pi zero audio project

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The goal is to use USB class-compliant soundcards as the pi zero has no audio ouputs.

Preparing the SD card for USB OTG

- Download the newest version of raspbian (stretch desktop in my case)
- Flash the image onto your SD card. I've done this from my linux machine using this guide
- Locate the boot folder on your SD card using the following command:

```
df -h
```

The folder we're looking for was called /**media**/**ward**/**boot** in my case.

```
cd /media/ward/boot
```

- Open the **confix.txt** file and add the following at the bottom of the file:

```
dtoverlay=dwc2
```

- Now create a file called **ssh**

```
touch ssh
```

- Now edit the cmdline.txt file and add the following inbetween **rootwait** and **quiet**

```
modules-load=dwc2,g_ether
```

Make sure that there are no unnecessary spaces or other characters.

Connecting over ssh

- Now put the SD card into your pi and connect the pi to your pc using USB.
  - Be sure to connect it to the micro USB port marked as USB, the other USB port only transmits power.
  - Linux only: I had to change IPv4 addresses mode to Link-Local only in order for it to show up as ethernet connection. You might be able to skip this step. See this article for more info
- Connect over SSH:

```
ssh pi@raspberrypi.local
```

- Enter the default password:

```
raspberry
```

Setting the usb soundcard as default device

Based on this article

- We assume the sound card is device #1
- We will have to edit some files. Let's open the first file with the built-in text editor (nano)

```
sudo nano /usr/share/alsa/alsa.conf
```

- Save and exit nano using the following keyboard sequence:

```
ctrl + x
y
enter
```

- Replace 0 with 1 in the following lines:

```
defaults.ctl.card 0
defaults.pcm.card 0
```

- Save and exit nano

- Now we need to create a file called .asoundrc and tell it to use device #1

```
sudo nano ~/.asoundrc
```

- Add the following lines:

```
pcm.!default {
    type hw
    card 1
}
ctl.!default {
    type hw
    card 1
}
```

- When you reboot the pi with a sound card connected, it should default to using that card.

Testing audio

- As test we can play some audio using ALSA's *speaker-test* utility. We will play a sinewave at 440hz over 2 channels.

```
speaker-test -c 2 -t sine -f 440
```

- Because I do not have a USB hub and thus I can't connect both my pc and the soundcard, I will let the pi execute this command on boot. Because *rc.local* is executed as root, we will have to include the complete path.
- Therefore put the following in */etc/rc.local*

```
/usr/bin/speaker-test -c 2 -t sine -f 440
```