Thomas Lang

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EDUCATION

Bachelor of Science | Washington University in St. Louis 2021 - 2025

- Major: Electrical Engineering and Computer Science
- GPA: 3.94/4.0
- Relevant courses: Data Structures and Algorithms, Circuits, Digital Logic, Signals and Systems

WORK EXPERIENCE

Electrical Engineering Co-op Emerson Electric Professional Tools| January 2024 – August 2024

- Completed work integrating a new data-logging feature to store and retrieve information in an external SPI flash chip on a cable puller. Bluetooth Low Energy (BLE) characteristics were added to retrieve data, and unit tests were created to ensure storing of up to 300 hours of run data. Code was written for a NRF52 in C.
- Assisted in designing and laying out a custom test fixture PCB to verify product functionality, such as checking boards turns on and draw a reasonable amount of current. Design was made in Altium and simulated in LTSpice.
- Created a test procedure and report comparing a new supplier's board's performance with boards in production. Tests included comparing current draw with a multimeter and reactions to signals from a function generator.
- Updated previous test fixture firmware to improve test coverage with 2 new tests, including triggering sleep mode and verifying the state of the unit by measuring current. Development was done in Python on a Raspberry Pi.

Research Assistant Washington University | May 2022 – September 2023

- Developed pipelined High-Level Synthesis (HLS) C++ code for a Pynq board FPGA to receive a custom 4105 sample data packet and perform calculations such as integration and island detection in under 10,000 clock cycles.
- Collaborated with 3 team members from the University of Hawaii to replicate and validate their dual FPGA setup, where one simulated a data collecting ASIC sending a custom data packet, and one received the data.
- Implemented the AXI-Stream interface in VHDL to forward data packets read by the FPGA to HLS processing and interfaced reads writes from the FPGA BRAM to a text file, using a Jupyter Notebook overlay for debugging.

Clubs And Projects

STM32 Lightsaber May 2024 – August 2024

- Designed a custom PCB from schematic to layout powered off batteries for an STM32 to register button inputs, control a haptic motor, and control lights that fit in a small enclosure using KiCad.
- Wrote firmware for the STM32 to animate LEDs and control motor power with PWM inside STMCubeIDE.
- Implemented a ship mode circuit, and verified current draw was reduced by more than 90% using a multimeter.

Robotics Club Electrical Lead January 2023 – Present

- Programmed and wired an Arduino IOT microcontroller to accept pixel values from a webserver and display them on an 8 by 32 Neopixel LED panel.
- Built a Flask webserver to accept user drawn images and send a JSON with RGB values corresponding to the image.
- Worked with a team of 3 in constructing, soldering, and tunning a drone to fly based on the CrazyFlie framework.

IEEE Club Secretary August 2022 - Present

- Managed a group of 7 people in building, soldering, and maintaining of LED dance floor tiles to be used in the school dance party Vertigo, which is the second most attended event at WashU.
- Taught digital logic to club members to compete in a local Blackbox competition; the team won first and second.

Skills

Programming Languages: Java, C++, Python, MATLAB, Vivado, VHDL, Verilog

Other: Git, GitHub, J-Link Debuggers, Multimeters, Logic Analyzers, Oscilloscopes