

EE/CprE 4910 – sdmay25-26

## Status Report 2

1/31/2025 - 2/13/2025

Cost-Effective and Easily Configurable High Voltage Motor Controllers for Automotive Use

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### Summary

Software development is continuing to move along and get tests ready for when we have the full board assembled. Board components have come in and testing on the parts has begun. Board is still in transit from China still in processing in Detroit.

### Accomplishments

- Wrote GPIO and Timer abstractions which need to be fixed – Gavin
- Rewrite motor timing algorithm to use HALL sensors – Bryce
  - HALL sensor support for basic 6 step is developed

### Pending Issues

Capacitors have a much worse performance than anticipated, will need to scale up for our final design.

Gavin got his wisdom teeth out.

Classes have been hitting hard, but we're getting back in the groove of things.

Shipping latencies have been accumulating, creating some downtime.

### Individual Contributions

Member	Contributions	Period Hours	Cumulative Hours
Gavin Patel	Wrote more low-level abstractions for SAMC	2	62
Bryce Rega	Developed HALL sensor support for 6-step	6	77
Marek Jablonski	Capacitor performance testing	4	82
Jonah Frosch	Capacitor performance enhancements	3	82
Long Yu	Board testing plan	2	58

## Plans for next reporting period

### Hardware:

Assemble and begin testing PCBs. The assembly process will take a substantial amount of time. A hardware testing plan will be developed and then executed after assembly is complete.

### Software:

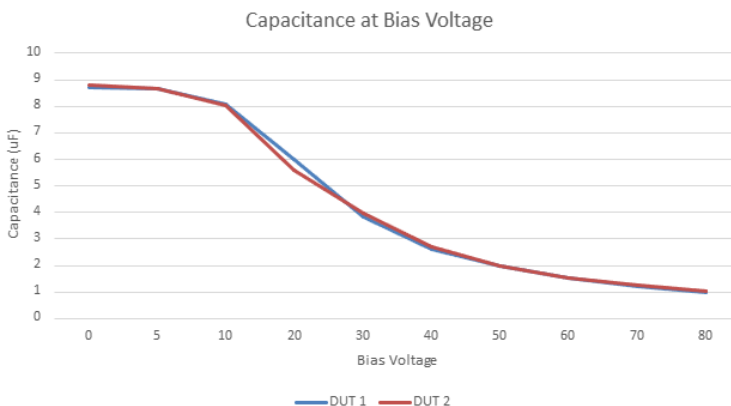
Continue developing abstractions for SAMC and test them to ensure they are working. Verify software tests work on new motor controllers and continue their development. Test that phases can be driven with oscilloscope and run other similar tests

## Project Work

Timer low level drives being developed for SAMC chip  
HALL sensor support being setup

## Research

As ceramic capacitors lose effective capacitance at applied voltages, we created and executed a test to determine how much we needed to derate the high voltage decoupling capacitors at running voltage. Our results concluded that the capacitors derated much more than expected and future revisions will require more capacitors.



Graph above: Tested effective capacitance of the high voltage decoupling capacitors against applied bias voltage.

## Advisor Meeting Summary

We had already reported our previous meeting in the last assignment that had them reflect on what we had completed last semester. The next advisor meeting is scheduled for next Wednesday.