EE/CprE/SE 491
wDAQ System (sddec24-19)
Weekly Report 6

March 6 - March 19, 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, User Interface

Vaughn Miller [CprE] - Computer Engineering

SUMMARY

This past week was Spring Break, so we didn't accomplish anything during that time, but we got some work done prior to the break and a little bit since coming back. Before break, we created schematics and PCB designs for a differential input circuit for the ADC, including an instrumentation amplifier, as well as finished up work with the low-noise amplifier PCB design. We also ordered an evaluation board for the STM32 MCU, which we will be testing. On the software side, we successfully created an interface with the Wi-Fi connection and LabVIEW.

ACCOMPLISHMENTS

Adam:

- Built LNA Schematic
- Built LNA PCB layout
- Rendered LNA 2D and 3D Model
- Built ADC Schematic
- Built ADC PCB layout
- Rendered ADC 2D and 3D model

Henry:

- Built LNA Schematic
- Built LNA PCB Layout
- Rendered LNA 2D and 3D Model
- Built instrumentation amplifier Schematic
- Built instrumentation amplifier PCB
- Rendered Instrumentation amplifier 2D and 3D model

Lisa:

- Programmed ESP32 to send data over the WIFI server
- Created LabVIEW VI for TCP connect with WIFI Module IP Address
- Created LabVIEW GUI to show data received from WIFI

Vaughn:

- Looked at STM32 chip and eval board
- Worked on debugging test code for STM32

PENDING ISSUES

Adam:

- Need verification of ADC board
- Need to get the LNA and ADC boards ordered
- Need to test boards

Henry:

- Unsure about types of components to place on PCB - is a specific brand/manufacturer needed on every part for the BOM or are generic components acceptable?

Lisa:

- Improving LabVIEW performance by dividing processes into different loops
- Need to create a method to export data from LabVIEW to text file or Excel sheet

Vaughn:

- Still need a circuit to connect to and test the ADC
- Need to port F3 code to F4 to configure and run tests

INDIVIDUAL CONTRIBUTIONS

Member	Contributions	Weekly Hours	Total Hours
Adam	Schematic and PCB layout for LNA, ADC, and their respective 3D models	5	35
Henry	Schematic and PCB layout for LNA, instrumentation amplifier, and their respective 3D models	5	35
Lisa	Created code for ESP32 and LabVIEW programming. Meet with Avishek to troubleshoot and create a successful interface.	9	39
Vaughn	STM32 Eval Board exploration/analysis	5	33

COMMENTS AND EXTENDED DISCUSSION

Adam:

- Still working with Avishek and Henry on PCB design
- Need to order parts

Henry:

- Trying to contribute to/learn more about PCB design with EasyEDA

Lisa:

- Analyzing ESP32 for other pins with compatible analog read
- Creating a method to log and export data from LabVIEW

Vaughn:

- Hope to make more progress with STM32 when ADC circuit is complete

ACTION ITEMS FOR UPCOMING WEEK

Item	Member(s) Assigned	Desired Completion
Order PCBs for the ADC and LNA	Adam, Henry	3/20/2024
Verify PCBs upon arrival	Adam, Henry	3/27/2024
Analyze/verify ESP32 to LabVIEW connection, Find available pinouts	Lisa	3/20/2024
Create data logging and export to text file on LabVIEW	Lisa	3/20/2024
STM32 Eval Board Testing	Vaughn	3/27/2024

SUMMARY OF WEEKLY MEETINGS

Weekly Client Meeting (3/6):

- Review LNA schematic and PCB board with the team
- Discussed tasks & desired deliverables for 3/20/2024 meeting
    - PCB design for ADC and Instrumentation Amplifier
    - Order PCBS and MCU evaluation board
    - Develop methods to program the DMA to MCU
    - Obtain results for ESP32 to LabVIEW connection (signal acquisition to text file)

WIFI/LabVIEW Interface Meeting (3/7, 3/19):

- Discussed current state of program and potential solutions for an interface
- Troubleshoot results of the Arduino IDE and LabVIEW TCP VI