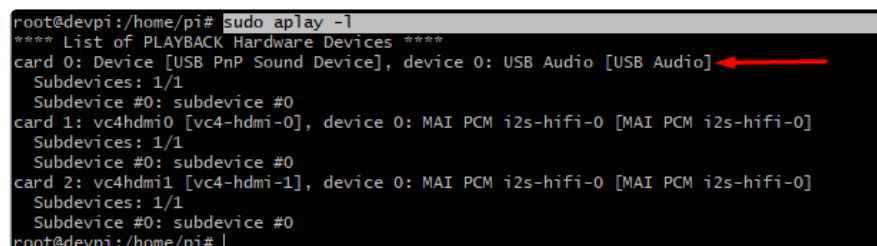
and put a # in the beginning of that line. Then exit and save file.



```
pi@devpi: ~  
GNU nano 5.4 /lib/modprobe.d/aliases.conf  
# These are the standard aliases and dependencies.  
# This file does not need to be modified.  
  
# prevent unusual drivers from appearing as the first sound device #####  
options snd-pcsp index=-2  
#options snd-usb-audio index=-2  
options cx88_alsa index=-2  
options snd-atiixp-modem index=-2  
options snd-intel8x0m index=-2  
options snd-via82xx-modem index=-2  
  
# work around other kernel issues #####  
# The EHCI driver should be loaded before the ones for low speed controllers  
# or some devices may be confused when they are disconnected and reconnected.  
softdep uhci-hcd pre: ehci-hcd  
softdep ohci-hcd pre: ehci-hcd  
  
AG Help      AO Write Out  AW Where Is  AR Cut       AT Execute   AG Location  
AX Exit      AR Read File  AA Replace   AU Paste     AJ Justify   AL Go To Line
```

Then `sudo reboot` to 'set' the changes

Upon reboot, if you run `sudo aplay -l` to list the interface, the USB audio card will be first and the default!



```
root@devpi:/home/pi# sudo aplay -l  
**** List of PLAYBACK Hardware Devices ****  
card 0: Device [USB PnP Sound Device], device 0: USB Audio [USB Audio] ←  
  Subdevices: 1/1  
  Subdevice #0: subdevice #0  
card 1: vc4hdmi0 [vc4-hdmi-0], device 0: MAI PCM i2s-hifi-0 [MAI PCM i2s-hifi-0]  
  Subdevices: 1/1  
  Subdevice #0: subdevice #0  
card 2: vc4hdmi1 [vc4-hdmi-1], device 0: MAI PCM i2s-hifi-0 [MAI PCM i2s-hifi-0]  
  Subdevices: 1/1  
  Subdevice #0: subdevice #0  
root@devpi:/home/pi#
```

Testing Audio

Testing!

OK now that you've configured ALSA depending on your OS...that's it! Now reboot with `sudo reboot` and log in again, you can test with `speaker-test` by running

```
speaker-test -c2
```

Which will play white noise through the left and right 'speakers' on the audio card. Once you've got something coming out, try to play an audio file with `speaker-test` (for WAV files, not MP3)

```
speaker-test -c2 --test=wav -w /usr/share/sounds/alsa/
Front_Center.wav
```

If you want to play a stream of music, you can try

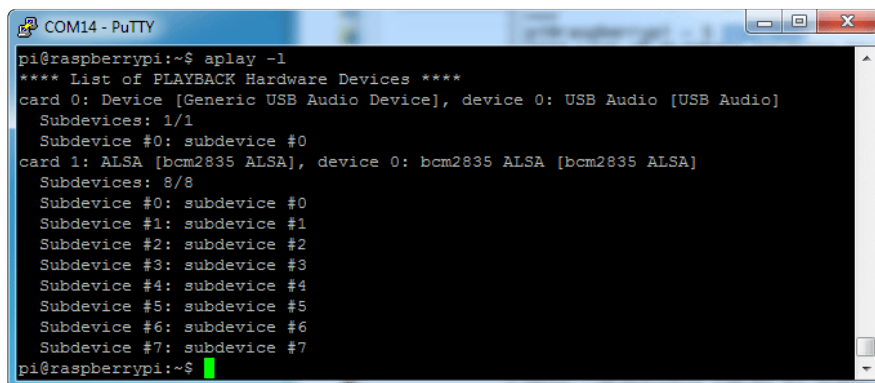
```
sudo apt-get install mpg123
mpg123 http://ice1.somafm.com/u80s-128-mp3 (https://adafru.it/d26)
```

If you want to play MP3's on command, check out this tutorial which covers how to set that up (<https://adafru.it/aTD>)

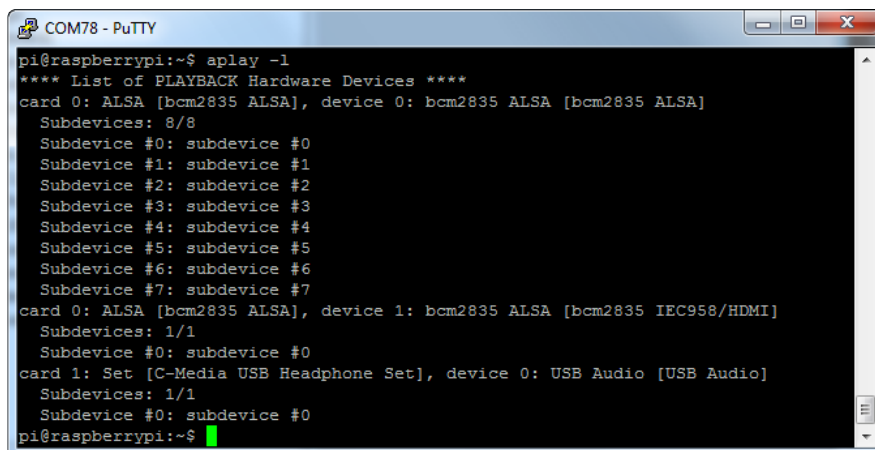
Headphone vs Audio card

Don't forget, you still have the built in headphone jack on the Pi, if you edited `alsa.conf` it might be called **card 1** now (not the default **card 0**)

You can run `aplay -l` to list the devices



```
pi@raspberrypi:~$ aplay -l
**** List of PLAYBACK Hardware Devices ****
card 0: Device [Generic USB Audio Device], device 0: USB Audio [USB Audio]
  Subdevices: 1/1
  Subdevice #0: subdevice #0
card 1: ALSA [bcm2835 ALSA], device 0: bcm2835 ALSA [bcm2835 ALSA]
  Subdevices: 8/8
  Subdevice #0: subdevice #0
  Subdevice #1: subdevice #1
  Subdevice #2: subdevice #2
  Subdevice #3: subdevice #3
  Subdevice #4: subdevice #4
  Subdevice #5: subdevice #5
  Subdevice #6: subdevice #6
  Subdevice #7: subdevice #7
pi@raspberrypi:~$
```



```
pi@raspberrypi:~$ aplay -l
**** List of PLAYBACK Hardware Devices ****
card 0: ALSA [bcm2835 ALSA], device 0: bcm2835 ALSA [bcm2835 ALSA]
  Subdevices: 8/8
  Subdevice #0: subdevice #0
  Subdevice #1: subdevice #1
  Subdevice #2: subdevice #2
  Subdevice #3: subdevice #3
  Subdevice #4: subdevice #4
  Subdevice #5: subdevice #5
  Subdevice #6: subdevice #6
  Subdevice #7: subdevice #7
card 1: Set [C-Media USB Headphone Set], device 0: USB Audio [USB Audio]
  Subdevices: 1/1
  Subdevice #0: subdevice #0
pi@raspberrypi:~$
```

If you want to `aplay` through a specific card, specify **card 1** with `-D plughw:1,0` or card 0 `-D plughw:0,0` etc

```
speaker-test -c2 -D plughw:1,0
```

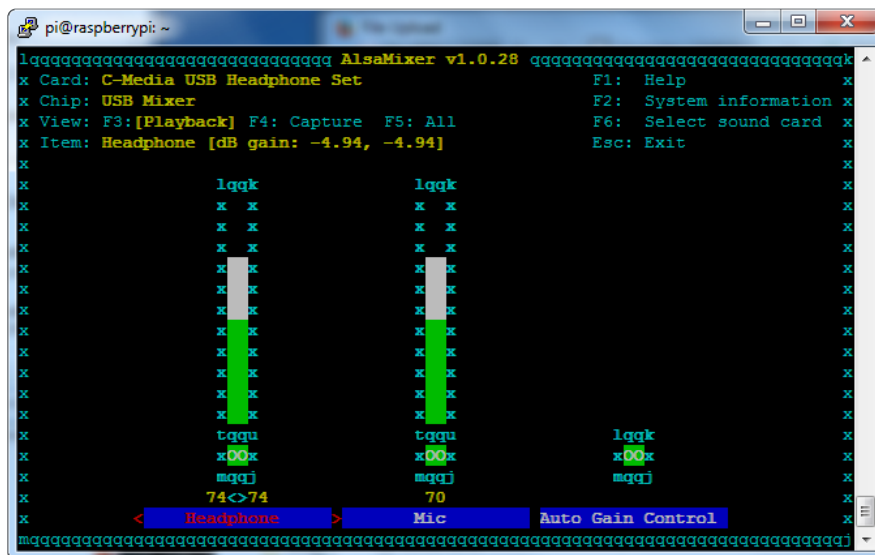
```
aplay --device=hw:1,0 test.wav
```

Setting Audio Levels

You can set audio levels for both output and input with

```
alsamixer -c 1
```

Use the arrow keys and return/escape to set and save the settings. It's a sorta-cute text-graphics system



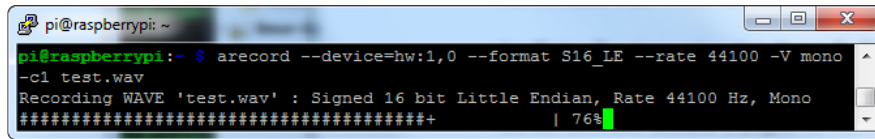
Recording Audio

At least with the CM-Headphone type adapter, you can also record audio.

```
arecord --device=hw:1,0 --format S16_LE --rate 44100 -c1 test.wav
```

Will record signed 16-bit (`S16_LE`) audio at 44100 Hz (`--rate 44100`) mono (`-c1`) audio to `test.wav`. We've noted that any audio input will be echoed out the speakers as well

You can have a little VU meter show up if you add to the `-V mono` command line. Press control-C to quit

A terminal window on a Raspberry Pi. The prompt is 'pi@raspberrypi: ~'. The command entered is 'arecord --device=hw:1,0 --format S16_LE --rate 44100 -V mono -c1 test.wav'. The output shows 'Recording WAVE 'test.wav' : Signed 16 bit Little Endian, Rate 44100 Hz, Mono' and a progress bar at 76%.

Once you're done recording you can play back with

```
aplay --device=plughw:1,0 test.wav
```

Troubleshooting!

If you're using a Raspberry Pi and notice the output isn't totally clean, some USB Audio adapters don't like USB-1.2 and produce crackling in the output. You can work around the problem by adding `dwc_otg.speed=1` to `/boot/cmdline.txt` and setting the USB ports to USB-1.1 mode.

You can get user access to the audio hardware with other devices by granting access using `sudo usermod -a -G audio username`