Brandon A. Bornkamp

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PROJECTS

DC to 3-Phase AC Inverter | *Senior Design* | Angola, IN Aug. 2020-present

- Designed a 3-phase inverter to convert a 9V DC signal from a parallel combination of rechargeable batteries to a $12V_{RMS}$, 60Hz AC signal for each phase. Voltage, current and power are displayed at the output terminal before the 3-phase 18W load. The inverter uses a microcontroller for PWM signal generation, half H-bridge IC chips to control switching MOSFETs, an LCL filter to smooth out the AC signal, and a boost converter with manual feedback control.

LED Bar Volume Meter | *Instrument Systems* | Angola, IN Aug. 2020-Nov. 2020

- Designed an LED Bar Volume Meter to be used in various audio applications. The device was to be handheld and battery operated. Responsible for selecting a sensor and other electrical components, designing the circuit, and laying out a printed circuit board (PCB) using KiCad. Worked with two DET groups to design an encasement for the PBC with the electronics fully assembled and resolve design issues such as sensor, switch, display, wiring, and battery placement. Ensured that the total cost for two devices did not exceed $90.

Automatic Pet Feeder | *Mechatronics* | Angola, IN Mar. 2020-May 2020

- Designed an Automatic Pet Feeder to be used by the Angola Animal Shelter. The device was to stand alone and be powered by the grid. It contains a hopper that can be refilled and cleaned and can accurately dispense food down to a ¼ cup. It initializes the feeding sequence from an RFID tag on a pet's collar. Using a variety of sensors and a Raspberry Pi 3, the pet feeder was coded in C and Python and remained under $100.

EDUCATION

Bachelor of Science – Electrical Engineering Expected Graduation: May 2021
Minors: **Robotics** and **Mathematics**
Trine University, Angola, IN

- GPA: 3.78/4.00
- Student Athlete & Social Media Coordinator, ACHA Men's Ice Hockey (2017-2020)
- Eleven Fifty Academy: Winter Coding Experience (Dec. 2020-Jan. 2021)

SKILLS

Proficient:

- Microsoft Office - Word, Excel, PowerPoint)
- Circuit component knowledge & datasheet analysis
- Lab equipment - oscilloscope, power/signal generator, DMM, soldering iron
- CAD software - Inventor, AutoCAD, Fusion 360, Siemens NX 12.0, MathCad, Revit Architecture
- CAE software - TINA, LTspice, Labview, Quartus
- PCB design using KiCad
- Spanish speaking and writing

Beginner:

- Programming & Coding – C, HTML, CSS, Java, JavaScript, Python, Verilog HDL, & MATLAB
- API & webpage development using Visual Studio Code
- Woodshop machinery - drill press, band saw, sander, grinder, etc.
- RSLogix500 & RSLogix5000 PLC ladder logic
- Experience with the Digilent Analog Discovery 2, a USB oscilloscope device
- Microcontrollers - Raspberry Pi, Arduino, Teensy ++ 2.0, ATMEGA328PB Xmini

RELATED EXPERIENCE

Electrical Engineering Intern | *Ultra Electronics USSI* | Columbia City, IN May 2020-June 2020

- Researched alternative GPS chip modules used to pinpoint sonobuoy location via satellite to minimize cost and avoid programming modifications.
- Modified a high voltage buck-boost converter board to increase its output charging voltage/current and designed an encasement to house the board, power adapters, and cooling fans.
- Worked with functional leads and other interns to facilitate the design and production of transducers on Air Deployable Active Receiver (ADAR) sonobuoys.

Engineering Intern (Work-Study) | *Innovation One, Trine University* | Angola, IN Sept. 2018-May 2019

- Constructed circuit encasements and performed digital multimeter (DMM) testing on prototype reaction light systems to be used in swim competitions for deaf swimmers.
- Fabricated an integrated flashing light and touch board system.

Engineering Intern | *ALCONEX Magnet Wire* | Fort Wayne, IN June 2018-Aug. 2018

- Used AutoCAD and Fusion 360 to design and replicate machine parts and create engineering drawings.
- Designed and constructed a wire insulation cutter to eliminate wasted product and recycle insulation.
- Developed an accurate pound-to-footage calculator on Excel to minimize production errors.
- Performed tensile strength tests for Cu and Al wire and completed certificates of compliance.
- Designed a quality control spreadsheet on Excel to tabulate monthly/annual errors by shift and category.