Collins Culbert

Electrical Engineering Student | Embedded Systems & Robotics Control

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SUMMARY

Junior Electrical Systems Engineering Technology student with hands-on experience across closed-loop robotics control, FPGA digital logic, and register-level embedded programming. Led the engineering build of a 10-servo, PID-controlled robotic hand that earned a 1st Place - Best Presentation award and finalist standing. Comfortable working end to end: schematic to firmware to live demo.

TECHNICAL SKILLS

Programming	Python, SQL, Pandas, C/C++ (STM32 bare metal), MicroPython, JavaScript, HTML/CSS
Hardware & Tools	Keil uVision, Quartus Prime (FPGA/DE10), KiCad, oscilloscopes, multimeters, DC motor drivers
Generative AI	Anthropic Claude API integration, prompt engineering, AI-assisted workflow automation
Specializations	Closed-loop PID control, I2C sensor integration, FPGA state machine design
Software	MS Office Suite, HubSpot (basics)

PROFESSIONAL EXPERIENCE

Engineering Participant | GE Aerospace Electrical Engineering Simulation | Dallas, TX · 05/2025

- Analyzed avionics electrical systems using structured problem-solving and critical-thinking frameworks.
- Developed electrical system design plans and produced supporting technical documentation for proposed designs.
- Contributed to verification and validation planning to support design accuracy and reliability.

PROJECTS

Robotic Hand - Closed-Loop PID Control · MicroPython, RP2040/ESP32, AS5600, PCA9548A, I2C

- Co-designed and built a 10-servo DC motor-driven robotic hand (2 continuous-rotation servos per finger) for the Texas A&M Robotic Hand Challenge.
- Engineered a closed-loop PID control architecture using AS5600 magnetic encoders read over I2C through a PCA9548A multiplexer for per-finger position feedback.
- Built a calibration workflow in MicroPython to capture and store named hand poses from live encoder data.
- Delivered the technical presentation that earned the team the 1st Place - Best Presentation Award and overall finalist standing.

FPGA Motor Speed Controller · Quartus Prime, DE10 FPGA, Verilog/VHDL, PWM

- Designed and implemented a 7-state, one-hot Moore state machine PWM motor speed controller on the DE10 FPGA.
- Drove a BCD 7-segment display output directly from FSM state logic.

STM32F4xx Embedded Systems Lab · C (bare metal), STM32F4xx, Keil uVision

- Programmed GPIO peripherals and SysTick timers at the register level in C with no HAL abstraction.

EDUCATION

- B.S., Electrical Systems Engineering Technology (in progress) · Texas A&M University, College Station, TX · Expected Dec. 2028
- Regents Scholar

LEADERSHIP & INVOLVEMENT

- Cohort 2 Member, KCLI Brotherhood · College Station, TX · Sept. 2024 - Present