

EE/CprE 4910 – sdmay25-26

Status Report 4

2/27/2025 - 3/13/2025

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

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Summary

More software tests were run and some larger tests were run with software and high voltage. There are a number of changes to be made that have already been identified for the next hardware revision. Unfortunately, the software was unable to complete and pass all tests and the lead time on a new board revision prevents everything from being tested before another board is ordered.

Accomplishments

- Current and HALL sensor measurement and logic – Bryce
 - ADC and DMA stuff set up and worked
- Driving phases tested at high voltage – Marek and Bryce
- Board modifications made to resolve logic issues – Marek
- Resolved popping noise (capacitor) and fixed imbalanced cap bank – Jonah

Pending Issues

- Keeping the bootstrap capacitor charged on high phase isn't working
 - Pinout wasn't done right for this and software jank solutions aren't working
- Voltage midpoints on capacitor banks are all different (with one being the full voltage instead of half) leading to some imbalance issues
- Full discovery wasn't done so second board may not solve all problems due to incomplete testing

Individual Contributions

Member	Contributions	Period Hours	Cumulative Hours
Gavin Patel	Assisted with software drivers and testing	8	78
Bryce Rega	Further developed software tests	16	104
Marek Jablonski	Coordinated HV Hardware testing with SW	8	98
Jonah Frosch	Hardware debugging + repairs	9	97
Long Yu	Hardware soldering	1	64

Plans for next reporting period

Hardware

- Begin next revision with current testing feedback.
- Continue working with software to continue test plan and find issues for Rev 2

Software

- Support for capturing frequency to measure voltage bus
- Try different software janks to handle Detroit bootstrap cap issue
- Fix more tests and try to get through test plan, including spinning the motor
- Update pinout for next revision so software janks aren't needed

Advisor Meeting

- Next advisor meeting is the week after spring break