Problem: redbull not headbanging
Motor working but can't get music and BPM to work

Solution: Use teensy with premade libraries, get signal or FFT and send to arduino to move.

Plan:

    A. Teemsy Audio Example working
        a. ~~Solder Teensy~~
        b. ~~Get hardware test~~
        c. Choose good example relevant to project
        d. Test
    B. Teensy Audio Low pass working
        a. Apply Low pass code
        b. Check if low pass can eliminate most signal and leave only bass
        c. If doesn't work rethink different hack
    C. Correlate between signal of Teensy and actual bull head motor movement working

PLAN B:
If Audio Jack doesn;t work, we can load music using SD card… easily

Log:
    1) Teensy blink test checked
    2) Solder done
    3) Teensy Audio tutorial
        a) Hardware check
            i) Examples>Audio>Tutorials> 02HDW chek
                (1) Hardware connection for audio works!
                (2) Hardware pins work
   b) Choosing good project to apply

Applying FFt, with 43hz chunks, we get the bass on 4-7, with sometimes strong on 3…

Usully, value 1 is 12 dB in setup

Two solutions, either peak or FFT, with FFT just add the numbers for hte first whatever colums and take that really

The two final folders, TeensyBeatDetect one from Github
BASS_SNARE detect file I had

Use Akapeko Comp for Servo reference
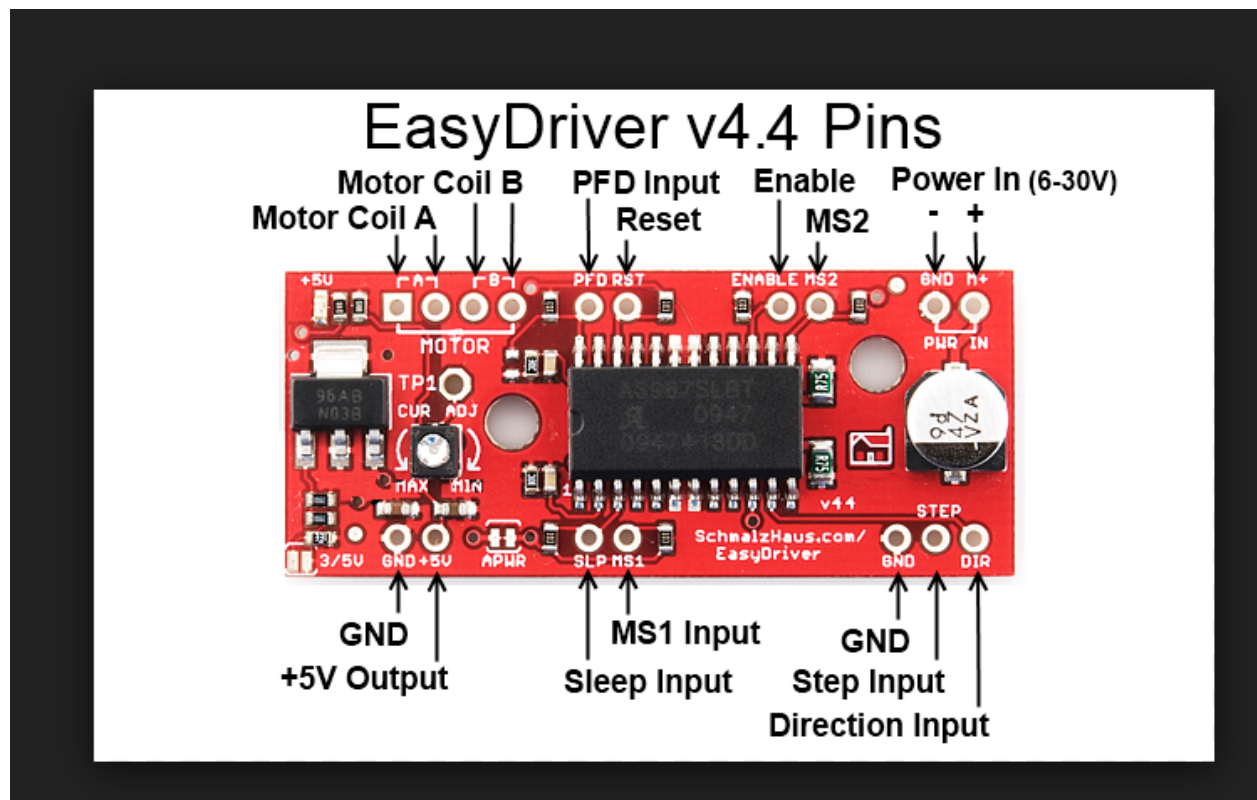
Test:

On biQuad, highPass:

```
 biquad1.setHighpass(0,1500,0.54);
 //biquad1.setNotch(0,1300,0.054); //good at 1300
 //biquad1.setHighpass(1,1500,0.54);
 biquad1.setHighShelf(1, 2000,10,0.05);//this detects bass as a signal, otherwise zero
```

American idiot,
Official: 186 BPM
Median: 186.34
Mode: 186

The Greatest:

Official: 191
Median, Mode, and all: shit 134

What we came for,
Official: 124
Mode: 124.7
Others are messed up

BYOB:
Official 101
Mode is 202.7, exactyl double official
makes sense cus it may be counting the fillings while the beat is 101 bpm.. Need to learn when to split in half

Numb:
Official: 110
Mode: 146
Avg: 164
Med: 156

Paradise city:
Official: 100
Mode: 95/182
Avg: 145
Med: 147

The kill:
Official:183
Mode: 182
Avg:158
Med:154

Mr. Brightside
Official: 148
Mode: 147
Avg: 190
Median:179

Feel Good Inc:
Official:139
Mode: 138.89
Avg: 170
Med: 148

```
//Eqy=ualizer?
  sgtl5000_1.audioPreProcessorEnable();
  //sgtl5000_1.eqBands(0.5,0.5);
  //sgtl5000_1.eqBand(4,-1);

  sgtl5000_1.eqBands(0,-1,-1,0,0);


//option 5 notch the middle

  //biquad1.setHighpass(0,3500,0.054);
  //biquad1.setNotch(0,1300,0.054); //good at 1300
  //biquad1.setHighpass(1,1500,0.54);
  //biquad1.setHighShelf(1, 2000,10,0.05);//this detects bass as a signal, otherwise zero
  //biquad1.setNotch(0,1300,0.054); //good at 1300

//option 3 bass response... doesn't pick up any snare, and picks up so much bassy noise
sometimes but still most accurate

  biquad1.setLowpass(0, 200, 0.5);
  //biquad1.setHighpass(1, 100, 0.54);
  //biquad1.setLowShelf(1, 100, 10,0.3);//this detects bass as a signal, otherwise zero

  Serial.begin(9600);
  // turn on onboard led to signal successful completion of setup //
  digitalWrite(13, HIGH);
```

It seems like a good chunk of the beginning of the song is a good place to determine the tempo, after which perhaps implementing something that eliminates "always high signal" or just cluster high mess would give us better results… call it a RUNON: either a drumbreak, a singer screaming, or a chorus "fara7" style.., basically if the distance between beats suddently decreased (almost doubled), stop listening until the distance between the beats goes back to the last known one (the bigger number)

American idiot
Official: 186 BPM
Mode: 186 first qrtr /
Avg 160 frst qrtr / 142
Median 182 frst qrtr / 126

The score went down cus in the middle all music went down and he sang, then music came back again.. In these situations the code should know it's a break, or song end..

So A) Runon, when the peak keeps on going and there isn't really a peak all is going to max kind of (chorus); singer screaming, drummer breaking, guitars going all together, a fest of instruments, and of course (fara7), what happens also is that the numebr, the BPM calculation kind of doubles, and that would also be another sign in the if condition that detects it…

B) AwkSilnc: whenever there is silence, the app should stop recording, or listening and pause until another break happens by which it restarts looking at claculations and what not. This way you don't screw over average and what not by a break in th emidd.e also yo need to separate songs in the future.

The Greatest:
Official: 191
Mode:127/ 127
Avg: 170/ 151
Median: 150/ 129

That rapper part threw the other two number off

What we came for,
Official: 124
Mode: 123.71 / 123.71
Avg: 175/ 162
Median : 163/ 155
Tracking beat stopped in the middle cus of the bridge

BYOB:
Official 101
Mode: 151
Avg 164/ 141
Median 156/ 130

Numb:
Official: 110
Mode: 146
Avg: 155
Med:146

Paradise city:
Official: 100
Mode: 49

Avg: 101
Med: 71

The kill:
Official:183
Mode: 182.93
Avg:122.85
Med:121.70

Mr. Brightside
Official: 148
Mode: 144.6
Avg: 137.07
Median:144.58

Feel Good Inc:
Official:139
Mode: 93.31
Avg: 152
Med: 140

After a long break, but before that they were way off

Shape of you:
Official: 96
Mode:48
Avg: 122
median:117