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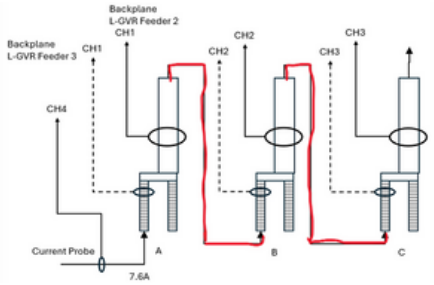
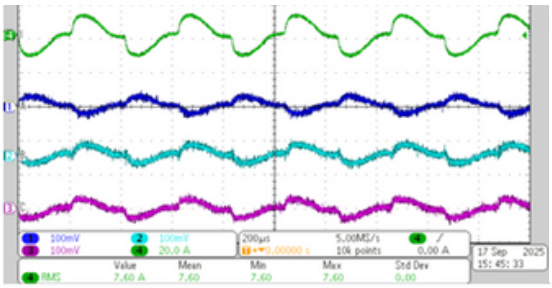
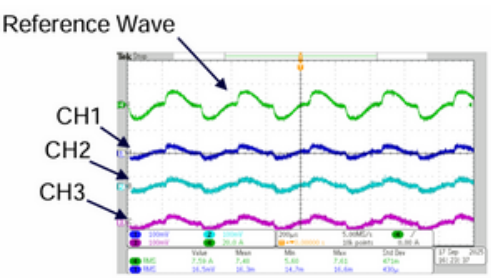
BACKUP GENERATOR CURRENT TRANSFORMER TEST - GE AEROSPACE







What?

- Performed an **analysis to identify the fault location** and **verify the root cause** indication that led to a generator differential fault.

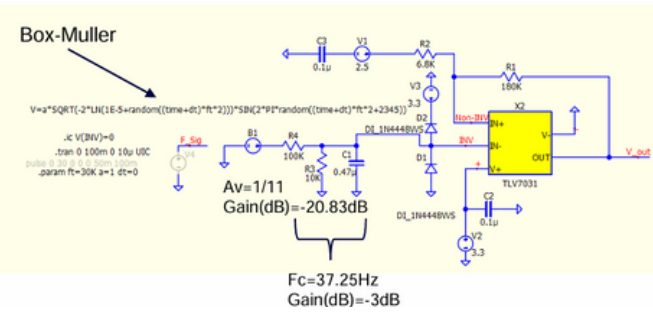
How?

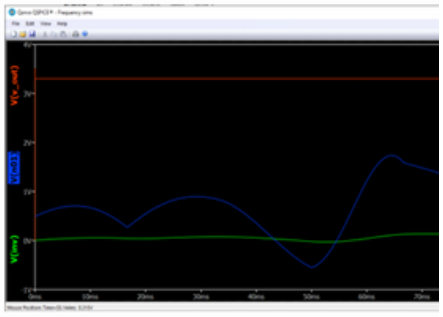
- Reran ESS while monitoring system readings to **confirm fault symptoms.**
- Injected a sine wave signal to evaluate zero-sequence and shorted input currents.
- Applied a 17 V test signal through the supply load and **monitored current flow** via jumper connections using an **oscilloscope** to verify CT polarity.

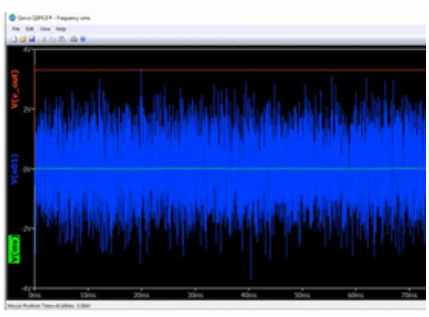
Results

- Reduced faulty products sold to customers by **87%**.

RAT ESS TESTING STAND SIMULATION - GE AEROSPACE







What?

- Designed and validated a low-pass filter circuit for the RAM Air Turbine (RAT) ESS **PWB** test stand by analyzing its response to **Gaussian (white) noise** across the passband and stopband frequencies.

How?

- Designed the low-pass filter schematic using **Altium Designer**.
- Simulated circuit performance in **LTspice** and **QSpice**, sweeping input frequencies below and above the cutoff frequency to evaluate attenuation behavior.
- Generated a Gaussian noise source using the Box–Muller Transform.

Results

- Verified filter performance using input frequencies of 30 Hz and 30 kHz.
- **30 Hz** (below cutoff): minimal attenuation, confirming proper passband behavior.
- **30 kHz** (above cutoff): high attenuation, validating effective stopband noise suppression.

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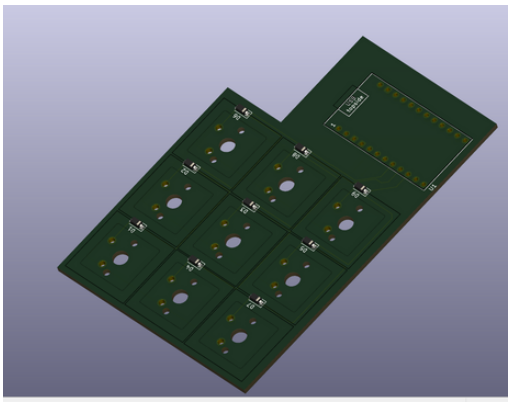
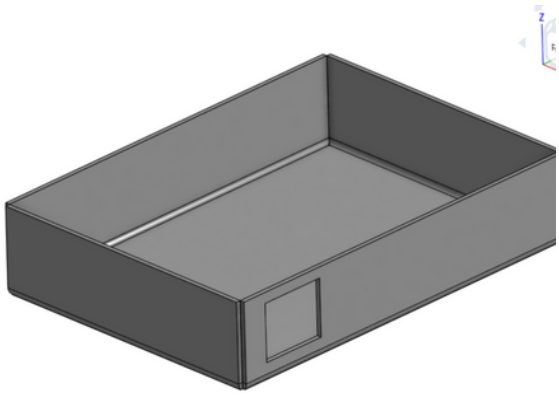
3 BY 3 MACROPAD - Personal Project





What?

- Designed and built a 3×3 macropad for customizable. keyboard shortcuts
- Intended to attach to laptop for improved workflow and efficiency.

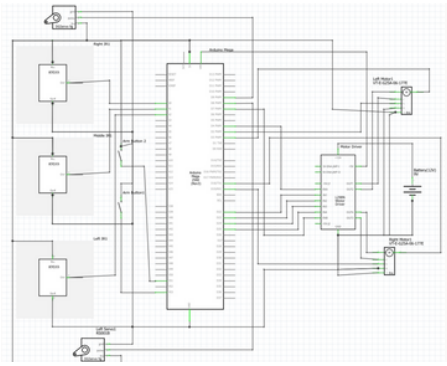
How?

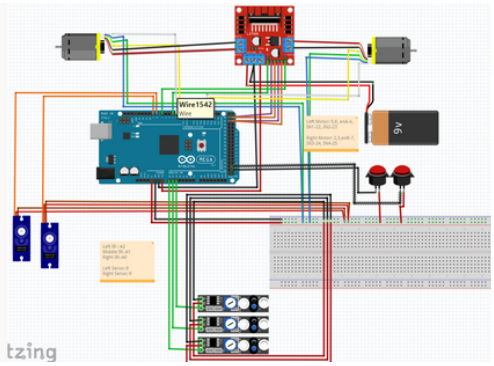
- Created circuit schematics and PWB layout using **KiCad**.
- Modeled and designed a metal case in **OnShape**.
- Used a **press machine** for sheet metal bending and **welded corners** for rigidity.
- Laser-cut chassis and PWB spacer with a CO_2 laser.
- Programmed device with **QMK firmware** for full shortcut customization.

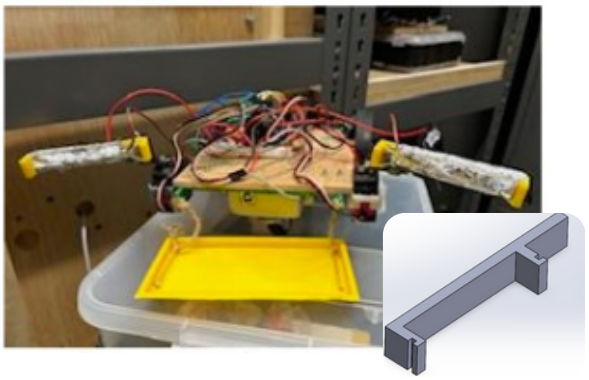
Results

- Achieved a fully functional macropad integrated with the laptop setup.
- Demonstrated proficiency in **CAD design, electronics, and manufacturing processes**.

AUTONOMOUS BEAVER BOT - ASEE ROBOTICS COMPETITION







What?

- Designed and implemented an autonomous **servo-actuated gripper system**.
- The system collects and transports target objects into a collection dustpan.

How?

- Designed collector arm gear in **SolidWorks**.
- Implemented rubber band tensioning system with tan foil contact sensor.
- **Wired servo motor control** circuit to **Arduino** and integrated sensor feedback using **C++**.

Results

- **Achieved 75% success rate (36/48)** during 2024 ASEE competition trials.
- Mechanical tan foil trigger system ensured precise activation timing.

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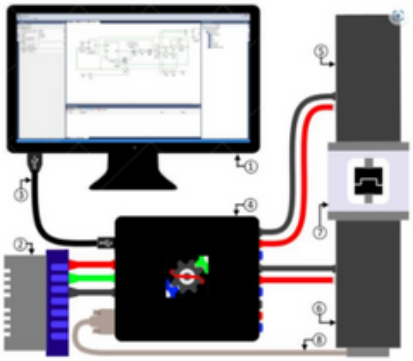
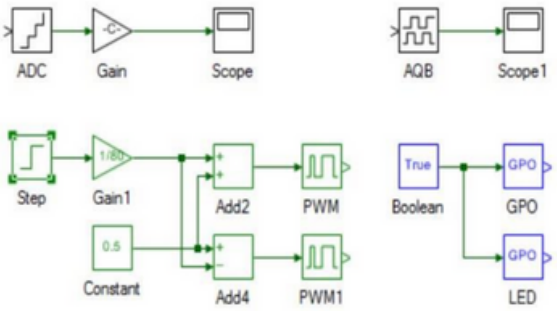
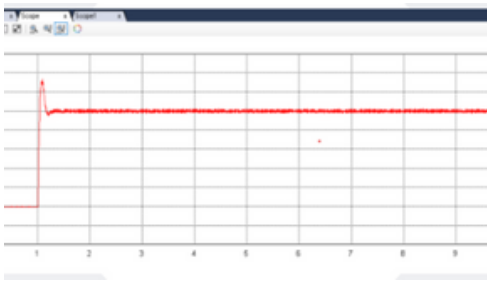
DYNAMOMETER PI MODULE - UNDERGRADUATE RESEARCH UofL







What?

- Characterize a DC motor and implement a **Proportional-Integral (P.I.)** controller for precise speed control using a dynamometer setup.

How?

- Derived and applied parametric equations on the **Workbench Software** to estimate real-time parameters such as armature resistance and inertia.
- Implemented a P.I. controller, using the proportional gain for faster response and the integral gain for **improved steady-state accuracy**, to achieve desired **motor speed trajectories**.

Results

- Successfully simulated and achieved real-time **DC motor speed control** and practical application of theoretical control algorithms.
- Verified the functionality of the P.I. controller in maintaining a constant output torque or speed regardless of certain load changes.

ENGINEERING ACADEMY LEADER/SCHOLAR - J.B. SPEED SCHOOL UofL

Brown-Forman Engineering Academy Scholar | 2023

- Selected as **1 of only 48** participants for a highly competitive, 2-week intensive residential engineering program.
- Awarded **$5,000+** in merit-based scholarships for academic performance and program completion.

Brown-Forman Engineering Academy Mentor | 2024

- Selected to **lead a cohort of 8** incoming freshmen, serving as a primary resource for their transition into engineering school.
- Provided intensive **calculus tutoring** and **academic support**, helping students navigate the rigors of engineering-level mathematics.
- Awarded a **$3,000+** stipend in recognition of leadership excellence and commitment to student success.