

# EVAN LAU

MECHATRONICS ENGINEER AT TMU

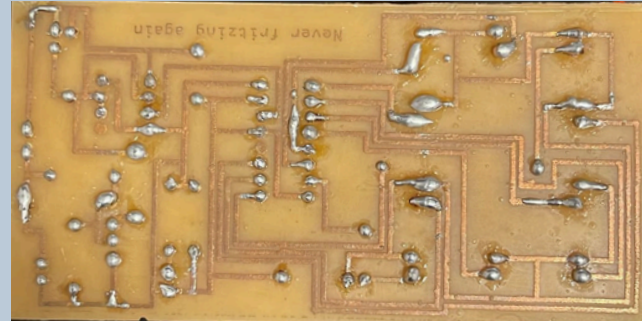
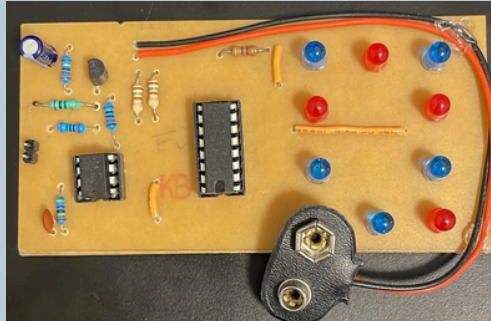


647-880-5028



lau.evansf@outlook.com

## 555 Timer Roulette Simulation



### What?

- Designed and built a roulette simulation circuit using the 555 timer IC
- Aimed to explore how timing circuits could be applied beyond theory

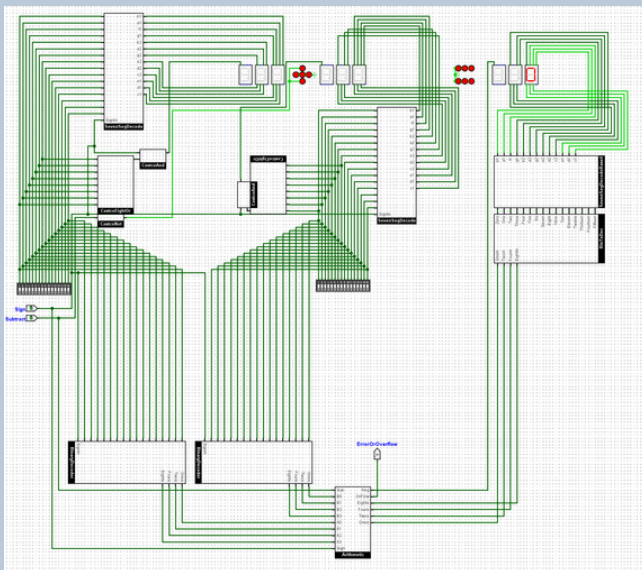
### How?

- Assembled and soldered components onto the fabricated board
- Developed the PCB layout to generate timed pulse sequences with the 555 timer

### Results

- Delivered a fully functional roulette simulation with visual outputs

## Base 7 Input to Base 4 Output ALU



### What?

- Designed and implemented an Arithmetic Logic Unit (ALU) capable of performing basic arithmetic and logical operations.
- Extended the design to include signed number support and base-conversion functionality.

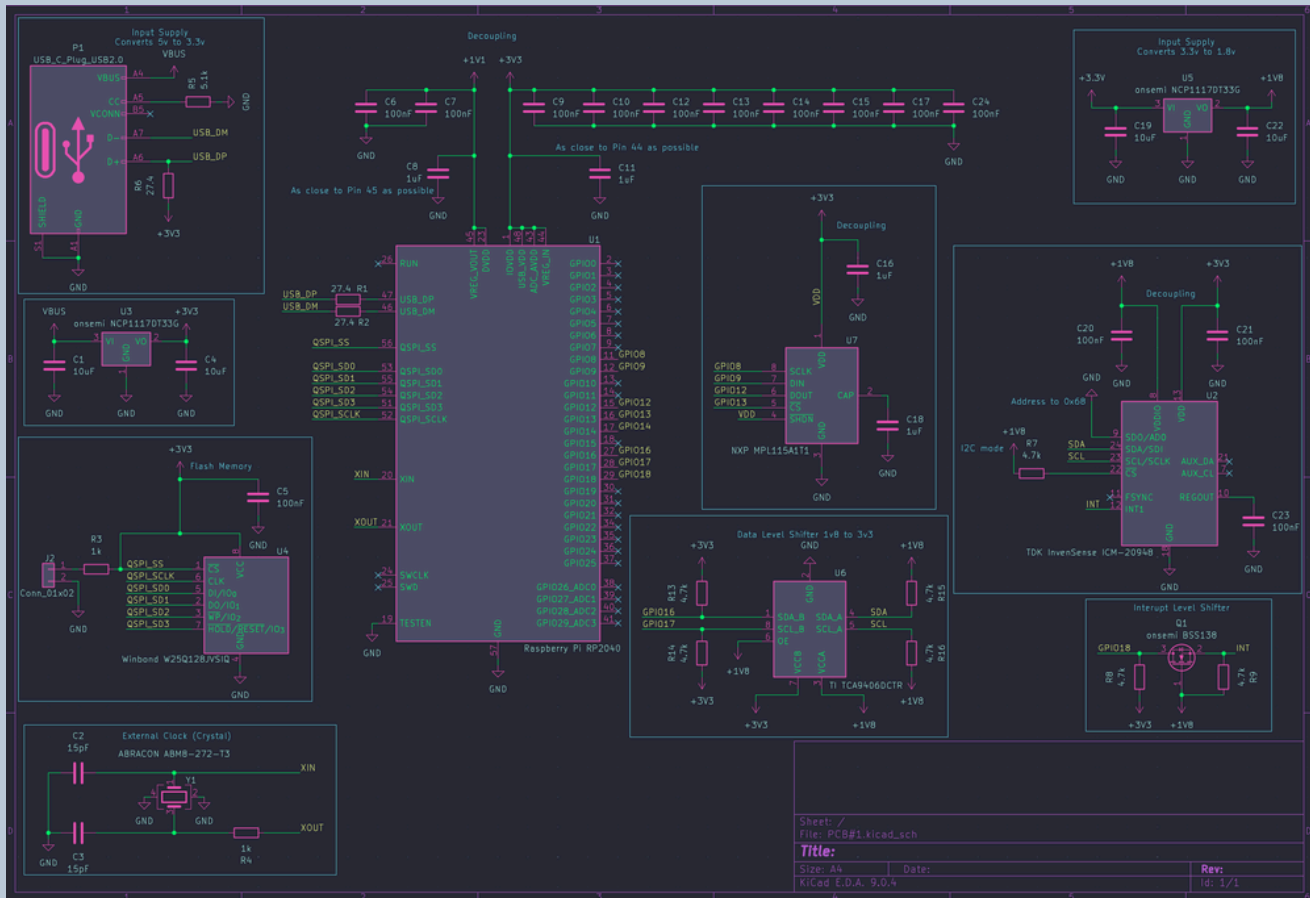
### How?

- Designed logic circuits using fundamental CMOS gates to implement arithmetic and logic operations.
- Integrated additional modules to handle signed integers and perform base conversions.
- Conducted thorough testing across multiple input cases to verify correctness and reliability.

### Results

- Produced a fully functional ALU capable of executing a range of arithmetic operations.
- Achieved accurate results across all tested operations, including signed number handling and base conversions.

# Avionics Sensor Board



## What?

- Designed a custom RP2040-based 9-axis sensor board for embedded motion sensing applications
- Integrated power regulation (5V → 3.3V → 1.8V)
- Aimed to gain hands-on experience with KiCad and end-to-end hardware development

## How?

- Developed full schematic from scratch in KiCad, partitioning power, MCU, sensor, and interface subsystems
- Implemented proper decoupling strategy and regulator stability components
- Ensured proper level shifting to ensure signal compatibility and reliability

## Results

- Gained hands-on experience in microcontroller bring-up considerations, voltage domains, and embedded system architecture
- Practical experience in voltage domain management, decoupling strategy, and digital signal interfacing
- Established a foundation in PCB system design principles