Ashwin Kuppahally

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Education

The University of Texas at Austin — Austin, TX

Bachelors of Science, Electrical & Computer Engineering and Biomedical Engineering — *May 2028*

- Relevant Coursework: Circuit Theory, Embedded Systems, Signals and Systems, Computer Architecture

Experience

Tesla Motors — May 2026 – Aug 2026

Hardware Engineering Intern — *Palo Alto, CA*

- Redesigned the Cybercab drive inverter active discharge circuit, resolving a **25% crash-test failure rate** issue critical for passenger safety and homologation by optimizing the BOM, layout, and crash-activation timing.
- Directed end-to-end testing for the Cybercab discharge circuit, overcoming significant thermal constraints through rigorous long-term thermal validation and leading full-vehicle crash testing for field deployment.
- Diagnosed and fixed the **#1 gate drive field failure** for Model 3/Y (internal FET shoot-through) by redesigning the circuit with tuned gate resistance, balancing deadtime margin with vehicle efficiency via dyno testing.
- Eliminated a critical Semi truck axle failure affecting **20% of the test fleet** by redesigning the clutch control board's eFuse circuit to prevent overcurrent conditions and protect the clutch assembly.

SpaceX — Jan 2026 – May 2026

Hardware Engineering Intern — *Hawthorne, CA*

- Designed a mission-critical **10kW high-voltage converter board in Xpedition**, implementing triple redundancy and a 4-phase architecture to reliably power a satellite optical payload.
- **Led EMI/EMC qualification testing** (conducted and radiated emissions/susceptibility), collaborating with mission managers and satellite engineers to present data to government clients and secure flight approval.
- Troubleshot a direct-to-cell RF phased array panel using **CDMA testing and spectrum analysis**; analyzed the FPGA-to-antenna signal chain to root-cause a **5% production failure rate** to faulty bare-die wire-bonded LNAs, driving corrective action with the supplier.
- Investigated precision power converter failures on a modem controller, **tracing a 33% first-pass failure rate** to BGA micro-bridging from a faulty solder stencil; spearheaded the transition to a new contract manufacturer, resulting in a significant improvement in production yield.

Longhorn Racing Electric FSAE Team — Aug 2024 – Present

Hardware Design Engineer — *Austin, TX*

- Designed a high-voltage battery management board using a **Tesla ADBMS chip**, incorporating low-pass filter cell sensing, **isoSPI isolated communication**, and cell balancing to accurately manage cell voltage and temperature
- Developed a 600V, 6.6 kW charging PCB for an electric racecar, significantly reducing battery electronics complexity and increasing future charging compatibility.
- Engineered custom low-voltage boost/buck converters achieving 98% efficiency, and led hardware validation efforts including root-cause diagnosis and PCB rework to resolve design errors.
- Programmed STM32 firmware utilizing **CAN/SPI protocols** to manage battery sensors and user feedback, and implemented the J1772 charging standard with digital logic for precise vehicle state detection.

Projects

25kW Automotive Motor Inverter | *KiCad, PLECS* — May 2025 – Present

- Engineered a custom 3-phase motor inverter for an EV hub motor in KiCad, designing custom gate drive, current sensing, and isolated power topologies to effectively switch Silicon Carbide (SiC) FETs.
- Optimized power stage stability and mitigated FET ringing by validating designs in PLECS and implementing advanced layout techniques such as interleaved power planes and tuned DC link capacitance.
- Implemented critical high-voltage safety features, including discharge circuits and physical isolation, while optimizing the BOM and thermal interfaces to reduce turnkey assembly costs and improve heat dissipation.

Technical Skills

Skills: PCB design (Altium, Xpedition), embedded systems software (C, C++, Verilog), CAD (Solidworks, Catia, Onshape), Spice simulation, wireless chip communication/telemetry (BLE, 5G), electronics manufacturing, PCB rework/soldering, 3D printing, composite materials, Python, MATLAB, Simulink, LabView