
EE/CprE/SE 491

wDAQ System (sddec24-19)

Weekly Report 10

April 10th- April 16th, 2024

Client: Manojit Pramanik and Avishek Das

Faculty Advisor: Manojit Pramanik

TEAM MEMBERS

Adam Shoberg [EE] - Circuit Design & Simulation, PCB Design, Team Communications Leader

Henry Chamberlain [EE] - PCB Design & Construction

Lisa Tordai [SE] - Software Development, Wireless Data Sharing

Vaughn Miller [CprE] - Computer Engineering

SUMMARY

This week, we completed some PCB assembly, testing, and analysis, as well as a fair share of computer and software-related work. On the electrical front, after receiving circuit components from ETG, we soldered the PCBs for the low-noise RF amplifier and ADC circuits; however, due to certain components being missing from the order or in short supply for the PCBs, we were unable to complete the assembly of the ADC circuit. After we completed the assembly that we were able to with the components on hand, we traveled to the Applied Science Complex (ASC) to work with our client to test & analyze the RF amplifier circuit. We were able to derive some of the voltage, gain, and performance characteristics of the circuit at different frequencies and analog inputs, from which we were able to conclude that we will need to cascade two or more of the amplifier circuits in series in order to achieve the desired gain as per the specifications of the project proposal. On the software and computer front, we were able to create and polish code to record and plot voltage values over time, which is transferable to recording other types of data for analysis. Additionally, we successfully configured the microcontroller to read parallel digital inputs at its GPIO pins from the ADC, as well as created serial plots of data. Looking ahead for the next couple of weeks, we aim to slightly revise our circuitry and order multiple assembled PCBs from JLCPCB through EasyEDA, as well as make progress on the software side and push to design and order the remaining circuits for the device.

ACCOMPLISHMENTS

Adam:

- Soldered LNA
- Tested and evaluate LNA

Henry:

- Soldered ADC
- Tested and evaluate LNA

Lisa:

- Sending time and voltage over WIFI
- Improving LabVIEW GUI

Vaughn:

- Wrote program to test parallel input and serial output
- Setup dummy ADC test input to test transform code

PENDING ISSUES

Adam:

- Concerned about having time to compile a prototype before the end of the semester
- Struggling with wait times on devices
- Need better access to materials(i.e clamps, flux, solder paste, magnification lens)

Henry:

- Concerned about time constraints associated with complete prototype by May
- Concerned about receiving products and services promptly working with ETG
- Wish there were better PCB and circuit analysis tools available at Coover

Lisa:

- Formatting message with time and analog value
- When microcontroller is programmed with ESP32 need to test connectivity to LabVIEW

Vaughn:

- Progress on MCU will slow as core functionality is built
- Time constraint with current deadlines will be very difficult to navigate

INDIVIDUAL CONTRIBUTIONS

Member	Contributions	Weekly Hours	Total Hours
Adam	LNA soldering and testing	7	54
Henry	ADC soldering, LNA testing	7	54
Lisa	LabVIEW Programming, Modifying ESP32 Code, Updating website	4	58
Vaughn	Cleaned up code to convert GPIO inputs, worked on SPI implementation	3	53

COMMENTS AND EXTENDED DISCUSSION**Adam:**

- I believe that it would be beneficial to start identifying more firm goals as the semester approaches an end and classes get a bit hectic. This would help keep the team on track
- Continue to communicate on a day to day basis

Henry:

- It seems unlikely that the prototype will be completed by early May at our team's current pace. It may be beneficial to adapt to more of a "waterfall" project management approach for the rest of the semester (and possibly next semester) to solidify our team's objectives and ensure timely completion of milestones and deliverables.
- Communication has been somewhat lax lately outside of team meetings; it may be beneficial to consider another communication medium besides Teams, as we have run into issues and delays with sending messages in Teams.

Lisa:

- Extend team discussion about goals and documentation with mentor to align plan of work for the following weeks of the semester and next semester
- Create plan for testing components together

Vaughn:

- Need to figure out how we want to tackle the end of the semester, as the current projections are likely too ambitious, more solid goals are necessary too.

ACTION ITEMS FOR UPCOMING WEEK

Item	Member(s) Assigned	Desired Completion
Reorder ADC and LNA using Gerber files from EasyEDA (incorporating modifications)	Henry	4/19/2024
Make modifications on LNA based on test results from prototype board	Adam	4/18/2024
Finalizing LabVIEW GUI	Lisa	4/23/2024
Completed prototype of device (PCB designed & ordered, soldered)	Lisa, Vaughn, Adam, Henry	5/03/2024
Add all images, schematics, PCBs, etc. from the design phases into the academic paper and get a draft started	Lisa, Vaughn, Adam, Henry	5/03/2024

SUMMARY OF WEEKLY MEETINGS**ASC Client Workday(4/15):**

- Soldered ADC and LNA
 - Discussed pros and cons of having vendors send completed prototype boards
- Evaluate the LNA prototype board
 - Results were not fruitful, the system's filtration had a lot of DC mixing.
- Evaluated progress with STM32 microcontroller and LabVIEW
 - Displayed digital values on STM32F
- Planned team/client workday for Tuesday (4/16)
 - Want to create/update the LNA based on results from prior tests(04/09/2024)

Advisor Meeting (04/13/2024)

- Discussed status overall of project and if there were any concerns
- Discussed upcoming panel presentation
 - What to expect and how to prepare
 - Required deliverables (design document and website updates)