

sdmay19-47: NSF Lab furnace control system

Week 8 Report

November 3rd- November 9th

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

During this period we were successful in getting the LTC1660 DAC to work with the arduino. The code we wrote demonstrates the capability of the device--using the arduino serial monitor we can specify which channel and voltage value we would like to use. The code then converts this information into a two byte value that is sent to the DAC over SPI with the following format:

Table 1b. LTC1660 Input Word

A3	A2	A1	A0	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0	X1	X0
ADDRESS/CONTROL				INPUT CODE										DON'T CARE	

```
val = userVal*1023/5 ;
val = (channel << 12) | (val << 2) ;
```

So the channel is specified in the 4 MSB and the value we are setting is specified in the following 10 bits. This code accomplished through some interesting C code seen above. Testing was done with a DMM to verify that the voltage specified by the user (anywhere from 0.0 5.0 volts) was being output. We found that the device was no more than 0.5%.

We also began work on an API in Python for the GUI to interface with the Omega Temp Controller (OTC). It contains all of the command codes and data byte lengths as constants, and it contains the skeletons of some basic functions such as `getTempAlarmAll()` which uses the 'T' command to get the current state, temperatures and alarms, of all zones. The Arduino is set up to be a passthrough for communication between the API and the OTC.

Pending Issues

Python OTC API:

- Uncertain where it is best to open and close serial port within the project. Code structure is not developed enough yet.
- Using Python's standard serial library `pySerial`, communication with OTC via Arduino is unsuccessful. Uncertain what the cause is.

Plans for Upcoming Reporting Period

- Continue work on the OTC Python API; successfully communicate OTC <-> Arduino <-> API
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Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Adam Matthews	<ul style="list-style-type: none">• Began Python API for OTC and GUI communication.	8	40
Kevin Lang	<ul style="list-style-type: none">• Began researching on the DAC	3	27
Jeremy Hartl	<ul style="list-style-type: none">• Gui and DAC interfacing	4	37
Christopher Pohlen	<ul style="list-style-type: none">• Added several functions to the test GUI. These things include different types of message boxes, a tabbing system, dropdown menus, and several others.	5	35
Nick Brylski	<ul style="list-style-type: none">• Developed C code to interface with DAC	5	50

Gitlab Activity Summary

Nothing to report.
