Colton Acosta

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SUMMARY

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

EDUCATION

B.S.E, Electrical Engineering; Signal Processing and Controls — Graduating May 2023
Arizona State University, Tempe, AZ — 4.00 GPA
Relevant Coursework: EEE 480 Feedback Systems, EEE 481 Digital Control Systems

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 switching power supply and serial opto-isolator PCB to be used in multiple Pyramid bill acceptors
- Conducted testing and qualification of replacement optocouplers including measurements of logic low voltage and slew rate for 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 revised USB to MDB serial converter PCB adding serial indication LEDs, signal buffering, inrush current protection, and short circuit protection to the original design
- Designed a revised bill acceptor software development board 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 nine engineering 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
- Designing an instrumentation amplifier PCB with digitally programmable gain to boost available sensor outputs to measurable ranges resulting in sensor savings upwards of 10% of club funding
- 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
- Building a central telemetry system using RS-485 electrical interfaces for long distance and noise insensitive serial communications between data acquisition, valve control, and main controllers
- 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
- Designed and simulated a saturated PI controller with integrator clamping using Simulink to meet performance 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 quadrature rotary encoder for feedback.