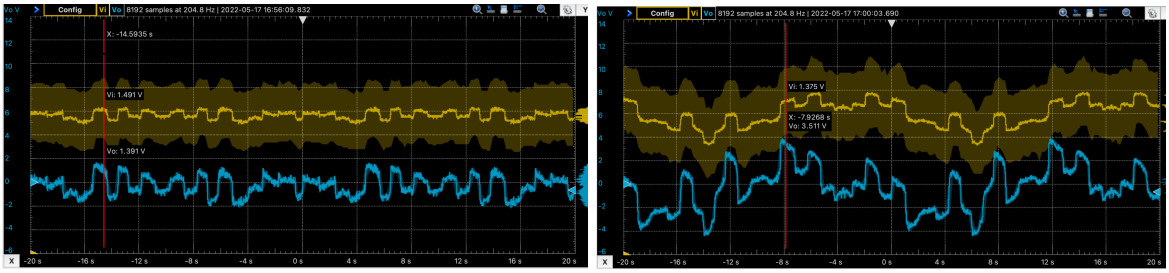
May 17, 2022

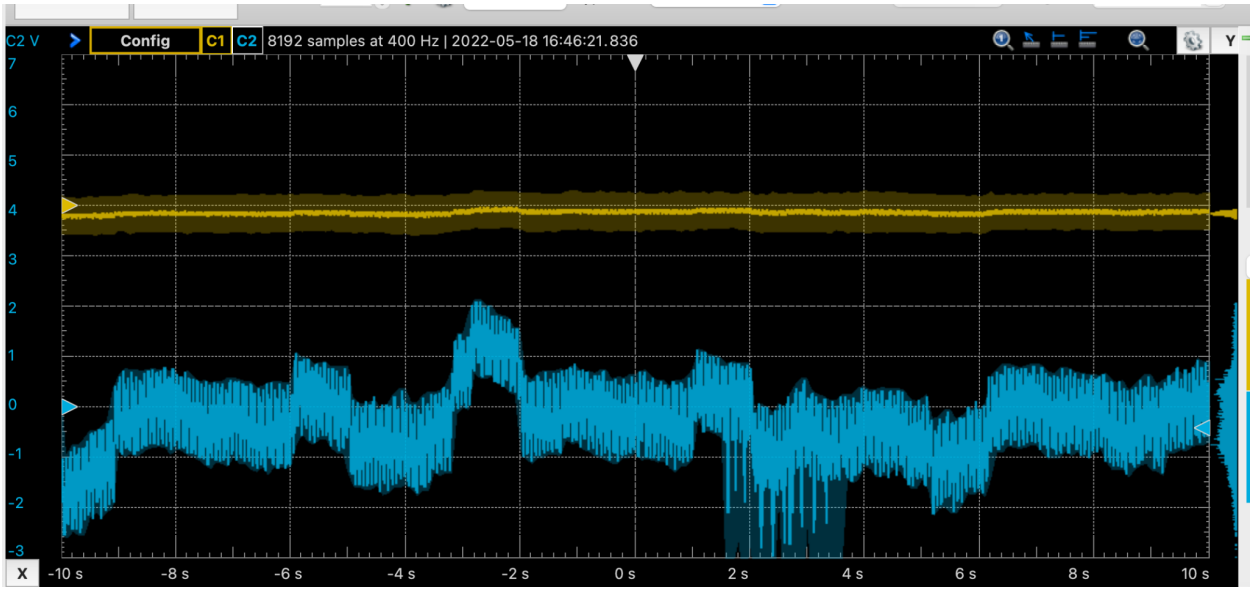
Tested the circuit with the dataset signal 1 and 2. Refer to “Validation_sig1.mp4” and “Validation_sig2.mp4”. I have also added a real-time showing of gaze angle in matlab script “PlotData.m”. It performs 10s countdown, and starts playing the gaze angle.

Results:
The LEDs do correspond to the change of the changing of gaze angle. However, the threshold doesn’t seem to be consistent in a set value. The positive side also shines less frequent and with less intensity than the negative one. It seems that the drift may not have been fully removed. As shown in figures in “FiltAmp” May 17th, the baseline of signal 1 is raised, so the peaks have lower magnitude in the positive side, while signal 2’s drift is not fully removed, but this frequency is higher than actual, because it is generated by a mirroring signal, i.e. the downward drift becomes a 20s-period wave.



May 18, 2022

Followed by the in-person trouble-shooting, I should also test my circuits on the dataset provided in the module, especially the noisy one.
Testing with the noisy signal, we can see that the powerline noise is quite large, so a bandpass filter is not enough, and a notch filter or low pass filter is required. In matlab, we can also confirm that the noise is at 50Hz.



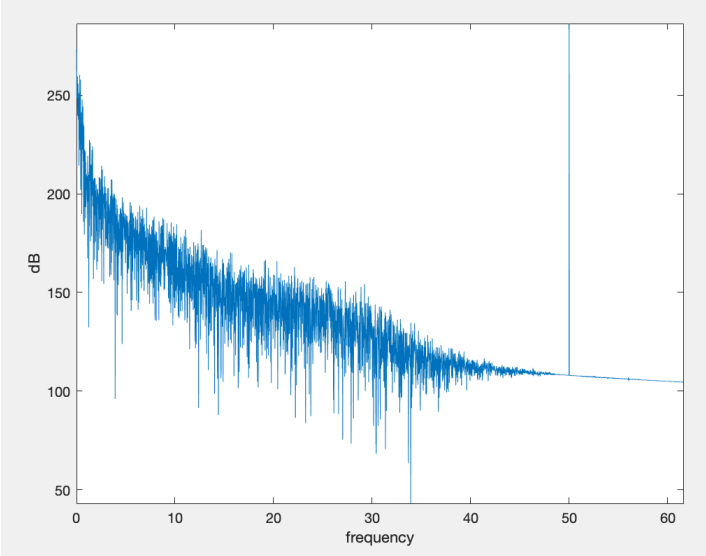
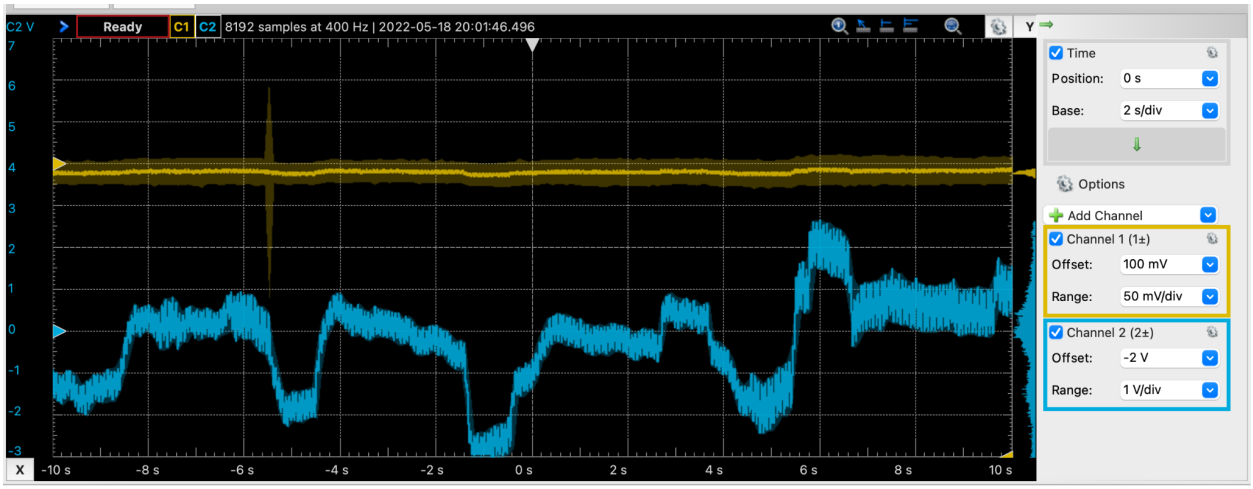


Figure : psd of the signal

After adjustments on the circuits (refer to Filtamp and LED_Interface), the results is as follows:



The noise is mitigated. Although the noise is still visible in the signal, we have implemented smoothing to reduce the flickering in the LEDs.