Logan Hartford

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Skills

- **Electrical:** Altium Designer, PDN Analyzer, High-Speed Routing, Power-Converter Design, SaturnPCB
- **Programming:** Python, JavaScript, HTML/CSS, C/C++, Arduino, Embedded Development
- **Mechanical:** SolidWorks, Matlab, Simulink, Weldments, 3D Printing, AutoCAD, CNC Machining

Experience

Robotic Electrical System Integration, Tesla Bot | Tesla, Inc. September 2023 - December 2023

- Led electrical system integration for AI-driven data collection platforms, designed harnesses with verified CAN-FD signal integrity and developed test protocols to assess operational efficacy.
- Devised a modular repair guide, a comprehensive repair process and a training procedure for technicians for a new generation of robotic hands to boost repair yield from 50% to 95%.
- Reduced triage time during repairs by 75% by implementing software-driven start and end-of-repair checks for robotic hands, employing a Python backend and HTML/JS/CSS frontend for UI efficiency.

Cell Manufacturing Engineering, Can Stamping | Tesla, Inc. January 2023 - April 2023

- Created two end-to-end Python applications to automate data collection and aggregation for an equipment troubleshooting guide, a project aimed at reducing equipment downtime.
- Developed a Python script to extract and format tooling measurement data from over 400 historical PDFs, allowing for analysis of tool lifespan trends.
- Modeled and fabricated a bracket assembly to accurately position trigger sensors and a reject actuator relative to a CV camera on a high-volume production line, resulting in a 15% improvement in system reliability.

Robotic Hardware Design & Firmware | EMR Laboratories Inc. May 2022 - December 2022

- Consolidated the electrical footprint of a sewer inspection robot by 60% by integrating a custom Nvidia Jetson baseboard, motor controller, and fiber-to-ethernet converter into a single main-board.
- Continuously refined the main-board and simultaneously developed the firmware to produce the final version of the board (qty. 400), consisting of an 8-layer, dual-sided PCB with MIPI, USB2.0, and Ethernet routing.
- Designed a custom 4S Li-Ion battery management system (BMS) board with firmware and a prototype charger that enhances the user-friendliness of the robot by eliminating the need to remove the batteries for charging.

Consumer Hardware Design & Firmware | EMR Laboratories Inc. September 2021 - April 2022

- Developed a low-cost, low-power PCB for production (qty. 1500) of a novel safety device for workers at height. The device detects and raises an alarm if a boom lift operator is not safely tied off during operation.
- Built a functional elevator model to emulate real-life scenarios of the safety device, utilizing Arduinos and radio modules to transmit data to a computer for firmware development and performance evaluation.
- Optimized IC configurations, implemented automatic sleep/wake functionality, and reduced code runtime from 90ms to 16ms to extend device battery life from 20 to 128 days.

Electrical Lead, Team Lead | University of Waterloo Robotics Team September 2021 - Present

- Managed team direction, project coordination, and sub-team integration to ensure seamless functioning of all systems in the Mars Rover Robot in preparation for the University Rover Challenge.
- Coordinated and led the electrical team, providing mentorship to novice members throughout their board design process, including assisting with design reviews and assembly and testing using appropriate equipment.
- Created and validated two iterations of an 8A output, 48-24V multi-phase buck converter, utilizing high-power layout techniques to ensure adequate power and heat distribution on the board.

Education

University of Waterloo September 2020 - May 2025

BASc Mechanical Engineering · Mechatronics Option

- Circuits I/II
- Intro to Microprocessors and Digital Logic
- Microprocessor Systems and Interfacing
- Intro to Control Systems
- Mechanical Design I
- Mechanics of Deformable Solids I/II
- Thermodynamics I/II
- Manufacturing Processes
- Fluid Mechanics I/II
- Heat Transfer I