

Week 8

Design Journal

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Overview

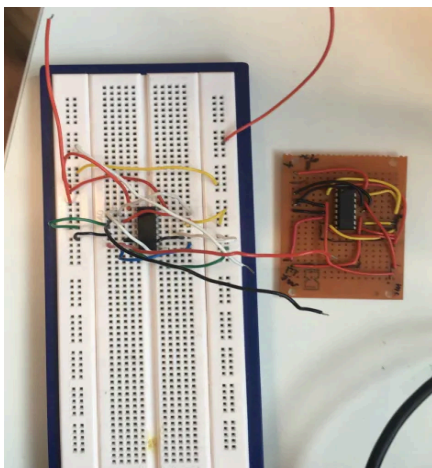
Our aim is to create a Dalek which acts as an IR receiver, rotating itself toward the emitting source and signaling that it has been found by saying “Exterminate.”

Weekly Progress:

- Both teams are looking into distributing the voltage received from SubG-B over to SubG-A's 3-wire interface
- SubG-A is currently soldering their circuit onto a perfboard
- Both subgroups have successfully passed acceptance testing
- SubG-A is looking into wiring their circuit to SubG-B's (3-wire interface development.)
- SubG-B is currently bolstering their filter and amplifier for the competitive phase, such that it can receive signals clearly in sunny environments

Personal Progress:

- I am handling coding the Arduino and distributing voltage to SubG-A, so I am currently working on understanding their circuit
- I soldering their circuit to a perfboard, and now have a working understanding of the motor control system, as seen below



- Aaron and I (both in SubG-B,) are working on buffering the filter-amplifier stage of our circuit such that it can handle the excess radiation from the sun for the competitive phase. Our current circuit and code is below:



```
• const int leftSensorPin = A0;    // Left photodiode
• const int rightSensorPin = A1;   // Right photodiode
•
• // Pins for LEDs
• const int leftLEDPin = 9;        // Left LED
• const int middleLEDPin = 10;     // Middle LED
• const int rightLEDPin = 11;      // Right LED
•
• void setup() {
•     Serial.begin(9600); // Start serial communication
•
•     // Set pins as output
•     pinMode(leftLEDPin, OUTPUT);
•     pinMode(middleLEDPin, OUTPUT);
•     pinMode(rightLEDPin, OUTPUT);
• }
```

```

•
• void loop() {
•     // Get the readings from both photodiodes
•     int leftReading = analogRead(leftSensorPin);
•     int rightReading = analogRead(rightSensorPin);
•
•     // Debugging: Print the raw readings to Serial
    Monitor
•     Serial.print("Left Reading: ");
•     Serial.print(leftReading);
•     Serial.print(" | Right Reading: ");
•     Serial.println(rightReading);
•
•     // Calculate the signal difference as a ratio
•     float ratio = calculateRatio(leftReading,
    rightReading);
•
•     // Determine which LED to turn on based on the
    angle range
•     if (ratio < -5) {
•         // L ON
•         setLEDState(HIGH, LOW, LOW);
•     } else if (ratio > 5) {
•         // R ON
•         setLEDState(LOW, LOW, HIGH);
•     } else {
•         // Mid ON
•         setLEDState(LOW, HIGH, LOW);
•     }
•
•     delay(100); // delay to not mess things up

```

```

•
•
• // normalise ratio between sensors
• float calculateRatio(int left, int right) {
•     // diff calc
•     int difference = left - right;
•     int sum = left + right;
•
•     // Avoid division by zero
•     if (sum == 0) return 0;
•
•     // calc && return the ratio in range [-100, 100]
•     return (float)difference / sum * 100;
• }
•
• // Helper function to set the state of the LEDs
• void setLEDState(int left, int middle, int right) {
•     digitalWrite(leftLEDPin, left);
•     digitalWrite(middleLEDPin, middle);
•     digitalWrite(rightLEDPin, right);
• }
•
•
•

```

Looking forward:

- SubG-B aims to get their circuit on a perfboard by next Monday, following the bolstering of the filter.
- SubG-A&B aim to have their circuit fully wired together by next monday
- I aim to get the voltage distributed safely and effectively between both of our circuits