

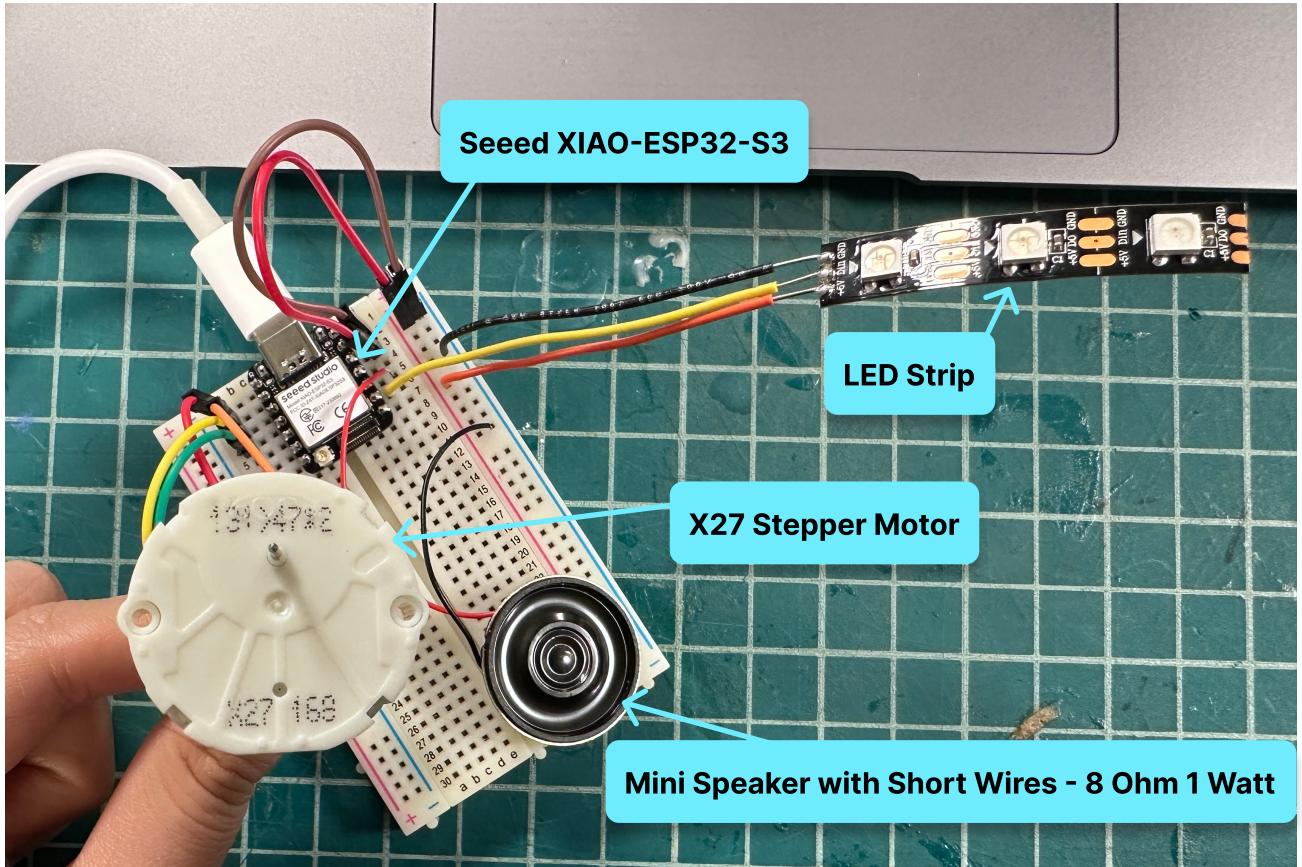
TECHIN 514 Second device

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1. Short Description

The second device operates as an interactive safety display, designed to deter children under 2 years old from reaching dangerous places at home. It employs a combination of auditory and visual alarms, utilizing a speaker playing sound from an embedded speaker and a LED blinking to create discomfort, encouraging the child to cease the hazardous action. A gauge is included to indicate the level of danger, providing a clear visual cue of the risk involved and the distance from children. This device interacts with the sensor device by offering complementary warning signals based on the distance and sensor data of the sensor device, where the use of warning LEDs and an optional turn-off switch button enhances safety measures. Both devices are powered by a rechargeable battery, ensuring continuous operation, and can be integrated to offer a comprehensive safety solution.

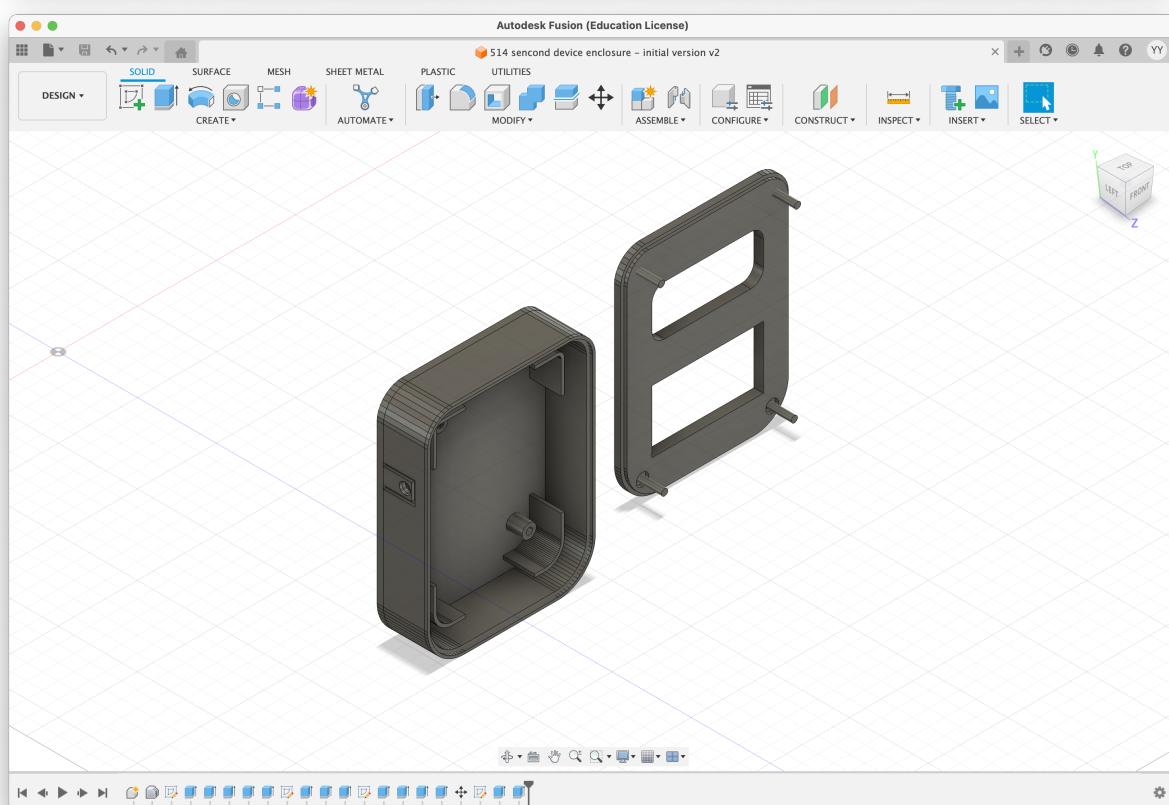
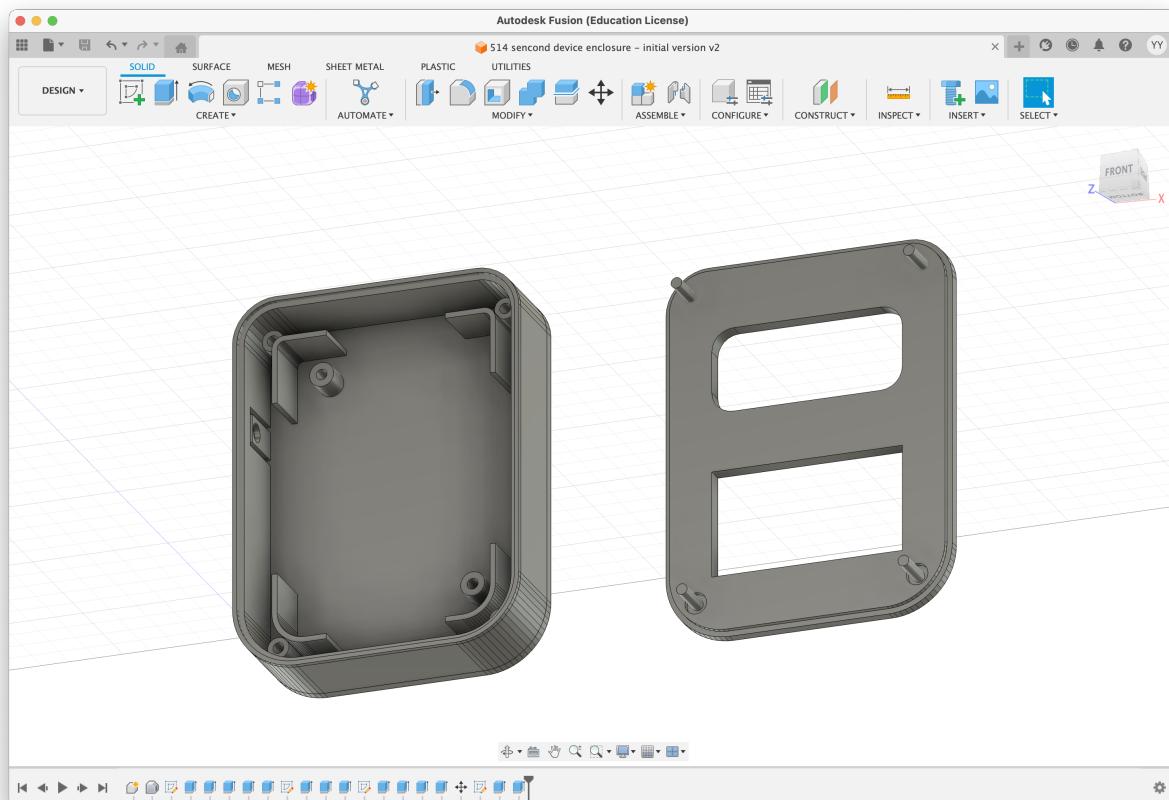
2. One Photo of Functional Breadboard, Perfboard, or PCB



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3. Two screenshots of CAD Model



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4. Link to code in Github

<https://github.com/yeyfreya/TECHIN514-Final-Project/blob/f8ad41f64526e9891f4c98d9eeab21fde3aceb2f/514%20Second%20Device/src/main.cpp>

5. Functional Code of Second Device

This code mainly tests the breadboard connect and functionality of the components of the second device. This includes the gauge stepper motor, the speaker, and the LED.

```
#include <Arduino.h> // Initialize LED strip
#include <FastLED.h>
FastLED.addLeds<WS2812, LED_PIN, GRB>(leds,
NUM_LEDS);

// Stepper motor pins
const int motorPin1 = 0; // Coil 1
const int motorPin2 = 1; // Coil 1
const int motorPin3 = 2; // Coil 2
const int motorPin4 = 3; // Coil 2

// LED strip configuration
#define LED_PIN 8
#define NUM_LEDS 10
CRGB leds[NUM_LEDS];

// Speaker pin
const int speakerPin = 7;

// Function to step the motor
void stepMotor(int step) {
    static const int steps[4][4] = {
        {HIGH, LOW, LOW, LOW},
        {LOW, HIGH, LOW, LOW},
        {LOW, LOW, HIGH, LOW},
        {LOW, LOW, LOW, HIGH}
    };

    digitalWrite(motorPin1, steps[step][0]);
    digitalWrite(motorPin2, steps[step][1]);
    digitalWrite(motorPin3, steps[step][2]);
    digitalWrite(motorPin4, steps[step][3]);
}

// Setup function
void setup() {
    // Initialize stepper motor pins
    pinMode(motorPin1, OUTPUT);
    pinMode(motorPin2, OUTPUT);
    pinMode(motorPin3, OUTPUT);
    pinMode(motorPin4, OUTPUT);
    // Initialize LED strip
    FastLED.addLeds<WS2812, LED_PIN, GRB>(leds,
    NUM_LEDS);
    // Initialize speaker pin
    pinMode(speakerPin, OUTPUT);
}

// Loop function
void loop() {
    // Step the motor
    for (int step = 0; step < 4; step++) {
        stepMotor(step);
        delay(10);
    }

    // Blink the LED strip
    for (int i = 0; i < NUM_LEDS; i++) {
        leds[i] = CRGB::White; // Turn on the LED to white
    }
    FastLED.show();
    delay(500);

    for (int i = 0; i < NUM_LEDS; i++) {
        leds[i] = CRGB::Black; // Turn off the LED
    }
    FastLED.show();
    delay(500);

    // Play a tone on the speaker
    tone(speakerPin, 1000); // Play a 1kHz tone
    delay(500);
    noTone(speakerPin); // Stop the tone
    delay(500);
}
```