# Colton Acosta

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## SUMMARY

Junior electrical engineering student with leadership and professional experience including work in PCB design and fabrication, electronics, embedded software, programming, and project management. Interests include control theory, 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

- Conducted phototransistor data collection and analysis with over 150 LEDs to find a viable replacement bill validation LED that would work at scale production
- Conducted electrical tests and wrote qualification documents for replacement PCB parts to resolve procurement issues
- Resolved electrical issues with dysfunctional test fixtures and equipment used by engineers and production staff
- Conducted testing and qualification of new optocouplers including measurements of logic low voltage and slew rate for ambient temperatures ranging from 0 to 60°C
- Revised a switching power supply and serial opto-isolator PCB to be used in multiple Pyramid bill acceptors
- Designed a revised USB to MDB serial converter PCB by 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 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 transducer outputs to measurable ranges in order to save upwards of 10% of club funding in transducer costs
- 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
- 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.