Boston University
Electrical & Computer Engineering
EC463 Capstone Senior Design Project

First Prototype Testing Plan

Augmented Reality Climbing Wall

by

Team 14
Augmented Reality Climbing Wall

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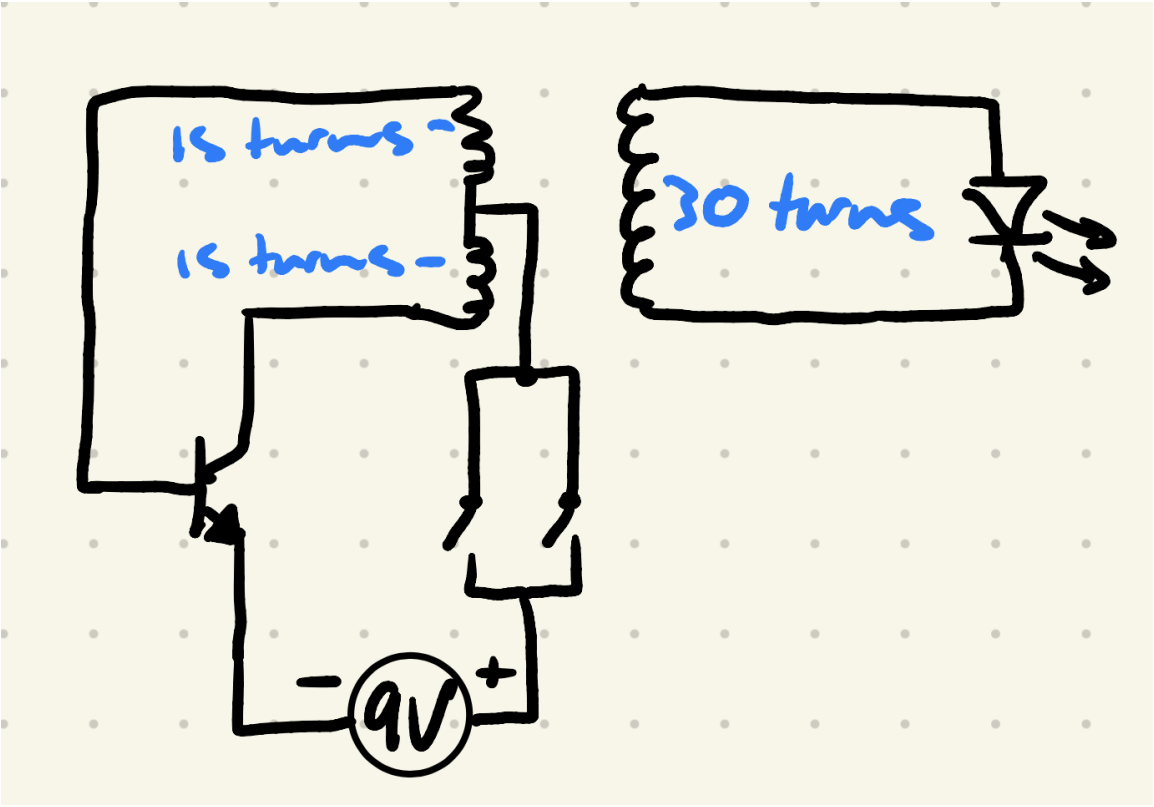
Required Materials

- Circuitry
  - 2 - 1.35 inch coils
  - 1 - 2222 transistor
  - 1 - 9V battery
  - 1 - 9V battery connector
  - 1 - Red LED
  - 2 - Push buttons
- Hardware
  - 1 - Rock climbing hold
  - 1 - Bolt (⅜ - 16 inch)
  - 1 - Nut (⅜ -16 inch)
  - 1 - Front facing coil enclosure
  - 1 - Battery enclosure
  - 1 - Hardware Button
  - 1 - Back facing coil clip
  - 1 - Square wood cutout

Set Up

The electronics are built using the following circuit:



The transistor in combination with the coil creates oscillations which allows the coil to transmit power wirelessly. The battery is connected with the 9V battery snap on connector. The circuit is complete when either of the two buttons is depressed (one is

located on each side of the larger hardware button). The magnetic field from the coil transmits power through the wall and lights the LED on the opposite side.

After assembly, the electronics are housed in the 3D printed enclosure, the battery is housed in the battery box, and they are all attached via the same bolt that supports the hold. This bolt is screwed through a hole that has been drilled in the center of the board and secured with a nut. Between the nut and the back of the board, a clip fastens the rear coil into place.

Pre-Testing Setup Procedure

1. Make sure the battery has sufficient charge.
2. Make sure the prototype has the battery correctly inserted.
3. Ensure all components are securely fastened.

Testing Procedure

1. Press button on sensor and ensure that the button depresses, LED turns on, and coil is not hot to the touch.
2. Release button and notice that button is released and LED turns off.
3. Teammate holds the prototype at chest level, and tester places hand securely on climbing hold.
4. Ensure that button depresses and LED turns on in less than one second after pressure is applied, displaying pressure is being sensed.
5. Remove hand from hold and ensure that button is released and LED turns off.
6. Teammate holds prototype at shin level, and tester places foot securely on climbing hold.
7. Ensure that button depresses, LED turns on in less than one second after pressure is applied, and coil is not noticeably hot to the touch.
8. Remove foot from hold and ensure that button is released and LED turns off.
9. Teammate holds prototype at knee level, and tester rests knee against the climbing hold.
10. Ensure that button does not depress and LED does not turn on.

Measurable Criteria

The criteria for successfully testing with the correct result is as follows:

I. LED successfully lights: When the button on the climbing hold is pressed and pressure is detected, the red LED behind the wall should light up

II. Response time: LED lights up <1 second after the button is compressed

III. Prototype temperature: Temperature of the coil is not hot to the touch

Score Sheet

Action	Correct? (1/0)
Button successfully depresses	
LED lights when button pressed directly	
LED turns off when button released	
LED lights up within 1 second of button being pressed	
LED lights when hand on hold	
LED lights when foot on hold	
Coil is not noticeably hot after 10 seconds of activation	
Total	/7