Colton Acosta

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SUMMARY

Junior electrical engineering student with leadership and professional experience including work in PCB design and fabrication, analog and digital electronics, embedded software, programming, and project management. Interests include controls, signal processing, and embedded systems. Open to relocation.

EDUCATION

B.S.E, Electrical Engineering   Graduating May 2023
Arizona State University, Tempe, AZ   4.00 GPA

TECHNICAL SKILLS

Design and Modeling: MATLAB/Simulink, LTspice, KiCAD, DipTrace, SOLIDWORKS, Microsoft Office
Hardware: Microcontrollers, Soldering, Digital Multimeters, Oscilloscopes, Function Generators
Programming: C, C++, Python, Linux, Git, ARM Embedded Toolchain, MIPS Assembly

EXPERIENCE

Pyramid Technologies, Inc, Mesa, AZ: Electrical Engineering Intern   May 2021-August 2021

- Revised a serial opto-isolator PCB for bill acceptors, resulting in improved digital specifications and MDB compliance
- Conducted testing and qualification of replacement optocouplers including logic low voltage and slew rate measurements for over 50 samples and ambient temperatures ranging from 0 to 60°C
- Designed a test fixture IO protection PCB to protect test fixture pins from overvoltage and overcurrent conditions using schottky diodes and a PTC resettable fuse
- Designed a new revision of a USB to MDB serial converter PCB by adding serial indication LEDs, signal buffering, inrush current protection, and short circuit protection to the original design
- Revised an embedded software development board for Pyramid bill acceptors by adding an electronic fuse to alleviate faulty supply/loading conditions and provide power supply fault indication

Sun Devil Rocketry: Liquid Propulsion Team Lead   August 2019-Present

- Leading a multidisciplinary team of over ten students to design and develop a liquid bipropellant rocket engine
- Designing an avionics system to monitor and manage all engine hardware including including valves, transducers, thermocouples, load cells, motor drivers, transceivers, and signal processing circuitry
- Designed an embedded engine controller PCB including an ARM Cortex-M4 microcontroller, a switching power supply, an embedded flash memory/micro SD card data logger, and GPIO connectors
- Interfacing temperature, pressure, thrust, and flow measurements with a Python graphical user interface
- Programming engine microcontrollers with C for software control of engine data acquisition and actuation
- Designing an instrumentation amplifier PCB with digitally programmable gain to boost sensor outputs to measurable ranges in order to save upwards of 10% of overall club funding in sensor costs
- Designed and built a second order, active low-pass filter and tested the filter's noise reduction and signal reproduction by adding noise to a measured signal with a voltage summing circuit
- Designing an actuation interface for the engine's AC powered flow control solenoids using solid state relays
- Documented project progress in published AIAA Propulsion and Energy conference paper

PROJECTS

Flow Control Valve Actuator Control System   Fall 2020

- Designed and built a closed loop control system for a valve actuator for use in flow throttling applications
- Examined the relationship between Pulse Width Modulation duty cycle and steady state shaft speed to derive a controller output signal with a linear transfer function from controller output to shaft position
- Characterized the plant transfer function with a series of step response experiments
- Implemented a saturated PI controller with integrator clamping in C++, and simulated the performance using Simulink to meet specifications of zero steady state error of step inputs and complete rejection of step disturbances
- Built the actuator control system using a brushed DC motor, coupling shaft, Arduino controller, and a quadrature rotary encoder for feedback