EE/CprE/SE 491 WEEKLY REPORT 5
2/21/2022 – 2/27/2022
Group number: SDDEC22-01
Project title: Plastic Machine Embedded IOT Controller
Client &/Advisor: Mark Hansen & Dr. Jones

Team Members/Role:
Stone Widder - Technical Lead
Joshua Baringer - Software Lead
Rachel Teberg - Historian/Reporter
*Evan Pasero - Project Manager*
Charles Sang - Controls Lead

o **Weekly Summary**

This week we worked on getting the server set up on the Beaglebone, testing how to read temperatures from a thermocouple, Tested controlling a relay with the BeagleBone and finished our trade study for the microcontroller and display. In our weekly advisor meeting we presented our high level software description and got some important feedback. We tried to set up a meeting with our TA, but they had to back out at the last minute.

o **Past week accomplishments**

- Thermocouple circuit design/Research done and decision on the temp chip from analog devices AD8495 - Charles, Evan, Rachel
- Server setup on BeagleBone - Josh
- Rachel and Evan
   - Finished trade studies for display and microcontroller
- Took Oscilloscope traces of on off signal from power supply to relay under different conditions. Dr. Jones suggested to us that this is a PWM signal that is being distorted or failing to manifest properly.
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This is the trace we took when the temperature was high. There are three sinusoidal humps and one square wave.
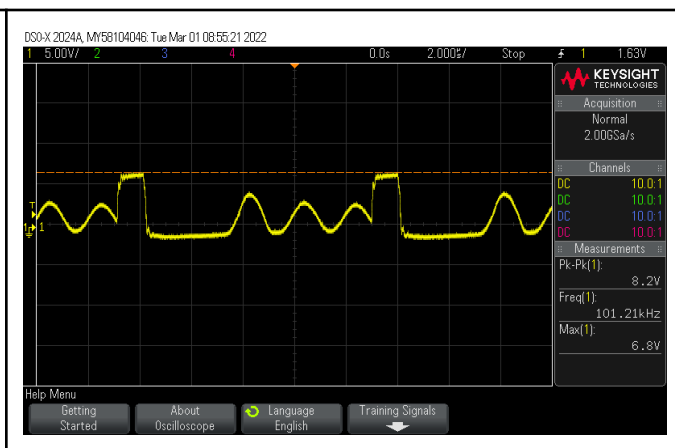
This is the trace we took when the temperature was low. There was only less hump and a similar looking square wave.	
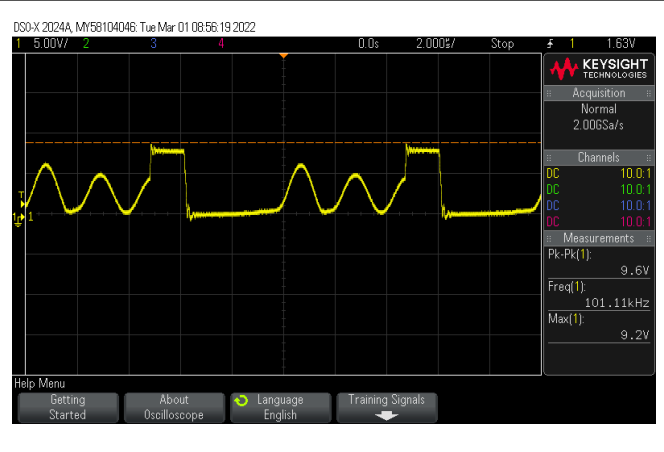
- ○ We are going to spend some time next week looking into this further to see if we can confirm or deny that this is a PWM wave.
- ● Thermo-couple and Relay Demo
  - ○ Working on setting up a demo of reading from the temperatures from the thermocouple that we have and controlling a relay for a demo for our client (if time permits add a simple PID and connect this to the heating element)
  - ○ Stone- Figured out the SPI of the Beaglebone for the thermocouple, and wrote code to read from it. Aswell as set up a very quick test of controlling the real. Both worked.
- ● We completed the work for our requirements presentation.

- ○ **Pending issues** *(If applicable: Were there any unexpected complications? Please elaborate.)*
  - ● TA Meeting.
  - ● Spend more time looking into the PWM signal.

- ○ **Individual contributions**

NAME	Individual Contributions *(Quick list of contributions. This should be short.)*	Hours this week	HOURS cumulative
Stone Widder	Thermo-couple and Relay Demo	7	31
Rachel Teberg	Finished trade studies, took meeting notes	6	28
Joshua Baringer	Setup server on BeagleBone Black	6	28
Evan Pasero	Took oscilloscope traces from power supply and finished trade studies.	6	28
Charles Sang	Thermocouple circuit design	6	28

- **Plans for the upcoming week**

Joshua: Help develop a website with Stone, start working on a command-line program.

Stone: Combine the control of the relay with the thermocouple readings and try to get the system mounted on the test stand for a demo on Thursday

Rachel: Assist with thermocouple circuit research/design/prototyping, update block diagram to include switches and lights, continue taking notes for all meetings.

Charles: Design and breadboard a thermocouple amplifier to be tested at our client meeting in two weeks. Also, research voltage delay circuits and decide if its better software implemented.

Evan: Map out high level board design, take another set of scope traces from the power supply and try to confirm whether or not this is, in fact, a pwm signal.

- **Summary of weekly advisor meeting**

At this week's advisor meeting we reviewed the notes from our design review with our client. We discussed the logistics of implementing a PID loop to control the temperature. We also talked about the logistics of creating the server. It was suggested that we look into the PWM rate that the current system is using and look into using the PWM function on the microcontroller.