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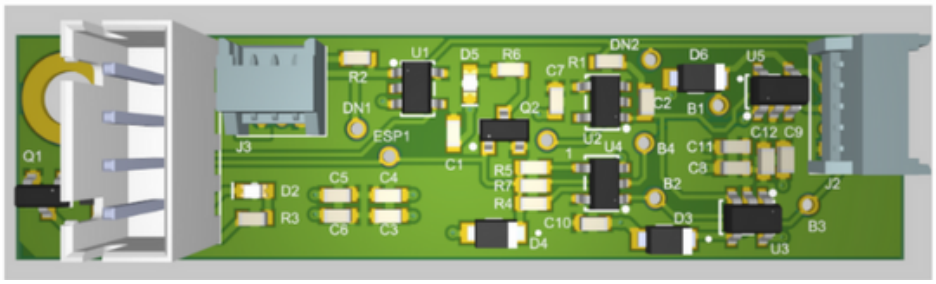
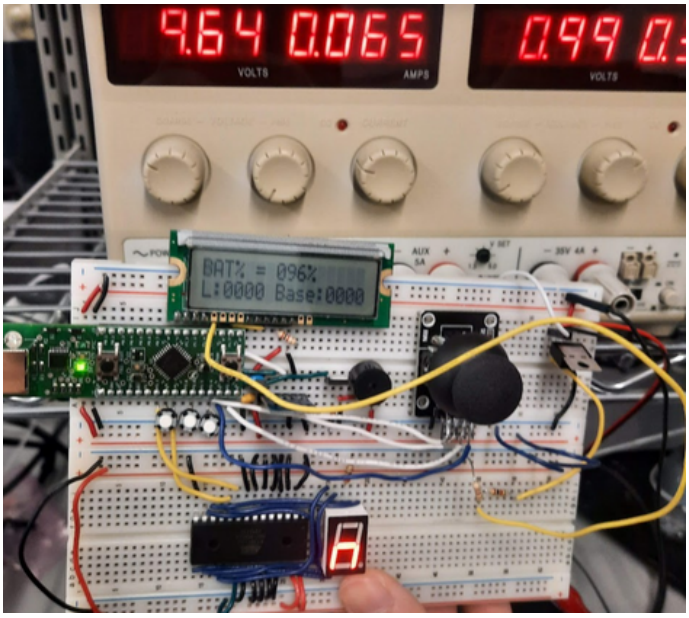
Breakbeam PCB



Control board

The purpose of the Breakbeam PCB is to detect the presence of a ball within the dribbler of a soccer-playing robot. It achieves this by using an infrared (IR) LED and sensor system. I updated the Control Board by adding a GPIO for cable shearing detection, replacing cable headers with low-profile through-hole connectors, and incorporating Zener diodes to protect logic circuits from static electricity.

Metal Detecting Robot

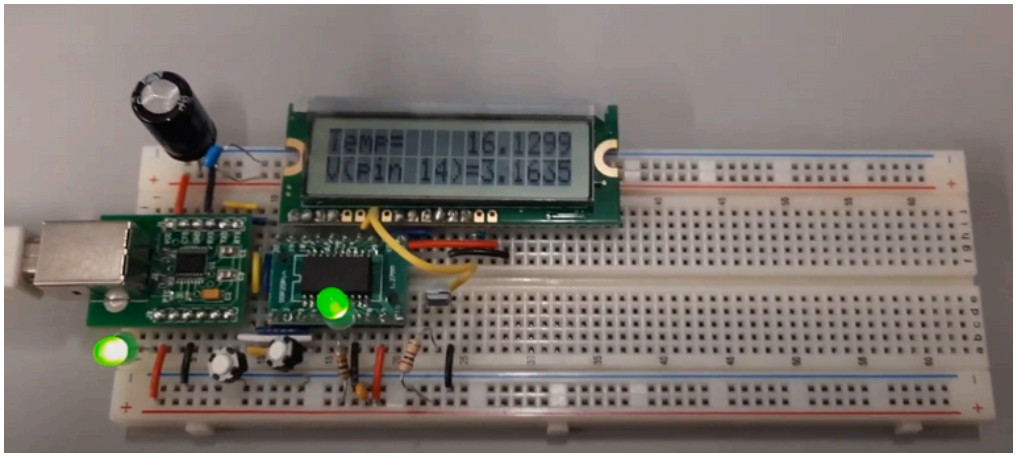


Controller for the Robot

For this project, I built and programmed a battery-powered robot to detect and identify metals. I used the LPC842 microcontroller on the robot and the EMF8 on the remote, coding the system in C for seamless control and data exchange. The remote includes a joystick for movement, an LCD to display coordinates, inductance, and battery life, a seven-segment display to show metal type (ferromagnetic or paramagnetic), and a speaker with varying beep frequencies based on metal size and proximity. A metal coil on the robot detects metals via frequency changes, while MOSFETs with opto-isolators control the motors. Both the robot and remote use JDY-40 radios for reliable communication, allowing for smooth control and real-time feedback.

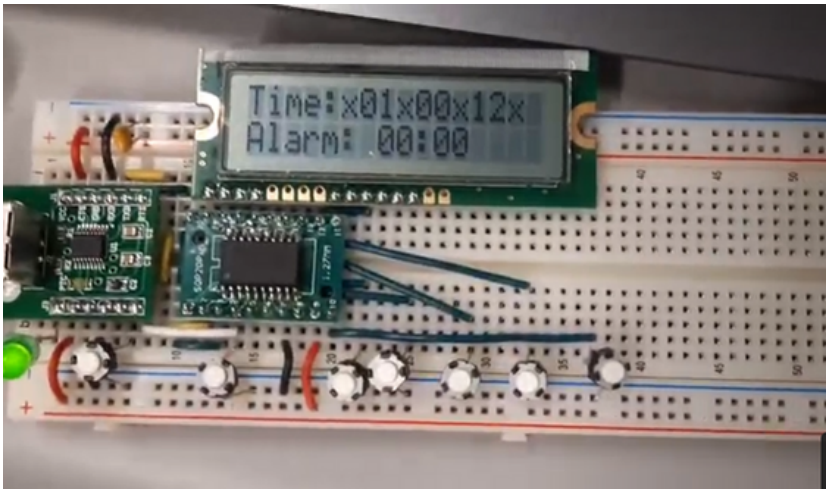
<u>Here's a video of the working Robot :</u>
https://photos.app.goo.gl/yJnuhXJYEFtjpWU49

Temperature Sensor



In this project, I built a temperature sensor using the N76E003 microcontroller and the LM335 sensor. I connected the N76E003 to a computer via a serial port for data exchange and configured the ADC to measure temperature accurately. For data processing, I implemented 32-bit unsigned arithmetic using an assembly language library, optimizing the system for precise temperature readings.

Alarm Clock



In this project, I designed an alarm clock with timer functionality using the N76E003 microcontroller, programmed in assembly language. Leveraging timer interrupts, I implemented tasks like incrementing or decrementing a BCD variable every half-second and generating a 2kHz square wave. The alarm clock displays hours, minutes, and seconds on an LCD screen, with time and alarm settings controlled via pushbuttons. When the alarm triggers, a mini speaker sounds to alert the user. This project relied on Interrupt Service Routines (ISRs) for precise timing and real-time response.