

Project May15-24 Advisor: Ayman Fayed

Individual Activity Report								Hours for task
Alan Stewart	Team Lead							
	Team Meetings							2
	EQ Build and Design							3
	Power Amplifier Design							1
						Total		6
Troy Bowers	Communications							
	Worked with Cadence to re-learn and build the Sawtooth generator of the Amplifier. Will begin testing next week							5.5
	Meeting with Advisor to discuss current progress and intended work for the week.							1
						Total		6.5
Xilu Wang	Web Master							
	simulation revision							2
	building high pass amplifier							2.5
	Sunday group meeting							1
	Coding website							1.5
	Meeting with Dr.Fayed							1
						Total		8
Dana Conrad	Team meetings							2
	Filter/EQ Designing and Testing							9
						Total		11
Jing Li	Key Concept Holder							
						Total		0
Kyle Maginot								
						Total		0

EQ status:

Background: A 5 band EQ:

Our initial frequency ranges for the filters were: 0-180 Hz, 150-325 Hz, 300-1000 Hz, 900-3000 Hz, and 3-20kHz. All filters were designed as 4th order active Butterworth filters and simulated in Cadence/PSpice. We also designed a mixer to add the filter outputs together while controlling the gain of each stage independently for equalization and an input buffer with DC-blocking filter.

What has been done this week:

After considerable simulation in PSpice, we have moved the HPF (highest range) to 4 kHz, the Middle Bandpass filter to 300-900 Hz, the LPF (lowest range) to 80 Hz, and the Low Band Pass Filter to 90-325 Hz. All of this is in an attempt to get a perfectly flat total frequency response across the hearing spectrum (when controls are equal) as well as avoid phase difference issues. We have managed to keep the entire spectrum approximately within 1 dB.

Due to a mysterious and confusing PSpice bug/glitch, the LPF was somehow dragging the mixer output down to -40 dB when adjusting gains in the mixer, where it should be 0 dB in relation to the input. We subsequently tried designing a 6th order LPF to gain a sharper cutoff, but this introduced a significant 2 dB bubble in the mixer output around 80-100 Hz. After going back to the original 4th order filter, simulations seem to show that it is now working as intended.

Next week's goal is to transform the filters so that the component values are common, close to common, or can be achieved with common valued parts. We also hope to start learning about the PCB process.

Simulation Results:

Here are a few select simulation results, which are also shown on our website along with current schematics:



