EE/CprE/SE 491 WEEKLY REPORT

Feb 20th – Mar 4th

Group number: Sdmay23/44

Project title: Mr. Ohm

Client &/Advisor:

- Client: Daniel Walker
- Advisor: Nathan Neihart

Team Members/Role:

1. Weekly Summary
   - Last week, our team made progress in several aspects of the project including the amplifier circuit, USB communication, and PCB design. This week, we have heavily focused on the PCB design of the ADC, which is crucial for the physical connection between the ADC and FPGA, as well as the ADC and analog signals. As we are running low on time, it is essential to finalize the ADC design for testing and fabrication. We were able to design the planned circuit in KiCad to prepare for physical development with a PCB, but due to issues discovered with the amplification circuit as well as feedback from our advisor, a significant revision is needed before we move on. On the FPGA side of things, we were able to communicate over USB to the FPGA using a standard python USB library, however we have yet to send information to and from the board that is not part of the standard USB procedure.

2. Past Week Accomplishments
   - Raj Singh:
     - Planned out connection points of PCB, Bill of materials, Layout, Design, Part ordering.
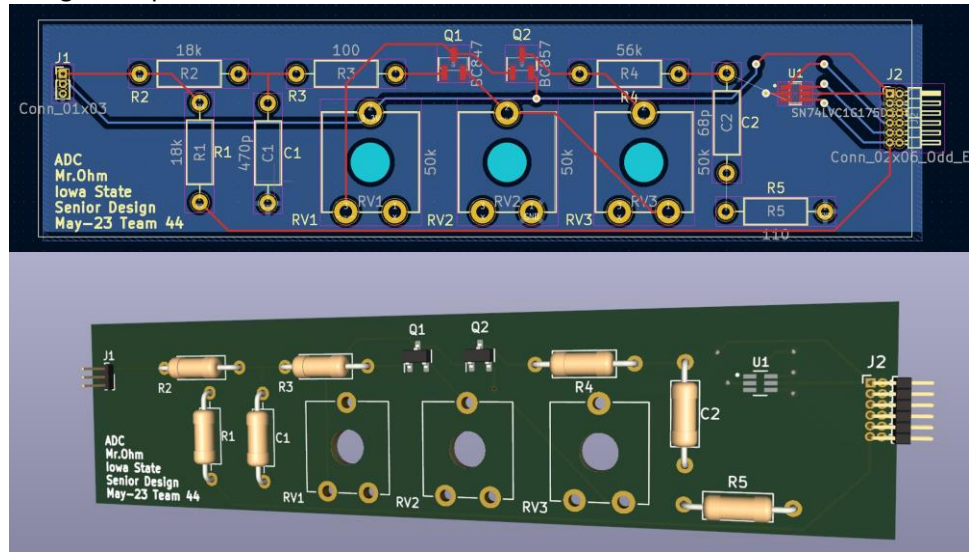
- Designed aspects of fabrication in Kicad

- Jordan McGhee:
    - Altered OrbTrace library to support our FPGA.
    - Using a standard USB python library was able to query the board for actual USB Endpoints placed on in modified OrbTrace code.
- Tyler Smith:
    - Worked on ADC circuit trying to establish stability at very high gain
    - Revised plan of action with advisor to determine gain
    - Met with client to determine a new amplifier type is more viable than old one
- Rachel San Agustin:
    - Familiarization with new amplifier type to be used
    - Provided assistance in new ADC design

3. Pending issues
   - Successful communication between the FPGA and raspberry pi of either data or sending commands.
   - Camera subsystem development.
   - Making sure ADC circuit works properly. (Stability – AC Analysis, Transient Analysis, DC Analysis)

4. Individual Contributions

Name	Individual Contributions	Hours this week	Hours cumulative
Raj Singh	Facilitating, FPGA	7	80
Jordan McGhee	FPGA	8	100
Rachen San Agustin	ADC	5	65
Tyler Smith	ADC	6	75

5. Plans for the upcoming week
   - Raj Singh:
       - Work with Tyler to get final part ordering complete for the PCB test.

- Adjust test PCB to be accurate with current design
- Jordan McGhee:
  - Work on allowing the raspberry pi to communicate data to the FPGA.
  - Get an outline ready for standard running procedure communicating to and from the board. (Preparation for when the ADC is connected)
- Tyler Smith:
  - Reworking new circuit to finalize official parts needed for PCB
  - Communicating with Raj and others for ordering parts
- Rachel San Agustin:
  - Adjust resistor values on amplifier to achieve gain of ~20dB
  - Provide support to Tyler in finalizing circuit

6. Summary of weekly advisor meeting

During our weekly advisor meeting with Nathan Neihart this week, we faced some challenges with our ADC design, which we have been unable to finalize for fabrication. We encountered some PCB design issues, which arose from incorporating potentiometers into the design, because this was an unconventional practice. However, despite the difficulties we faced, Nathan's guidance and support helped us to reorient ourselves as a team and realign our focus on important considerations for the PCB design phase. While it was a challenging meeting, we emerged with a clearer plan and a renewed sense of confidence for our project's future.