Colton Acosta

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SUMMARY

Junior electrical engineering student with leadership and professional experience including work in PCB schematic and layout design, analog and digital electronics, embedded software, programming, and project management. Interests include avionics, control theory, signal processing, and embedded systems.

EDUCATION

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

TECHNICAL SKILLS

Design and Modeling: LTspice, KiCAD, DipTrace, MATLAB/Simulink, Cadence, Keysight ADS
Hardware: System Verilog, Microcontrollers, Soldering (SMT), Multimeters, Oscilloscopes, Function Generators
Programming: C, C++, Python, GCC Assembler, Linux, Git, Make, ARM Cortex-M

EXPERIENCE

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

- Evaluated bill validation errors of a Pyramid bill acceptor in firmware using an in-circuit debugger with the calibration source code, written in coldfire assembly.
- 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
- Revised 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

Sun Devil Rocketry: President and Avionics Team Founder   August 2019-Present

- Managing a technical student organization with over 50 members by overseeing engineering projects, organizing events and meetings, writing budgeting plans, mentoring, and maintaining industry/university relations
- Developing an avionics system for a liquid rocket engine to manage all engine hardware including valves, transducers, thermocouples, load cells, motor drivers, wireless transceivers, and signal processing circuitry
- Designing an embedded engine controller PCB including an ARM Cortex-M7 microcontroller, a switching power supply, an external flash and SD card data logger, and an ignition system
- Programming ARM Cortex microcontrollers with C and assembly using CMSIS HAL drivers for low level software control of data acquisition, actuation, flow control, and communications hardware
- Programming a Python user interface for real-time visualization of temperature, pressure, thrust, and flow measurements
- Designing an instrumentation amplifier PCB with digitally programmable gain to boost available sensor outputs to measurable ranges in order to save upwards of 10% of club funding in new 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
- Designed a valve controller PCB to control AC powered solenoids and stepper motors using an ARM Cortex-M4 microcontroller, solid state relays, an optically-isolated AC supply monitoring circuit, and calibration sensor inputs

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 quadrature rotary encoder for feedback.