Samuel Braun

Electrical Design Engineer

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EDUCATION

University of Louisville, J.B. Speed School of Engineering Expected May 2027
B.S. Electrical Engineering | GPA 3.67 / 4.0 | Dean's List
Relevant coursework: Control Systems, Electronics, Computer Design (VHDL), Logic Design, Signals and Systems, Electromagnetics

University of Louisville, College of Arts and Sciences May 2021
B.A. Philosophy | GPA 3.6 / 4.0 | Dean's List

EXPERIENCE

ControlTouch Systems, LLC | Hardware Design Engineer Co-op | Louisville, KY Aug 2025 – Aug 2026
Two full-time co-op rotations and part-time work between them, designing motor control panels for airport baggage handling systems.

- Independently designed a motor control panel for an airport baggage handling system in AutoCAD Electrical, from the customer's specification and conveyor manifest to a drawing set of more than 70 sheets, ready for build.
- Designed the 480 V, 120 V and 24 VDC power distribution, and sized the motor branch protection, control transformer and power supply from the connected loads.
- Designed the control architecture to meet the customer's warm backup requirement: primary and backup PLC processors sharing an Ethernet I/O adapter, with distributed remote I/O on ring networks.
- Designed hardwired emergency-stop zones using safety relays, including the interlock with an existing panel.
- Calculated voltage drop on the field 24 VDC runs to determine how many drives could be supplied from a single run, and prepared the cable lists for the field I/O.
- Integrated the panel with an existing Modbus TCP panel through an EtherNet/IP gateway.
- Checked built panels before shipment by point-to-point continuity verification against the drawings, and revised drawing packages against redlines from senior and field engineers.

PROJECTS

Senior Capstone: Full-Size Pinball Machine | Project lead | ECE 497 Aug 2026 – Dec 2026

- Led the design and construction of a full-size pinball machine and completed most of the engineering: system design, simulation, 3D models, electrical design and testing.
- Reviewed the solenoid driver inherited from a prior team and found that a shared gate resistor reduced the MOSFET gate voltage from about 3.7 V to 2.2 V when two coils fired together; redesigned the driver with an independent 12 V gate divider on each channel.
- Sized the 48 V coil supply from a worst-case analysis of coil duty cycle, selecting a 500 W supply with a 30,000 µF capacitor bank to limit voltage sag.
- Designed two circuit boards in Altium, a seven-channel 48 V solenoid driver with optoisolation and per-channel fusing and an LED controller, then assembled and bench-tested both.
- Built the table in simulation (Visual Pinball X) before construction and used its dimensions to produce the CNC, laser and 3D-print files; used AI tools for the firmware and CAD scripting.

SKILLS

Design tools: AutoCAD Electrical, Altium Designer, KiCad, LTspice, MATLAB, Xilinx Vivado
Electrical design: Power distribution (480 V, 120 V, 24 VDC), motor control, safety circuits, schematic capture, PCB design
Test equipment: Multimeter, oscilloscope, bench power supply
Hardware: Board assembly and soldering, Arduino Mega (AVR), Teensy 4.1 (ARM Cortex-M7), VHDL on FPGA
Other: U.S. citizen