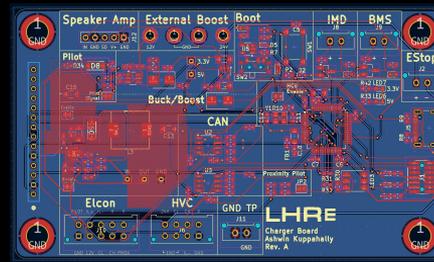
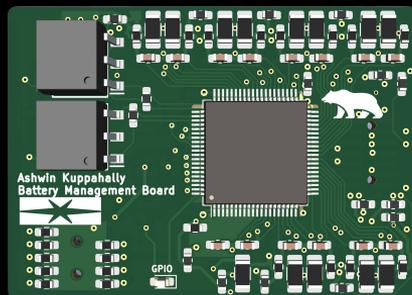


Ashwin Kuppahally

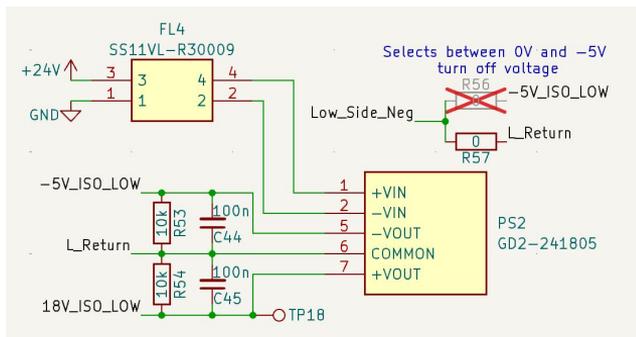
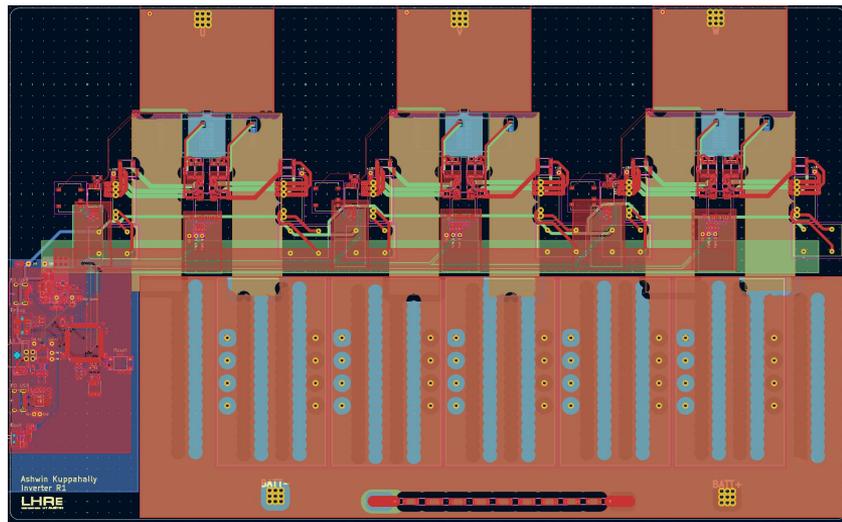
Engineering Portfolio



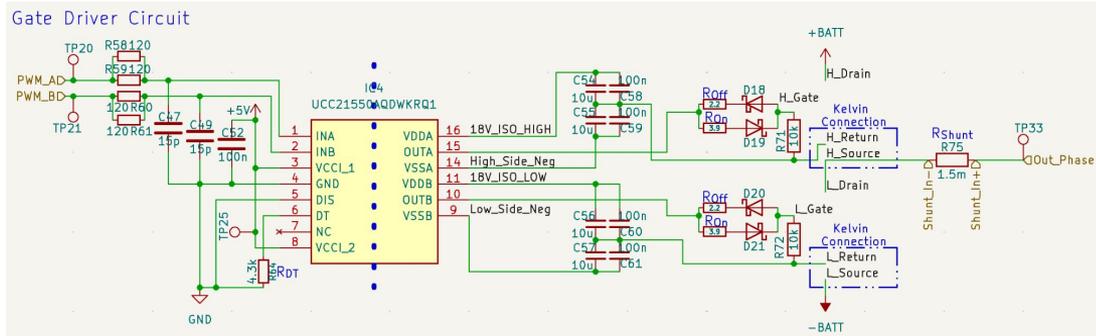
Electrical and Biomedical Engineering
The University of Texas at Austin, May 2028

25kW Automotive Inverter

- Developed a custom 3 phase motor inverter for an electric car hub motor
- Designed custom gate drive, current sense, and isolated power circuitry to switch silicon carbide FETs
- Optimized HV electronics with DC link capacitors, bleeder resistor circuits, and interleaved power planes for stability
- Implemented HV safety through discharge circuit and physical isolation



Isolated DC-DC Converter



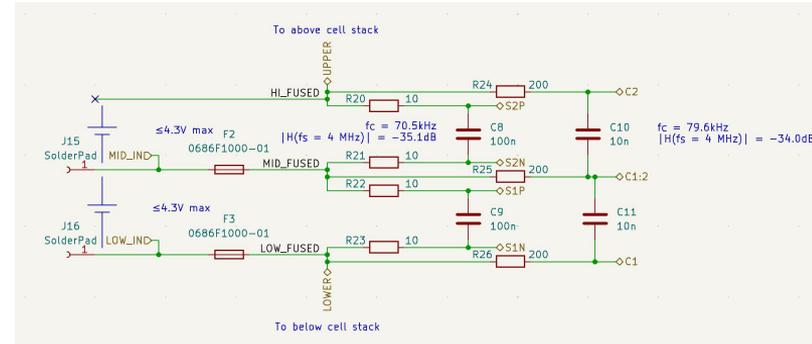
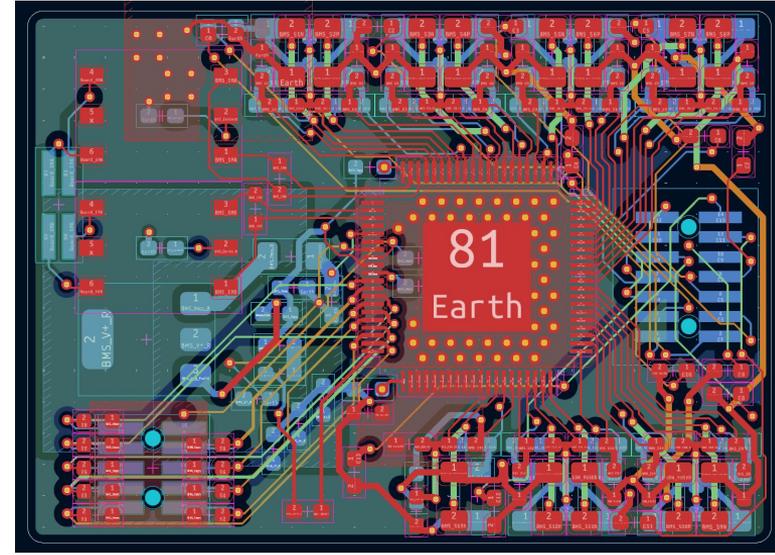
Low Pass Filter Circuit for Voltage Reading

Battery Management Board

- Developed circuitry for Tesla ADBMS chip
- Created low pass filtering circuits to accurately read lithium cell voltages
- Designed isolated communication system via IsoSPI, using transformers to ensure a physical isolation boundary
- Implemented temperature safety system with thermistors to monitor each cell
- Decreased board footprint by ~50% (compared to COTS)



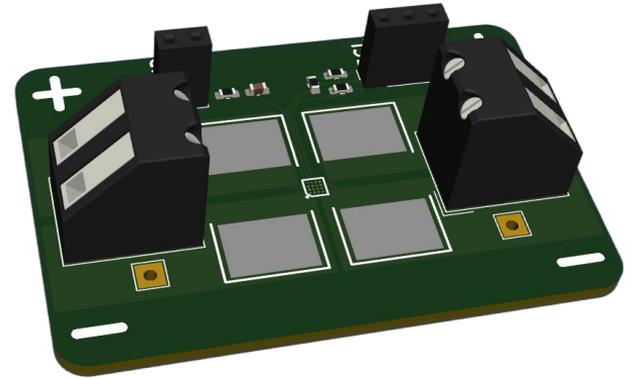
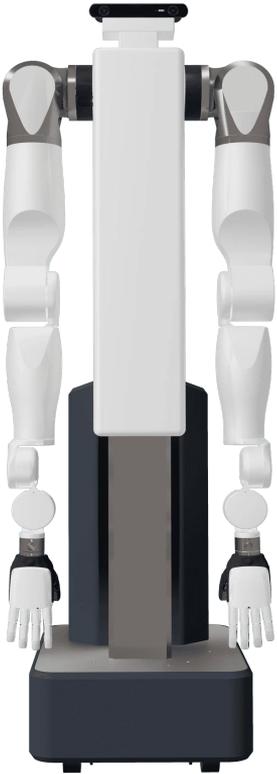
Board in Battery Segment



Low Pass Filter Circuit for Voltage Reading and Discharge

Feather Robotics

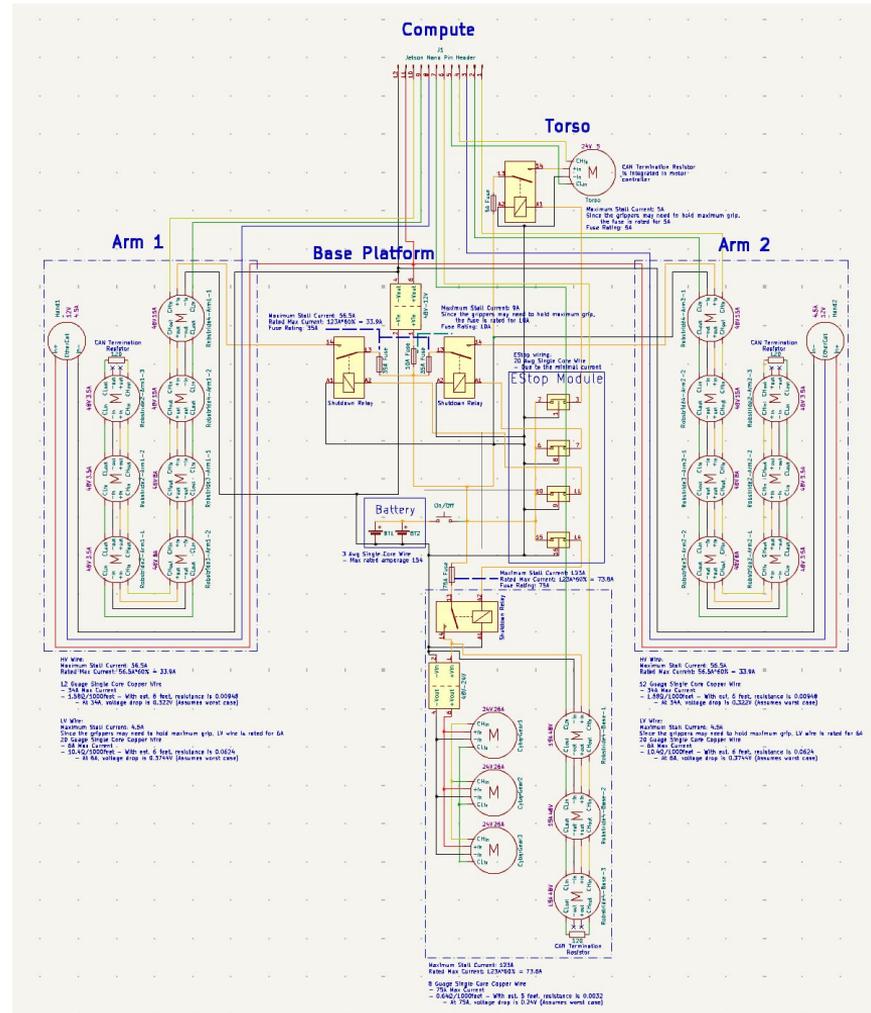
- Designed power control PCB in Altium
 - Consolidated power delivery electronics into centralized board
 - Monitored current and voltage of all subassemblies with TI chip, scanned for failures, reported data through CAN
 - Focused on efficiency of power electronics, signal integrity, and space constraints



Simple tester board for current sense validation.
Not the main board I designed due to confidentiality.

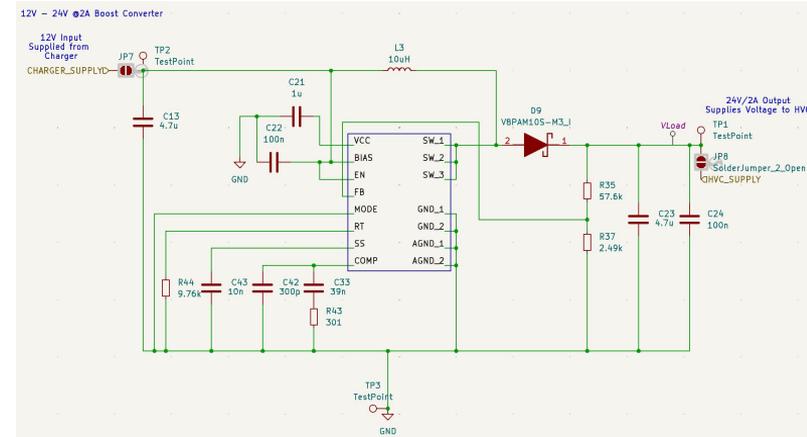
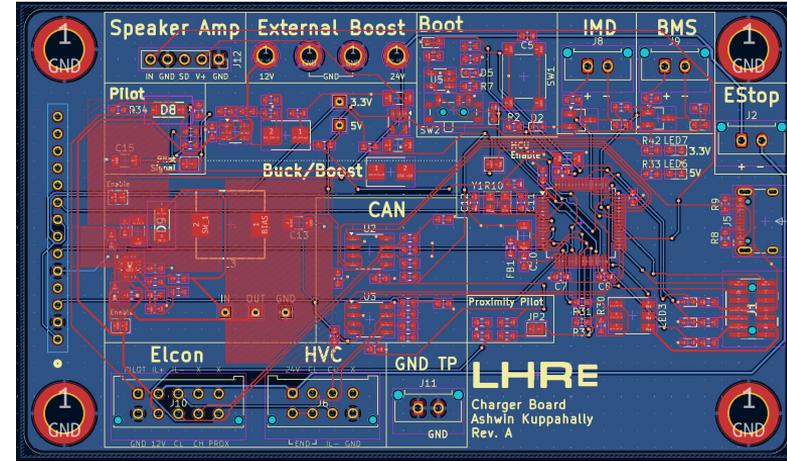
Feather Robotics

- Created UL-compliant electrical safety architecture
 - Defined interconnects, shutdown system, breaker and shunt placement
 - Specded wire harnessing for current needs
 - Reduced wiring complexity by 30%
- Setup Turnkey PCB Production
 - Revised BOMs and reduced production cost by 50%



Longhorn Racing

- Designed PCB for charging 600V electric racecar battery
 - STM32 firmware for CAN/SPI communication with BMS
 - Custom boost/buck converters achieving 98% efficiency
 - Developed battery safety systems and shutdown loop
 - Implemented the J1772 charging standard
 - Tested prototypes with oscilloscopes and did PCB rework to fix issues



Custom Boost Converter Circuit

10X Genomics

- Designed PCB in Altium for optical sensor testing
 - Controlled optical motor assembly over CAN
 - Precisely controlled high-current LEDs with luminosity feedback sensors
- Diagnosed issue on production board affecting 10% of instruments
 - Conducted PCB rework to find and fix issue
 - Helped firmware and field engineering teams implement fixes



Resume:
ashwink.org/resume
