

EE/CprE 4910 – sdmay25-26

Status Report 3

2/13/2025 - 2/27/2025

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

PRISUM Solar Car Club, Jonah Frosch

Nathan Neihart, Cheng Huang

Summary

Both boards have been assembled and testing has begun. Tests without software were ran. After a lot of software work, drivers, tests, and functionality was merged to begin some basic software tests before adding high voltage. There were some concerns with the hardware after some tests and software still needs more progress, so there is work to be done.

Accomplishments

- Wrote all low level drivers for software – Gavin
- Developed small software tests – Bryce
- Merged drivers, tests, and motor functionality for a full project – Bryce & Gavin
- Hardware is assembled – Marek, Jonah, & Long

Pending Issues

- A mystery pop sound hasn't been completely figured out yet
- Voltage midpoints on capacitor banks are all different (with one being the full voltage instead of half) leading to some imbalance issues
- Discovering how to properly drive a motor through software without breaking anything takes significant amounts of time

Individual Contributions

Member	Contributions	Period Hours	Cumulative Hours
Gavin Patel	Finished low level drivers for SAMC	8	70
Bryce Rega	Developed software for tests	11	88
Marek Jablonski	Assembled Logic board and tested hardware	8	90
Jonah Frosch	Finished Power Board hardware assembly	6	88
Long Yu	Board testing plan, soldered components	5	63

Plans for next reporting period

Hardware

- Begin next revision after more testing has been completed.
- Find source of odd popping noise when doing high voltage testing.
- Continue working with software to continue test plan and find issues for Rev 2
- Diagnose Capacitor bank issues

Software

- Fix any issues with low level drivers
 - Support for capturing frequency to measure voltage bus
- Set up the DMA to read ADC values (needed for current control)
- Continue development of more in depth tests (like current control)
- Get software to support spinning the motor (finish software tests in plan)

Advisor Meeting

- It's good to see tests going, hopefully something more complete for next meeting
- Suggested measuring capacitor banks...