Sadra Shirdarreh

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Education

University of Toronto – *BASc in Electrical and Computer Engineering* Sept. 2022 – May 2026 + PEY

Skills

Programming: C, C++, C#, Python, MATLAB, Verilog HDL, NIOS II Assembly, Javascript, CSS,

Tools: Git, Altium PCB Designer, CANalyzer, Intel Quartus Prime, ModelSim, NI Multisim, LTSpice, HTML, Oscilloscopes, Multimeters, VNA, Waveform Generators, Visual Studio code, Xcode, CPUlator, Quartus Prime Monitor Program, SQL Server Management Studio.

Experience

Computer Engineer, Exodus Orbitals *May 2024 – Present*

- Establishing two-way communication between an Arduino and a Raspberry Pi via GPIO UART on the satellite ground simulator project.
- Facilitating data transfer for the camera, GPS, gyroscope, accelerometer, and temperature sensors.
- Thorough testing of the ground simulator to ensure reliable and efficient communication.

Electrical Engineer, University of Toronto *Jan. 2024 – May 2024*

- Collaborated with a team to design a PCB using Altium Designer for the RF frontend of a Software Defined Radio (SDR).
- Led the development of the circuits needed for the RF frontend and simulated them using Multisim.
- Controlled the oscilloscope using a PC and utilized Python to modify the signals generated by the Oscilloscope and create graphical representations of the PCB outputs.
- Integrated the RF frontend PCB with rest of the radio to ensure full functionality.
- Showcased the designs to product managers using Microsoft applications such as Word, PowerPoint, Visio, Excel and more.

Computer Engineer, UofT Formula Racing Team *Aug. 2023 – Present*

- Designed a safety critical PCB using Altium Designer enabling complete shut-down if brake failure occurs per FSEA rulesets.
- Developed firmware in C++ using Git for Teensy MCU-based rear and corner controllers to proficiently process complex data streams from various sensors including strain gauges, tire temps, damper pots, and more using CAN.
- Enhanced the existing firmware inherited from prior years by adopting effective industry-standard replication practices.
- Developed debugging scripts to test the functionality of the steering motor by sending CAN messages to the actuator.
- Designed and built the fans for the accumulator of the car to ensure cooling of the HV battery for optimal performance.

Projects

Brake System Plausibility Device (BSPD) PCB

- Development of a 4-layer PCB on Altium Designer to implement a safety feature in a formula racing car for system-wide shut down when the accelerator and brake pedals are pressed simultaneously.
- Developed testing guidelines based on the specifications of the BSPD and carried out the testing procedure using multimeters, oscilloscopes, and waveform generators to ensure safety compliance.

Chess Game

- My partner and I created a chess game using the Cyclone-V FPGA in C.
- Developed the legal move checker, algorithms for displaying the board on a VGA display module, the PS2 mouse module for taking user inputs, audio algorithms, and the timer, displayed on the HEX display.
- Featured a GUI that greets the players, explains the rules, and announces the winner when game is done.

Racing Game

- My partner and I created a racing game using the Cyclone-V FPGA in Verilog.
- Employed signal processing to take inputs from a PS2 keyboard and reveal game response on a VGA display.