
EE/CprE/SE 491

wDAQ System (sddec24-19)

Weekly Report 5

Feb 28 - March 5, 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 made significant progress with the low-noise amplifier and moved forward with the design for the ADC and some software items. We desoldered the components from the Amazon amplifier and used multimeters in the TLA to measure capacitance and resistance values (we could not measure inductance using these multimeters), which we used to guide our selection of component values for the low-noise amplifier we designed. Afterward, we designed and ordered the PCB for our LNA using EasyEDA. On the ADC front, we selected an ADC and ordered parts for the differential drive circuit associated with the ADC, and our client (Avishek) designed a PCB for the ADC driving circuit. On the software side, we created a Virtual Instrument (VI) in LabVIEW for a Serial Port Visa or Transmission Control Protocol (TCP). A minimal circuit setup for the MCU was researched and a suitable design was found. Lastly, we began updating our team's website with team member information and context for our project.

ACCOMPLISHMENTS

Adam:

- Desoldered LNA PCB
- Measured passive element values(resistance, capacitance, and Inductance)
- Drafted Schematic for LNA
- Drafted PCB layout of LNA
- Researched biasing circuit for ADC.

Henry:

- Desoldered passive components from Amazon LNA PCB
- Measured resistance and capacitance values from LNA components
- Ordered ADC and components & amplifiers for ADC Differential Drive Circuit

Lisa:

- Updated Team Website (Project Overview, Team Members, Weekly Reports)
- Created LabVIEW VI for Serial Port Visa/TCP

Vaughn:

- Determined pinout for STM32 IC to enable programming
- Found suitable circuit configuration for the MCU with components and values
- Continued research on ADC interfacing, configuring interrupt to trigger a DMA read appears to be the most documented option

PENDING ISSUES

Adam:

- Need verification on PCB layout
- Can't get 3D PCB model for MAR-6SM+
- Need to have the group decided on the ADC and MCU to use

Henry:

- Unable to measure inductance values using multimeters in Coover
- Struggling to import 3D models into EasyEDA

Lisa:

- Completing setup demonstrating WIFI communication to LABView
- Team discussion for desired GUI (information presented, functionality)

Vaughn:

- Working on debugging interfacing, still stuck on the printf() functionality but can still program without
- Programming DMA functionality has been a slow process

INDIVIDUAL CONTRIBUTIONS

Member	Contributions	Weekly Hours	Total Hours
Adam	Desoldered components and drafted PCB	4	30
Henry	Desoldered components, measured component values, ordered parts	4	30
Lisa	Worked creating LABView to WIFI interface, Creating LABView GUI, Programming WIFI module, Setting up team website	6	30
Vaughn	Worked on ADC to MCU interface research and found suitable circuit diagram for MCU	4	28

COMMENTS AND EXTENDED DISCUSSION

Adam:

- Still working with Avishek and Henry on PCB design
- We need to have the ADC done

Henry:

- Logged into Altium 365 with PrISUm license. Hoping to use Altium for future PCB design
- Want to meet in person with Avishek to finish PCB design for LNA
- Hoping to acquire parts and make more progress with ADC before Spring Break

Lisa:

- Programming ESP32 to test WiFi to LabVIEW interface
- Team discussion over what we want presented on the website and style
- Discussion with Vaughn of future implementation of WIFI module with microcontroller

Vaughn:

- Need to take a step back and learn how to manipulate the DMA and configure the rest of the bus clocking before any ADC work gets done, because simple GPIO reads cannot reach the acceptable speed

ACTION ITEMS FOR UPCOMING WEEK

Item	Member(s) Assigned	Desired Completion
Build PCB for ADC differential drive circuit upon acquiring components	Avishek, Adam, Henry	03/20/2024
Continue PCB layout upon receiving all components; look into stacking amplifiers with header pins	Adam, Henry	03/08/2024
Working with LABView to create a function interface with WIFI module	Lisa	03/06/2024
Continue updating Team Website with more details	Lisa, Vaughn, Adam, Henry	03/08/2024
Experiment with DMA and trigger repeated, parallel, synchronized reads	Vaughn	03/08/2024

SUMMARY OF WEEKLY MEETINGS

Weekly Client Meeting (2/28):

- Summarized findings with experiments for the entire team
- Discussed tasks & desired deliverables for 3/06/2024 meeting
 - PCB design for LNA
 - Discussed Instrumentation amplifier components for ADC
 - Order ADC12020 and other equipment for project