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Projects

LIFI Communication Project | *School Project* *Ongoing*

- Research current developments in VLC (Visible Light Communication) and LIFI
- Develop and design a transceiver using light as a medium (instead of radio waves)

Macro Keypad | *Independent Project* *Ongoing*

- Design a feature-heavy macro keypad, which will include:
 - RGB CherryMX keys
 - Two rotary encoders
 - An OLED display controlled by the host machine

E-Ink Name Tag V2 | *Independent Project* *Ongoing*

- An upgrade to the previous E-Ink Display Label, which includes:
 - Replacing the SD card with an I2C EEPROM
 - Replacing the coin-cell battery with a Lithium-Polymer cell, and adding protection and charging circuitry for it
 - Adding a USB Type-C connector with a basic CC controller (TUSB230) to upload the frames directly from the host machine with a VirtualComPort

Space Invaders Game | *School Project* *2020*

- Final project for my Embedded Systems class, which includes re-creating Space Invaders on an STM32F107 development board
- Created the low level drivers for the LCD (ILI9341), EEPROM (24AA01), passive buzzer (PWM), and an audio IC (VS1053)
- Created the majority of the game logic and game abstraction drivers

E-Ink Name Tag V1 | *Independent Project* *2020*

- Worked in conjunction with Jake Iwanicki to develop a coin cell battery powered name tag which utilizes an e-ink display in order for the contents to be changed on demand
- Developed the low-level driver for the e-ink display and SD card
- Developed the option to load what will be displayed from an FAT32 formatted SD card
- Designed the circuit to have a current draw of 1.8uA or less when the circuit is inactive

Temperature Coefficient Automated Testing Rig | *Strain Measurement Devices* *2021*

- Design a fixture that is backwards compatible with the current setup to interface to a data-acquisition meter
- Create the testing software in Python to communicate with all instruments, automatically test all tested parts for their temperature coefficient, and store all information in a MongoDB database

Non-Invasive Single Point Liquid Level Detector | *Strain Measurement Devices* *Ongoing*

- Design a sensor which outputs a digital signal depending if a liquid has reached/passed the top of the sensor mounted outside of the liquid container
- Design a calibrator device in order to calibrate the sensor on-field

STM32 Music Player | *Independent Project* 2020

- Utilized an STM32F103 microcontroller to read an 8-bit .wav file from an SD card and output the read data unto a timer to generate a PWM signal with varying duty cycle, which is filtered into an analog signal with a low-pass filter

UNH's Makerspace's Valentines Soldering Event | *University of New Haven* 2020

- Developed 3 soldering kits in the shape of a heart, a heart with a piercing arrow, and a snowflake that was soldered by people with generally little experience with soldering during the Makerspace's soldering event in February 2020
- Designed the arrow pierced heart soldering kit with a square hole with right angle LED's on the edge in order to illuminate an engraved acrylic square that was placed in the square hole with a stand

Connect 4 PCB | *Independent Project* 2020

- Designed a Connect 4 game with a PCB, pushbuttons, and LEDs

STM32 Pong Game | *Independent Project* 2020

- Developed a pong game with an STM32 microcontroller and an ILI9341 LCD display driver
- Developed the low-level drivers for the ILI9341 display

UNH's Makerspace's Christmas Soldering Event | *University of New Haven* 2019

- Developed 3 soldering kits in the shape of a Christmas tree, a menorah, and an ornament that was soldered by people with generally little experience with soldering during the Makerspace's soldering event in December 2019
- Designed the Christmas tree soldering kit with the option of a multi-board construction in order to give the kit a more "3D" appearance
- Designed the menorah soldering kit to use a capacitive touch pad to increment the number of LEDs illuminated

Non-Invasive Pressure Sensor Automated Testing Rig | *Strain Measurement Devices* 2019

- Developed a fixture which acts as a communication hub between a computer, a multimeter, a non-invasive pressure sensor, and a pressure controller
- Programmed a test application in Python which, upon activation, automatically tests and calibrates the pressure sensor to output a linear response in accordance to out specification

UNH's Makerspace's Fall Soldering Event | *University of New Haven* 2019

- Developed 2 soldering kits in the shape of a ghost and a pumpkin that was soldered by people with generally little experience with soldering during the Makerspace's soldering event in October 2019
- Designed the pumpkin soldering kit to use a capacitive touch pad to trigger different illumination modes

Arduino Simple LED Matrix Library | *Independent Project* 2019

- Developed a library to simplify driving MAX7219 controlled LED matrices with an Arduino

OLED Business Card | *Independent Project* 2018

- Designed a PCB with an ATtiny85 and a 0.96" OLED module in order to display any information stored on an ATtiny85

WS2812B LED Controller | *Independent Project*

2017

- Designed a PCB with an ATmega328p to control a WS2812B LED strip, as well as an optional ATtiny85 to handle communication between the ATmega328p and an HC-06 Bluetooth module

Binary LED Watch | *Independent Project*

2017

- Designed a PCB with an ATmega328P, a TPS61222 Boost converter, and an MCP7940 RTC with 18 LED to represent the current time in a binary format

Personal Website | *Independent Project*

Ongoing

- Full-stack developer maintaining and programming my personal website
- Using PHP and JavaScript to allow for interactive pages