EE/CprE/SE 491
wDAQ System (sddec24-19)
Weekly Report 4

Feb 27, 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 worked on a wide range of technical problems and assignments. The first technical problem we resolved was our Low-Noise-Amplifier. The MARS-6SM+ was soldered to a PCB board and tested. This allowed us to essentially complete our Low-Noise-Amplification and filtration stage. For our MCU, we decided as a group to use the STM32F as it provided the greatest flexibility while meeting our design requirements. On the software side of things, we were able to use a bluetooth chip and an audio to communicate with lab view and display temperature values as a function of time. Finally, we met with our client and advisor to communicate our latest progress, goals, and action plans.

ACCOMPLISHMENTS

Adam:

- Soldered two MARS-3SM+ amplifiers to PCB and swept frequency, DC bias, and input signal to analyze effects on gain
- Soldered MAR-6SM+ and MAR-3SM+ LNAs to jumper wires, replicated Mini-Circuits evaluation circuits for the LNAs on breadboard and tested the design (failed to obtain accurate or desirable results because banana cable to breadboard did not support the bandwidth)
- Compiled simulation results to share with ground in weekly presentation
- Practiced desoldering with copper mesh and flux
- Created weekly report and compiled groups work

Henry:

- Soldered two MARS-3SM+ amplifiers to PCB and swept frequency, DC bias, and input signal to analyze effects on gain
- Soldered MAR-6SM+ and MAR-3SM+ LNAs to jumper wires, replicated Mini-Circuits evaluation circuits for the LNAs on breadboard and tested the design (failed to obtain accurate or desirable results because banana to breadboard cables do not perform well at radio frequencies)
- Compiled simulation results to share with group in weekly presentation
- Practiced desoldering with copper mesh and flux
- Collected ordered parts from ETG

Lisa:

- Worked to convert Bluetooth test setup to Wifi
- Researched how to read data into LabVIEW utilizing the VISA feature

Vaughn:

- Worked on debugging tool installation and CMSIS libraries to make programming easier
- Added to code to enable on-board ADC for STM32 to test with

PENDING ISSUES

Adam:

- Needs to get access to Altium designer or another PCB designer site.
- Continue talks on battery size and depending on that find a suitable DC-DC buck converter

Henry:

- Need access to Altium Designer. Hoping to be able to use the PrISUm Solar Car License.

Lisa:

- Need to complete a functional LabVIEW VI to communicate with WiFi setup

Vaughn:

- Makefile/linker script are creating some issues for compiling, need to go through and make sure required functions are defined in both

INDIVIDUAL CONTRIBUTIONS

Member	Contributions	Weekly Hours	Total Hours
Adam	Tested Physical circuits, soldered boards, compiled findings, and organized group assignments	8	26
Henry	Tested physical circuits using lab wavegen and NI Waveforms; ordered additional parts	8	26
Lisa	Ordered parts for WiFi test setup, Researched LabVIEW communication strategies	6	24
Vaughn	Worked on programming for ADC, continued programming effort to start producing results	6	24

COMMENTS AND EXTENDED DISCUSSION

Adam:

- Still working with Avishek and Henry on device power management

Henry:

- Reached out to PrISUm Electrical Director for access to Altium Designer License for PCBs
- If Altium cannot be used, will use EasyEDA (Avishek enjoys this software)

Lisa:

- Build LabVIEW VI to communicate with PC Serial Port
- Programming ESP32 to test WiFi to LabVIEW interface

Vaughn:

- Programming the ADC to test is high priority, and figuring out a quick parallel interface option once we get ADC will be next

ACTION ITEMS FOR UPCOMING WEEK

Item	Member(s) Assigned	Desired Completion
Desolder components from Amazon LNA PCB and trace connections	Adam, Henry	03/08/2024
Continue PCB layout upon receiving all components; look into stacking amplifiers with header pins	Adam, Henry	03/08/2024
Update Team Website with bios and progress reports	Lisa, Vaughn, Adam, Henry	03/08/2024
Programming ESP32 to test WiFi to LabVIEW interface	Lisa	03/08/2024
Configure ADC and produce test results to plot	Vaughn	03/08/2024

SUMMARY OF ADVISOR MEETINGS

Weekly Client Meeting (2/21):

- Discussed Battery protection systems
- Discussed results of physical LNA
- Narrowed down devices for bluetooth/wifi devices.
- Discussed action plan with ADC
    - Avishek will take over looking for best ADC
- Discussed tasks & desired deliverables for 2/21/2024 meeting
    - Breadboard results
    - Amplifier parts order from ETG
    - Further research into ADC and microcontroller components

Biweekly Faculty Advisor Meeting (2/23):

- Discussed recent progress with Prof. Manojit and presented findings on existing systems
- Discussed progress with team website
- Prof. Manojit informed us he will be out of the country throughout March, so March 8th meeting will be canceled; will keep us posted on the status of other March meetings