

sdmay19-47: NSF Lab furnace control system

Week 6 Report

October 22- October 26

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*

Summary of Progress this Report

During this period we spent time investigating DACs on various websites to find one that would be suitable for our project. To match the resolution of the arduino mega ADC we would need a 10 bit DAC. Then it would need to be 8-channels for the 7 MFCs in the system. Analog devices and Texas instruments both had about 4 DACs that fit the bill. We ordered free samples of these DACs from both websites for testing. We have received the chips from TI already. The package sizes were mostly TSSOP so these will require soldering onto a perf board. We are expecting a PDIP from ADI that will fit on a breadboard, once we get this chip testing should begin immediately.

We have started the creation of the python GUI using tkinter library. We spent time looking on the ISU library to find resources for GUI creation, one such book being called: Python GUI Programming Cookbook by Burkhard Meier. So far we have a few windows made that can show the values of temperatures.

We spent a considerable amount of time debugging an error with the OTC. It appears to be coming from sending commands that also contain a string on the end that is user specified. The OTC send back values that are not able to be interpreted by the serial monitor, the unknown character. We tried sending commands on multiple platforms and we still got the same result.

Pending Issues

Certain commands sent to the OTC result in unpredictable responses, specifically the question mark character. We will have to incorporate a certain testing to make sure these unpredictable values do not screw up the code. So far these values are read only when sending a command followed by a string to the OTC; this occurs when setting the temperature and the configuration for the OTC, reading any value off the OTC does not cause this problem. It may be able to be solved by flushing the serial buffer after sending such commands

Plans for Upcoming Reporting Period

We will begin testing out the DACs with the arduino. We ordered about 8 in total so we are going to have to do some more research to decide on a specific one to use. We have some perf boards to use so we may be able to solder some of TSSOP chips and begin testing, although they are quite small. We should get a PDIP DAC in the mail this week that should be able to fit on a breadboard for easier testing. The testing that will need to be done includes writing some code on the arduino IDE so send serial commands to the DAC. We should be able to calibrate all 8 channels over the IDE, whether through I2C or serial. Then we will need to hook up the outputs of the DAC to multimeters to ensure that the values are being set correctly.

For the GUI, we need to add more functionality to be able to send commands the OTC via the GUI. This means allowing the user to send configuration commands in addition to the set/read temperature commands we have already implemented. We will also need to add multiple pages to our GUI. Currently we only have one, but that will not be enough room for the of the options we need to display.

We also have a lot of soldering to do to be able to use the DACs. We will need to get some breakout boards from ETG.

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Adam Matthews	<ul style="list-style-type: none"> Researched Python GUI options 	3	29
Kevin Lang	<ul style="list-style-type: none"> Began working on GUI code utilizing tkinter library 	3	21
Jeremy Hartl	<ul style="list-style-type: none"> Reviewed GUI design and creation Researched best methods to create a GUI for our project 	7	28
Christopher Pohlen	<ul style="list-style-type: none"> Began working on the GUI code <ul style="list-style-type: none"> Learning the Tkinter library in Python Began making buttons, labels, comboboxes, etc. 	6	24
Nick Brylski	<ul style="list-style-type: none"> Ordered 8-channel DACs off of TI.com and analog.com Met with Dr. Tuttle and received more functional requirements for project <ul style="list-style-type: none"> He wants both analog and digital displays for readouts He's going to buy the Arduino Mega 	10	40

	<ul style="list-style-type: none">• Investigated & debugged serial communication non-expected character issue		
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Gitlab Activity Summary

Added a testing file for a Tkinter GUI.
