
EE/CprE/SE 491

wDAQ System (sddec24-19)

Weekly Report 8

April 2nd, 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

At the end of the work week, the components for the ADC and LNA arrived at ETG. As for the electrical side of the project, it came to a standstill due to the wait for the PCB boards to arrive and become soldered by ETG (these take longer to ship than components). Efforts were made to find suitable battery protection systems that would protect against overcurrent. Progress with the STM32F407 microcontroller was made using a minimal script to flash the development board and run simulations displaying a ~1MHz signal with a 10 μ s time scale. The code that is written will be verified by the client, Avishek, at the next weekly meeting, along with the data obtained. Work with the ESP32 Wi-Fi chip and LabVIEW continued to improve user interface capabilities while maximizing data accuracy when plotting. As of now, the individual components are being finalized and entering the test and validation stage. By remaining agile to the workload, it is reasonable to assume that a prototype can be developed by the end of the semester.

ACCOMPLISHMENTS

Adam:

- Coordinated with team on future goals and time frames
- Prepared for board testing and evaluation
- Sourced Uart bridge for microcontroller testing
- Investigated battery protection systems for our device

Henry:

- Prepared for board testing and evaluation
- Investigated battery protection systems for our device
- Coordinated with ETG to get boards soldered
- Reviewed academic paper written by client

Lisa:

- Adding a data logging feature to GUI
- Breaking LabVIEW program into separate loops to process faster
- Attended ISU Student Innovation Center 3D-Printing Workshop

Vaughn:

- Configured USART bridge and implemented printf() functionality for debugging on STM
- Can output value to serial monitor as well as input values

PENDING ISSUES**Adam:**

- Waiting for boards to be soldered and assembled to run test and evaluation
- Need other parts of the project to be completed in order to move onto other subtasks

Henry:

- Waiting for boards to be soldered and assembled to run test and evaluation
- Components for boards have been shipped, but boards themselves have not, which will delay the time frame for soldering work to be done

Lisa:

- When microcontroller is programmed with ESP32 need to test connectivity to LabVIEW
- Team discuss design for 3D Model of prototype case
- Testing Data logging in LabVIEW with different file format and starting/stopping logging

Vaughn:

- Waiting for ADC development board to begin configuration of ADC <-> MCU connection
- Working on SPI functionality for sending data to ESP32

INDIVIDUAL CONTRIBUTIONS

Member	Contributions	Weekly Hours	Total Hours
Adam	Faculty advisor presentation, team coordination, sourcing UART bridge, Battery Management System exploration	3	43
Henry	Battery Management System exploration, ETG communication, academic paper research/review	3	43
Lisa	LabVIEW data logging, Optimizing LabVIEW program, Updating Website, 3D Printing Workshop	6	50
Vaughn	Serial monitor output, ADC input, USART bridge for debugging	8	46

COMMENTS AND EXTENDED DISCUSSION

Adam:

- Things are slow on the electrical side of things. It would be beneficial to focus in on the microcontroller and Labview so we can get a full prototype tested before the end of the semester
- I will remain flexible to the workload and help in areas that need assistance

Henry:

- We need to remain flexible to the workflow and continue to push towards the goal of having a functional prototype by the end of the semester
- Electrical side of the project is slow, but I am available to contribute to other sub-tasks to lift the load off some of the team members.

Lisa:

- Finalize desired requirements for user interface
- Discuss formal documentation of our project and create a plan of work to consistently expand the documentation

Vaughn:

- Need to verify that SPI will work in conjunction with high-frequency input

ACTION ITEMS FOR UPCOMING WEEK

Item	Member(s) Assigned	Desired Completion
Continue to research and narrow down choices for battery management systems	Adam, Henry	4/10/2024
Display 1 MHz signal for at least 10 μ s using STM32F	Vaughn	4/03/2024
Plot voltage data on time scale in LabVIEW	Lisa	4/03/2024
Complete schematic & PCB for functional prototype of device (designed & ordered)	Lisa, Vaughn, Adam, Henry	4/31/2024
Start organizing data, images, and related materials for a first draft of academic paper	Lisa, Vaughn, Adam, Henry	4/31/2024

SUMMARY OF ADVISOR MEETINGS

Weekly Client Meeting (3/27):

- Discussed Battery protection systems
- Discussed how to focus the team's effort to meet the goal of having a prototype done by the end of the semester.
- Discussed plans for testing and evaluation of PCB boards
- Made action plans for work with the communication system, ESP32
 - Client required data to be saved to a text file in LabView
 - Plot needed the X-axis to be time (Seconds), and Y-axis to be voltage (Volts).
- Discussed action plan with MCU
 - Code must be written and thoroughly explained to client on display of 1MHz signal with 10 μ s scale
- Discussed tasks & desired deliverables for 4/05/2024 meeting with academic advisor
 - Given the academic advisor has been gone for a month, it was discussed that a presentation highlighting the major achievements would be needed to catch him up to speed.
 - Client stressed that need to be high level and result focused