Matthew Gorbold McCardle

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EDUCATION:

University of Colorado at Boulder Boulder, CO

Accelerated B.S./M.S. in Electrical Engineering, specialization in High-Speed Digital Engineering Expected: May 2027

Scholarships: Presidents Leadership Class (PLC), Hale, Buffalo Legacy

Relevant Coursework: Analog Signal Integrity in Memory Systems, Applications of Embedded Systems, Computer Systems in Assembly, Electromagnetic Fields, Electromagnetics for HSDD, Embedded Software Engineering, Electronics Design Lab, Leadership Applications I & II, Microelectronics, PCB Design Lab, Power Electronics.

EXPERIENCE:

Formula SAE Racing Team Boulder, CO

Electric Powertrain Lead Engineer Aug 2024 – Present

- Secure seed funding from CU's Engineering Innovation Fund to launch the first student-led EV racing program.
- Configuring the Emrax 208 motor with the DTI HV-550 controller for bench testing to capture speed and torque data.
- Developing the high-voltage battery accumulator architecture, implementing the Orion 2 BMS, and finalizing cell selection.

Kimley Horn Minneapolis, MN

Electrical Engineering Intern – Mechanical, Electrical, Plumbing Team (MEP) Jun 2025 – Aug 2025

- Designed 480/208/120 V power distribution, transformer and switchboard layouts, performing load calculations, applying precise CAD layouts and NEC compliance checks.
- Assisted in technical drawings and calculations using Revit, AutoCAD, and Excel, coordinating 3D MEP models for clash-free integration.

American Electric Power Columbus, OH

Power Engineering Intern – Station Engineering East Ohio Team Jun 2024 – Aug 2024

- Utilized AutoCAD to create detailed one-line diagrams of substations and conducted thorough walkdown checks with BlueBeam to ensure accuracy of onsite equipment against system records.
- Learned station engineering design principles and high voltage circuit protection during onsite substation reviews.

PROJECTS:

4-Layer Instrumentation Board

- Built a high complexity board integrating DAC, ADC, and slammer circuits to analyze power source impedance.
- Debugged boot loading issues, validated waveforms with oscilloscope, and calculated Thevenin equivalents from measurement data.

Embedded Connect Four – STM32F4 Touch Interface

- Developed a Connect Four game with single-player AI on Arm Cortex M4 STM32F4 hardware, implemented SPI LCD interface and I2C touchscreen driver.
- Tuned interrupt-driven GPIO control and profiled code timing to ensure sub-microsecond response for high-speed user input.

Custom Arduino Microcontroller

- Created a two-layer PCB achieving 20% noise reduction through optimized signal routing, power plane segmentation, and ferrite filtering.
- Performed SI sweeps and impedance measurements to refine trace geometry for improved eye-diagram clarity.

Remote Controlled SumoBot

- Built a combat robot using Raspberry Pi Pico, custom PCB, ultrasonic sensors, and IR/RF communications; led circuit layout and Python-based control software.
- Validated signal timing and communication integrity under fight-condition interference using oscilloscope captures.

TECHNICAL SKILLS:

Embedded Systems: ADC/DAC, Arduino, Assembly, C, C++, Debugging, I2C/SPI/UART, Python, STM32 (HAL).

Hardware Design: Altium Designer, AutoCAD, PCB Schematic/Layout, Revit, Signal Integrity, SPICE.

Lab & Prototyping: Breadboarding, Multimeter Testing, Oscilloscope, Soldering.

Software Tools: Bluebeam, Git, MATLAB, Microsoft Office, Onshape, System Verilog.

Interests: Data Centers, Electric Vehicles, Embedded Systems, PCB Design, Signal Integrity.