

Su22-ENGR-40M-01 Lab 1

Jannah Sabic El-Rayess

TOTAL POINTS

33 / 33

QUESTION 1

1 Lab Completion (working demo) 15 / 15

✓ - **0 pts** Correct

QUESTION 2

Lab Questions 3 pts

2.1 L1: Multimeter Measurements 3 / 3

✓ - **0 pts** Correct

- **0.1 pts** Low voltage (voltage drops should add to battery voltage, ~4.5V)

- **3 pts** Incorrect/No work

QUESTION 3

Analysis Questions 10 pts

3.1 A1: Power Delivered 5 / 5

✓ - **0 pts** Correct

- **2 pts** Wrong current

- **1 pts** Incorrect Units

- **3 pts** Calculations reasonable but Incorrect Final

Answer

- **2.5 pts** Stated the current instead of calculating power

- **5 pts** Incorrect

- **5 pts** Blank

- **0.2 pts** Wrong sign: power being "delivered" should be positive

- **2 pts** Wrong voltage

3.2 A2: Battery Voltage 5 / 5

✓ - **0 pts** Correct

- **2 pts** Incorrect voltage

- **1 pts** Wrong calculation

- **5 pts** Incorrect

- **5 pts** Blank

3.3 A3: (extra) Increase Power 0 / 0

+ **3 pts** Correct

✓ - **0 pts** Incorrect/ not attempted

+ **1 pts** Not enough explanation

+ **1 pts** correct suggestion to use converter but incorrect way to use it

QUESTION 4

4 Soldering (not graded but good indication for future labs) 0 / 0

✓ - **0 pts** Correct

QUESTION 5

5 Build Quality (not graded but good indication for future labs) 0 / 0

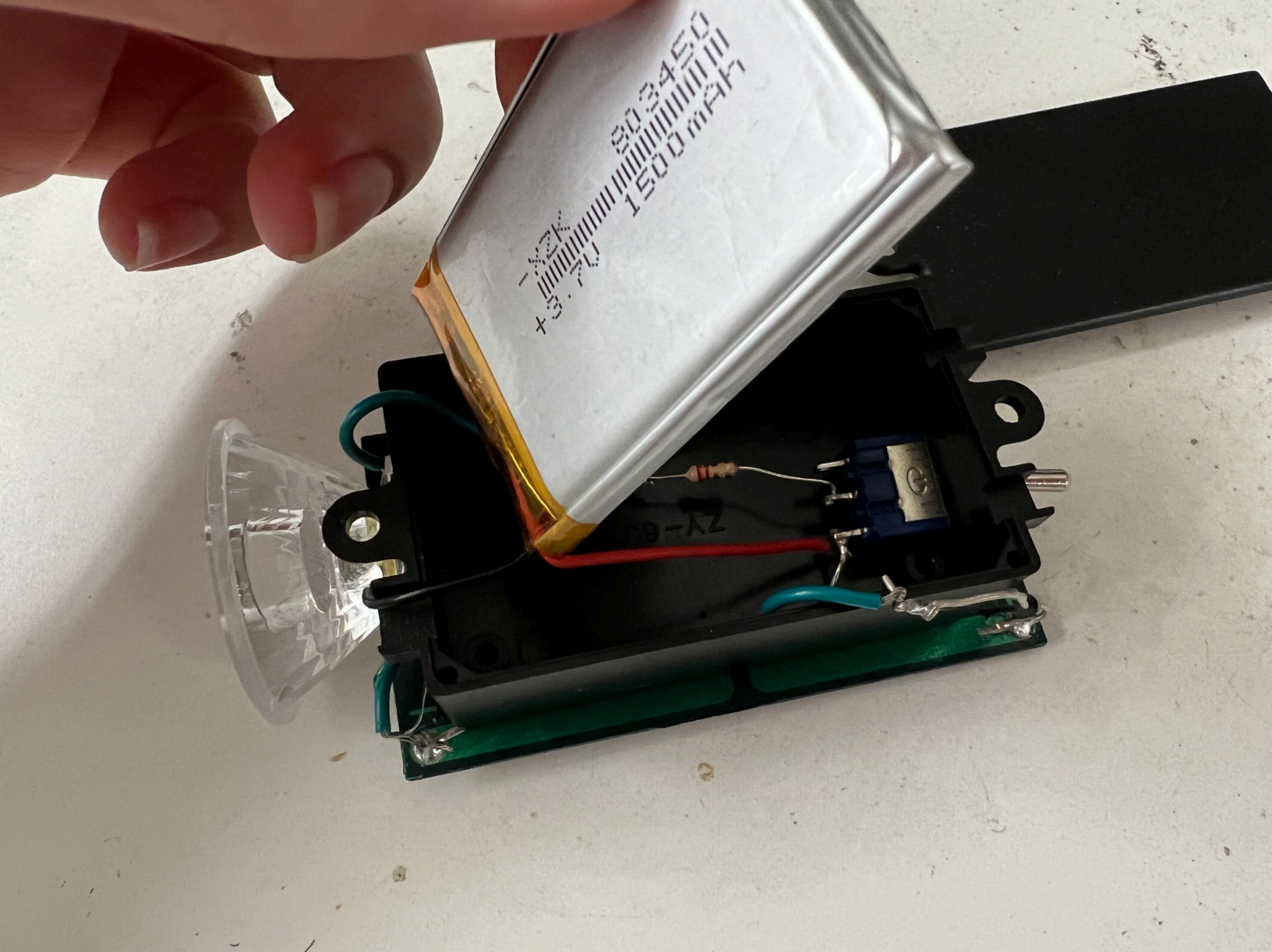
✓ - **0 pts** Correct

QUESTION 6

6 Clean up 5 / 5

✓ - **0 pts** Correct

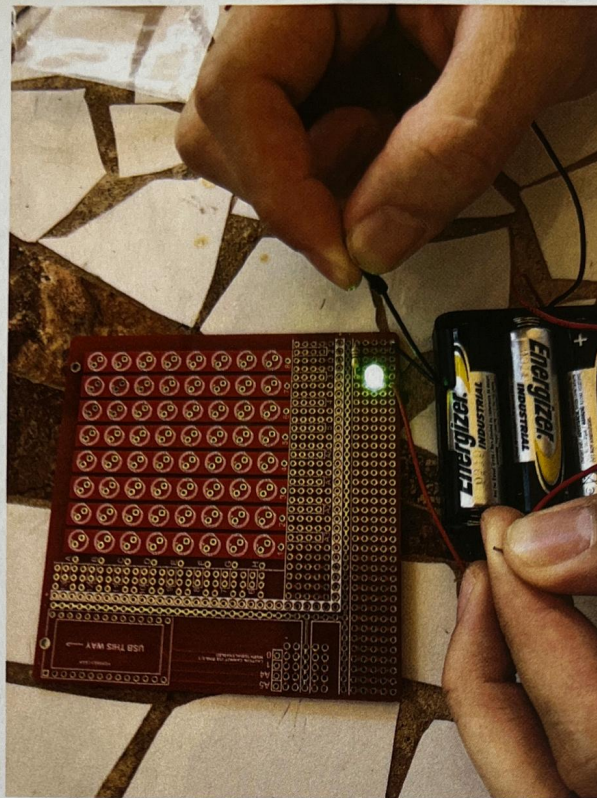






1 Lab Completion (working demo) 15 / 15

✓ - 0 pts Correct



L1: Use your multimeter to measure:

1. the total current
2. the voltage drop across the diode
3. the voltage drop across the resistor

1. 80mA

2. 2.36V

3. 2.16V

4 Assembly of Solar Device

You have the option to either make a solar charger or a solar flashlight. If you would like, you can also make both; however, we only have enough parts for each team to build one flashlight. You can solder components directly to the solar panel, converter board, LED, and switch, which will make the wiring neater. Please check out in-lab demo devices for an example.

4.1 Assembly of the Charger

Now it's time to assemble the charger. It's up to you to figure out how to wire it up, so talk with a TA if you aren't sure about the schematic you drew for the prelab.

2.1 L1: Multimeter Measurements 3 / 3

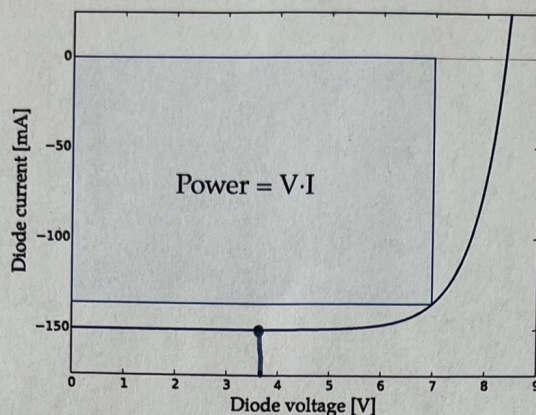
✓ - **0 pts** Correct

- **0.1 pts** Low voltage (voltage drops should add to battery voltage, ~4.5V)

- **3 pts** Incorrect/No work

5 Analysis

Our solar cells are rated to produce 1W in direct sunlight. But to produce this much power, the panel voltage must be about 7V:



However, we are charging the battery by connecting it directly to the solar panel, which forces the panel voltage to be 3.7V.

A1: In this setup, how much power is being delivered to the battery?

$$3.7V \cdot 150mA = 0.555W$$

555 mW

A2: We could collect more power from our solar panel if we used a battery of a different voltage. What battery voltage should we choose to get the most power from the solar panel?

7V

A3: *Extra credit:* LiPo batteries only come in multiples of 3.7V, so we can only use 3.7V, 7.4V, 11.2V, etc. Since our options for changing the battery voltage are limited, what else could we do to increase the amount of power we get from our solar panel?

3.1 A1: Power Delivered 5 / 5

✓ - **0 pts** Correct

- **2 pts** Wrong current

- **1 pts** Incorrect Units

- **3 pts** Calculations reasonable but Incorrect Final Answer

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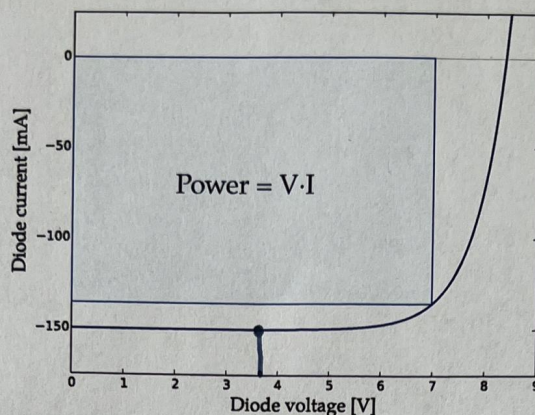
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3.2 A2: Battery Voltage 5 / 5

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- 2 pts Incorrect voltage

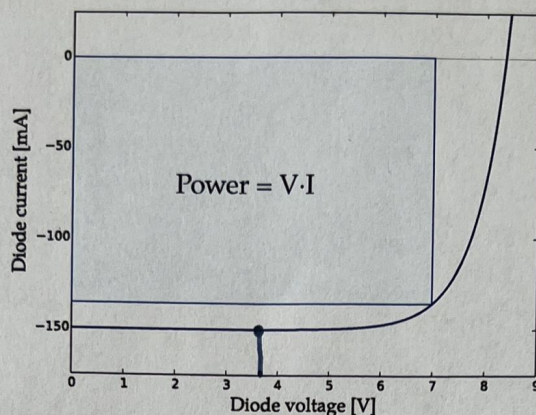
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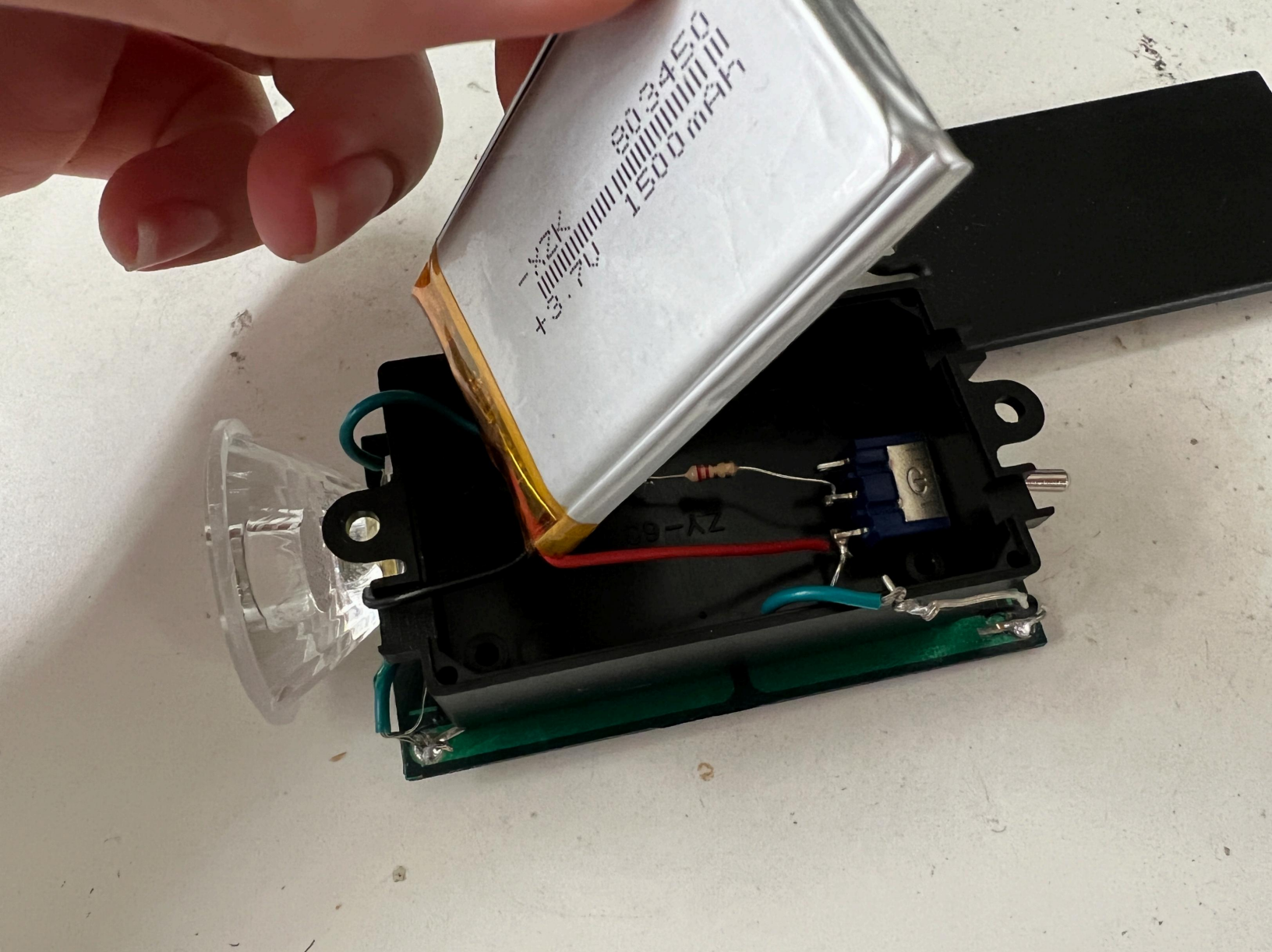
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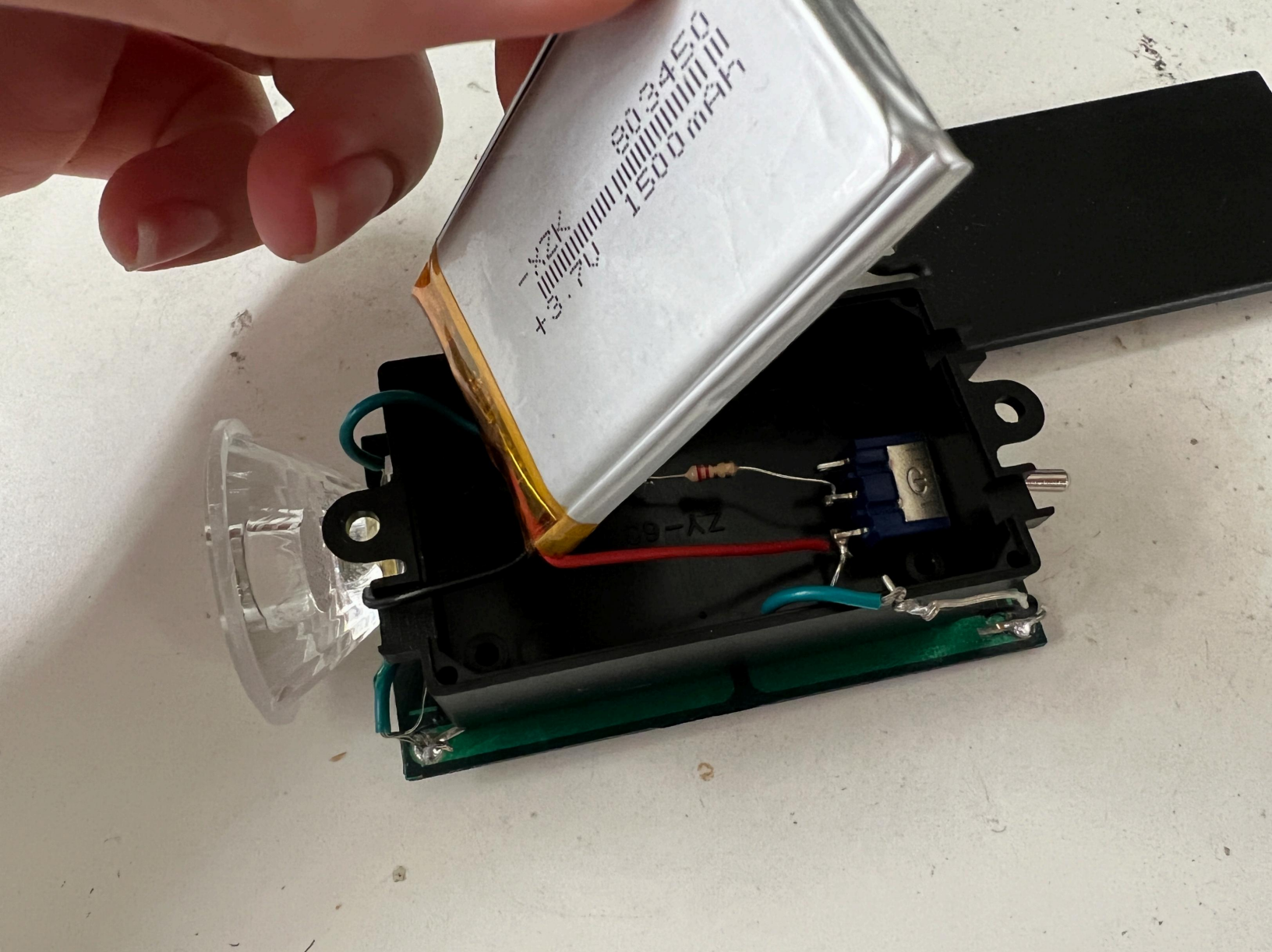




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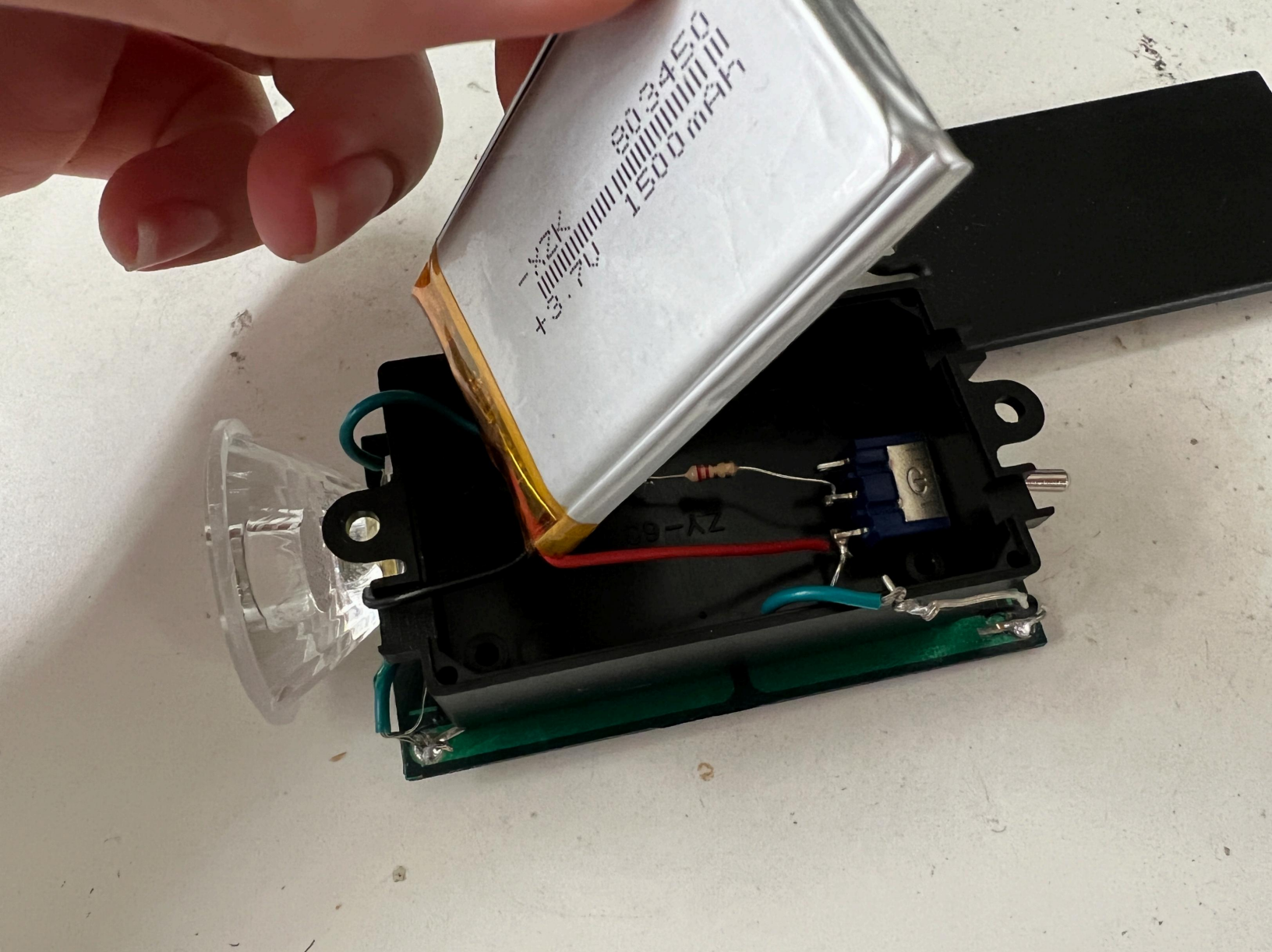




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6 Clean up 5 / 5

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