

sdmay19-47: NSF Lab furnace control system

Week 9 Report

November 10th- November 16th

Team MembersAdam Matthews — *Software/Hardware Engineer, Report Manager*Kevin Lang — *Electrical Engineer*Jeremy Hartl — *Hardware Engineer*Christopher Pohlen — *Software Engineer/Gitlab Moderator*Nick Brylski — *Systems Engineer***Advisor/Client**Dr. Gary Tuttle

Summary of Progress this Report

We got our arduino Mega in the mail and then went to configure the circuit for it, including the serial connectors and DAC. We then wrote code for the Mega to parse serial commands from the GUI. If a code starts with an L, the entire command is relayed through to the temperature controller. If the command starts with a D, the arduino will parse the following number (e.g D14.77) and set channel 1 on the DAC to 4.77 volts.

We also set up some preliminary eagle files folders including the necessary footprints we would be using on our PCB shield. This includes the RS232 transceiver, DAC, and arduino mega shield footprint. These were found in the eagle libraries and ultralibrarian.com

Thirdly, we constructed the major portion of a basic Python API for the Omega Temperature Controller (OTC). Thus far, this API has basic functions for reading status and setting parameters, alarms, and setpoints. It is written using callback functions that return errors and results to the function caller.

Pending Issues

We still need to write code to read voltages off the analog inputs on the Mega and relay this information back to the GUI. This will be another character like 'R' for read. This will need to be tested by hooking up all the pins to power supplies and seeing if our GUI is getting back the write values.

We need to start determining what kinds of physical connectors we will be using for the OTC and MFCs. We want our solution to have cables that are secured properly. Once we figure this out we can start finding the footprints for the connections and wiring everything up in eagle.

The API is still in testing format. It needs to be wrapped as a module that can be included in the GUI program. Additionally, the less basic functions, such as profiling and setting PID parameters,

and input error checking need to be implemented.

A true GUI prototype needs to be started since the ones up until now have been learning ones. The next program will likely be the first true prototype.

Plans for Upcoming Reporting Period

- Write code to read the analog voltages with the Mega and relay this info back to the GUI.
- Wrap OTC Python API as a module for use in GUI program.

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Adam Matthews	<ul style="list-style-type: none"> ● Wrote basic serial passthrough program for Arduino ● Wrote Python API for OTC 	12	52
Kevin Lang	<ul style="list-style-type: none"> ● Worked on GUI functionality 	3	30
Jeremy Hartl	<ul style="list-style-type: none"> ● Continued improving the Python GUI and updating it 	5	42
Christopher Pohlen	<ul style="list-style-type: none"> ● Worked on adding some basic functionality to the GUI. 	3	38
Nick Brylski	<ul style="list-style-type: none"> ● Wired circuit for newly acquired arduino mega ● Wrote code for arduino Mega to parse inputs from GUI and <ul style="list-style-type: none"> ○ Pass along to OTC ○ Set DAC outputs ● Setup eagle PCB libraries <ul style="list-style-type: none"> ○ Created footprint libraries for arduino mega shield, rs232 transceiver, ltc1660 DAC 	7	57

Gitlab Activity Summary

Nothing to report.