OpenAT Switch Latch
ASSEMBLY GUIDE

Makers Making Change
A Neil Squire Program
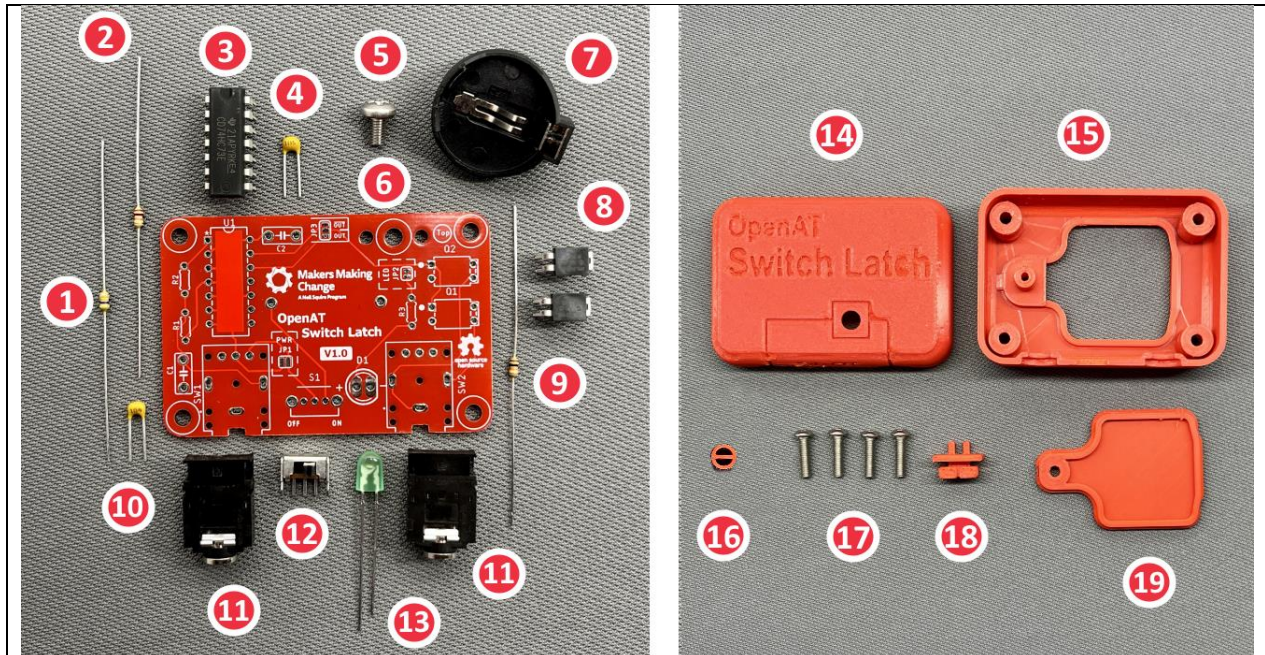
Required Components

BOM

1. 1X 470K Resistor
2. 1X 22K Resistor
3. 1X Texas Instruments CD74HC73E Flip-Flop
4. 1X 1uF Capacitor
5. 1X #4-3/8" Pan Head Screw
6. 1X OpenAT-Switch-Latch PCB (Printed Circuit Board)
7. 1X CR2032 Battery holder
8. 2X IRLD014PBF MOSFET
9. 1X 10K Resistor
10. 1X 0.1uF Capacitor
11. 2X SJ-3566AN 3.5mm Audio Stereo Jack
12. 1X Slide Switch
13. 1X LED (green, super bright)
14. 1X 3D Printed Enclosure Top
15. 1X 3D Printed Enclosure Bottom
16. 1X 3D Printed LED Spacer
17. 4X #4-3/8" Sheet Metal Screws
18. 1X 3D Printed Switch Slide
19. 1X 3D Printed Battery Cover
20. 1X CR2032 Battery

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Required Tools

- Screwdriver Medium Phillips
- Needle nose pliers
- Side Cutters
- Soldering Iron
- 60/40 rosin core solder for electronics
- Multimeter
- Assistive Switch with 3.5 mm cable for testing
- Optional: Tape / reusable putty-like adhesive (e.g., BLUE TACK) for helping position components while soldering

Required Personal Protective Equipment (PPE)

- Safety glasses
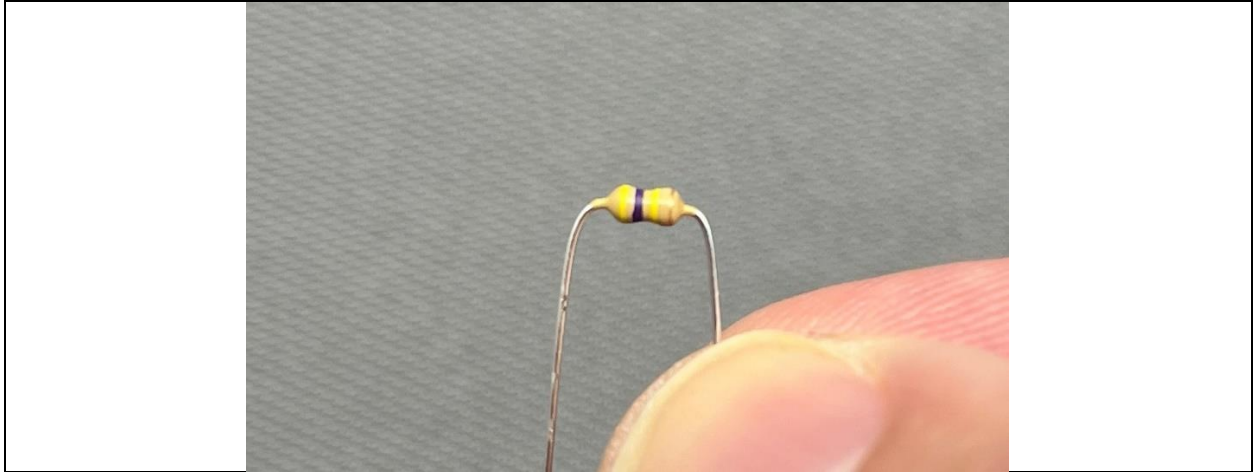- Vinyl gloves (if skin sensitivity to rosin or have dermatitis)

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Assembly Instructions

Step 1: Identify and Prep Resistor R1

Identify the 470K resistor (Colour code stripes: Yellow, Violet, Yellow). Bend both leads of the resistor straight down, so that it appears like in the photo below.

Step 2: Insert Resistor R1 into PCB

Insert the 470K resistor (Colour code stripes: Yellow, Violet, Yellow) into the holes marked "R1" on the PCB. Ensure the body of the resistor is flat against the circuit board. Bending the wires apart once it's in position will help keep it in place during soldering.
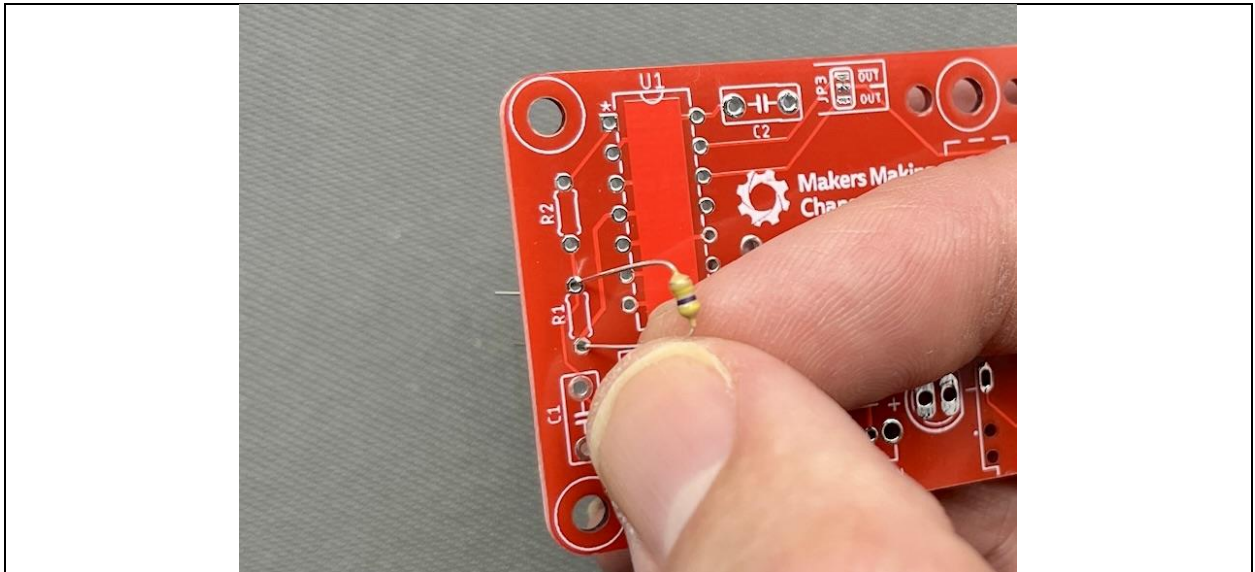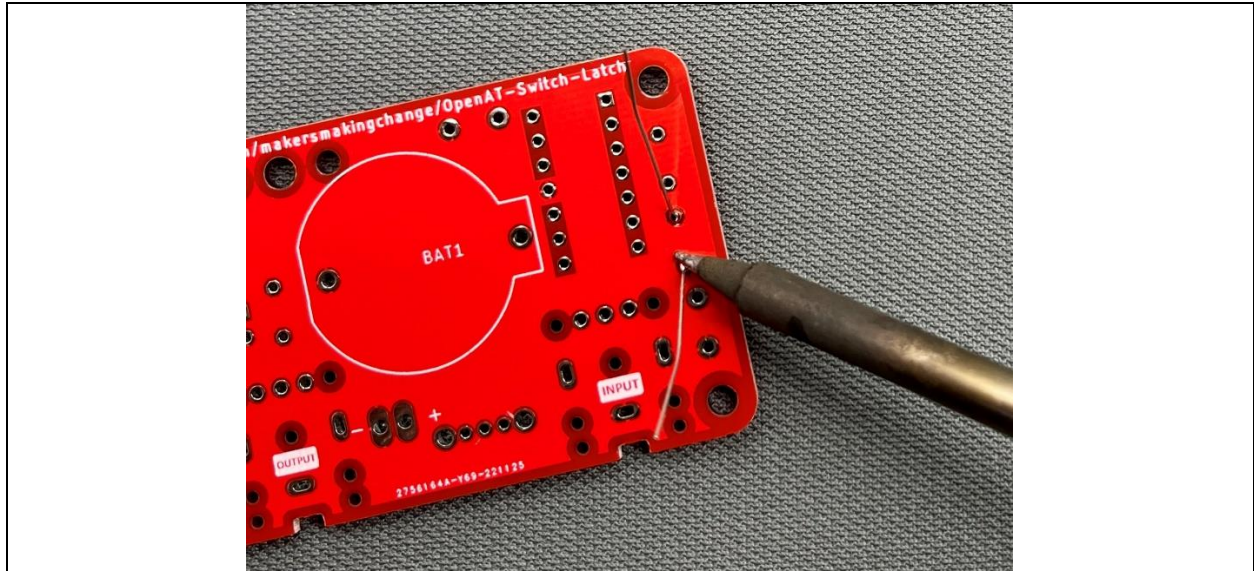
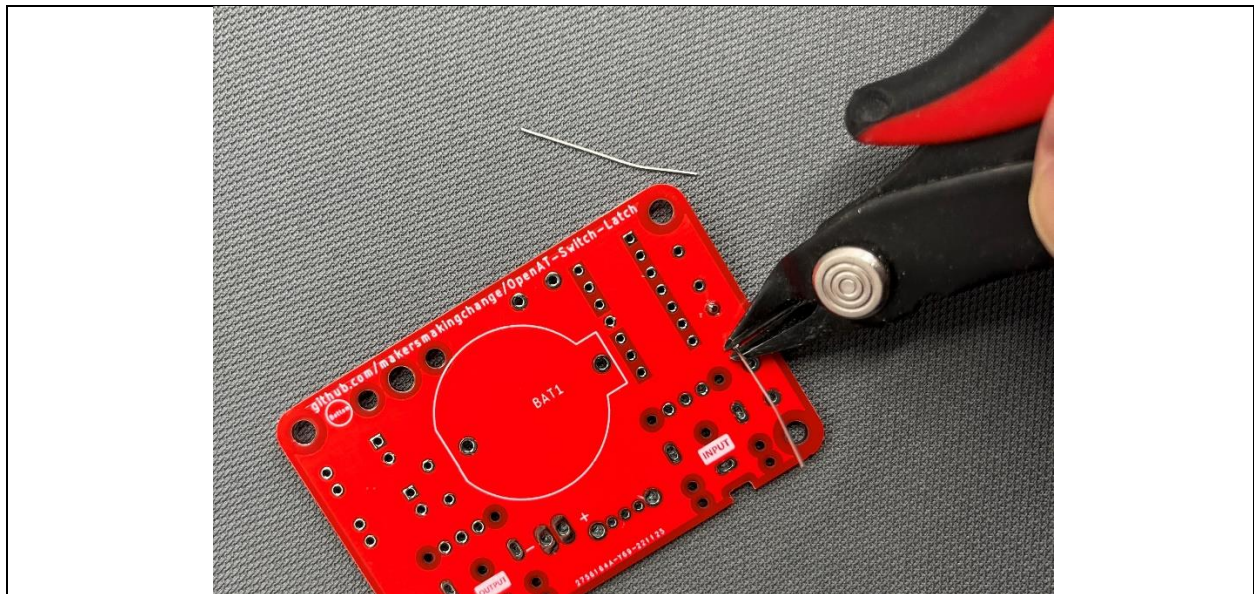# OpenAT Switch Latch
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Step 3: Solder Resistor R1 leads

Flip over the PCB and solder the two wires of resistor R1 to the circuit board.

Step 4: Trim Resistor R1 leads

When joints are soldered, trim the wire ends with the flat side of side cutters. Trim right on top of the solder peak.
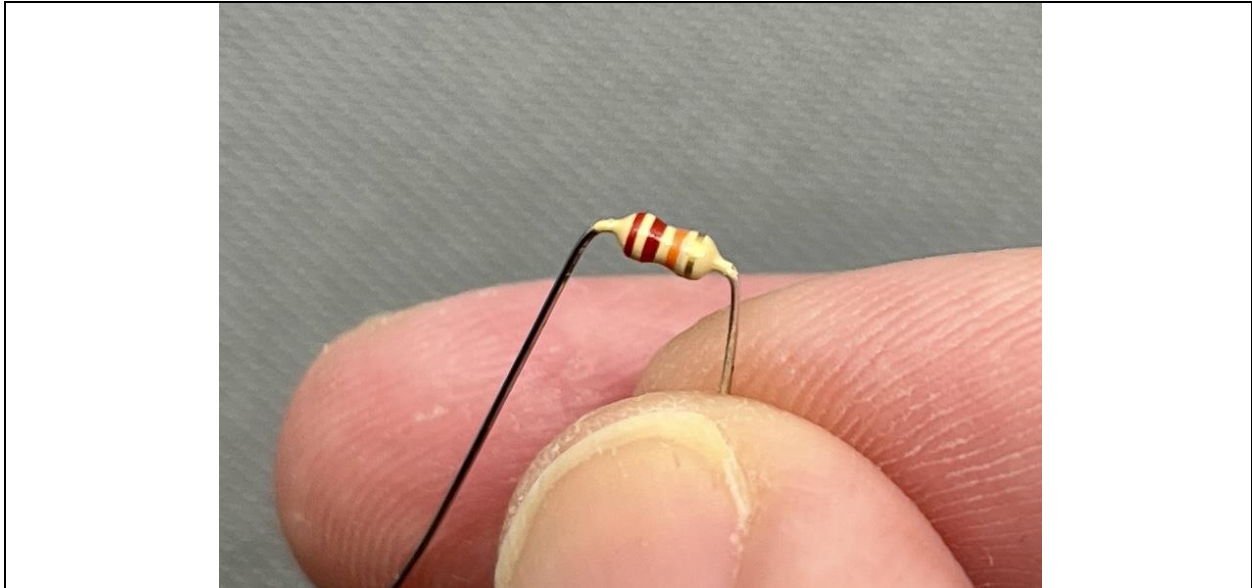
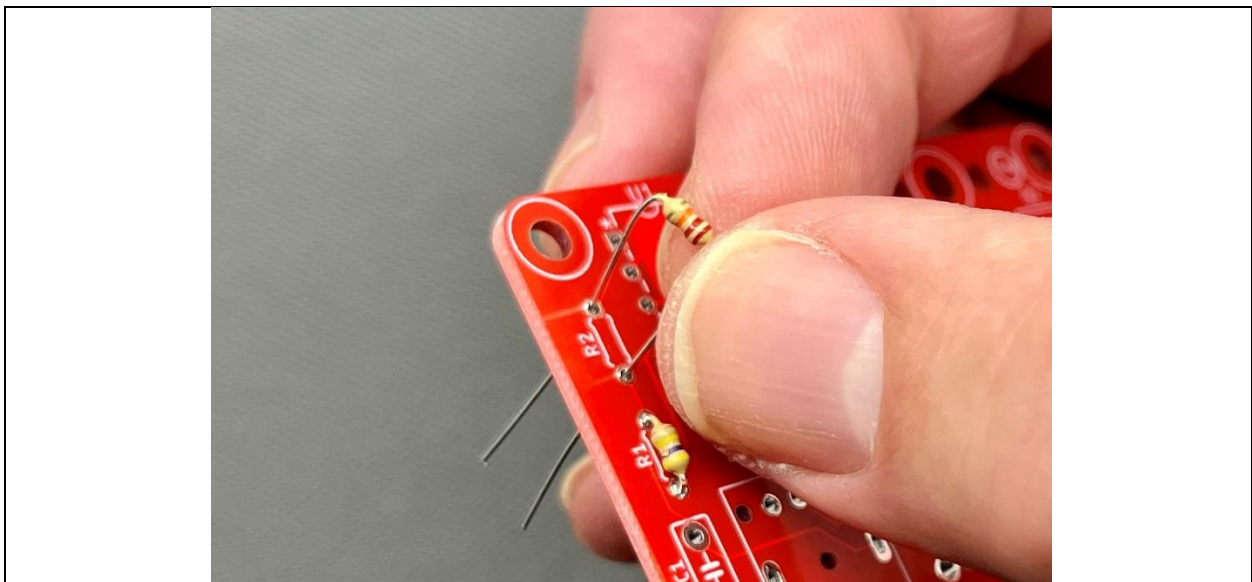# OpenAT Switch Latch
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Step 5: Identify and prep Resistor R2

Identify the 22K resistor (Colour code stripes: Red, Red, Orange). Bend the wire leads straight down, as before, in preparation for soldering.

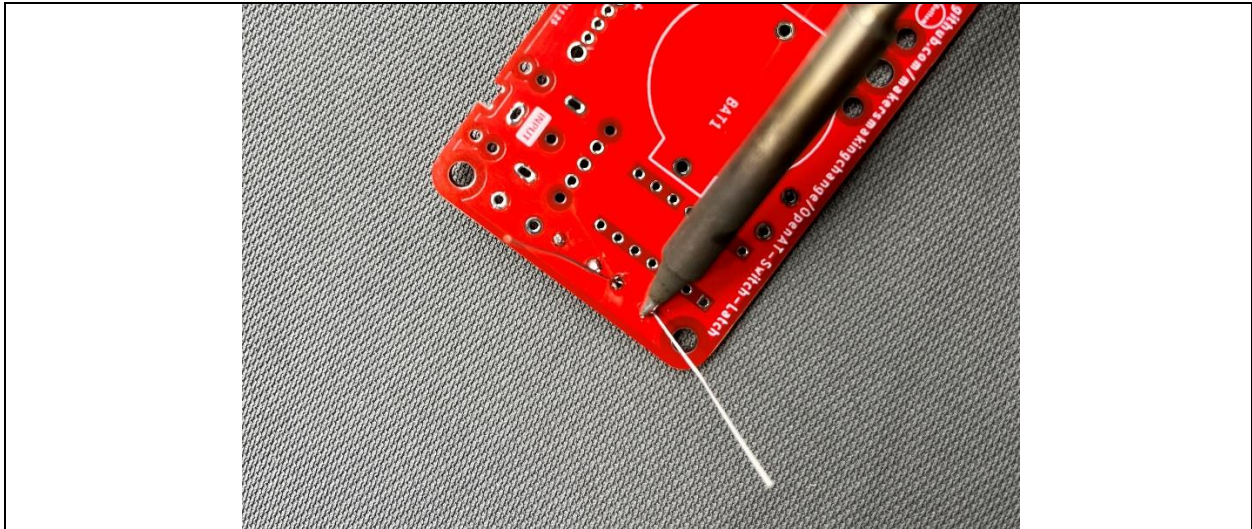### Step 6: Insert Resistor R2 into PCB

Insert the 22K resistor (Colour code stripes: Red, Red, Orange) into the holes marked "R2" on the PCB. Again, bend the leads after, to keep it in place during soldering.
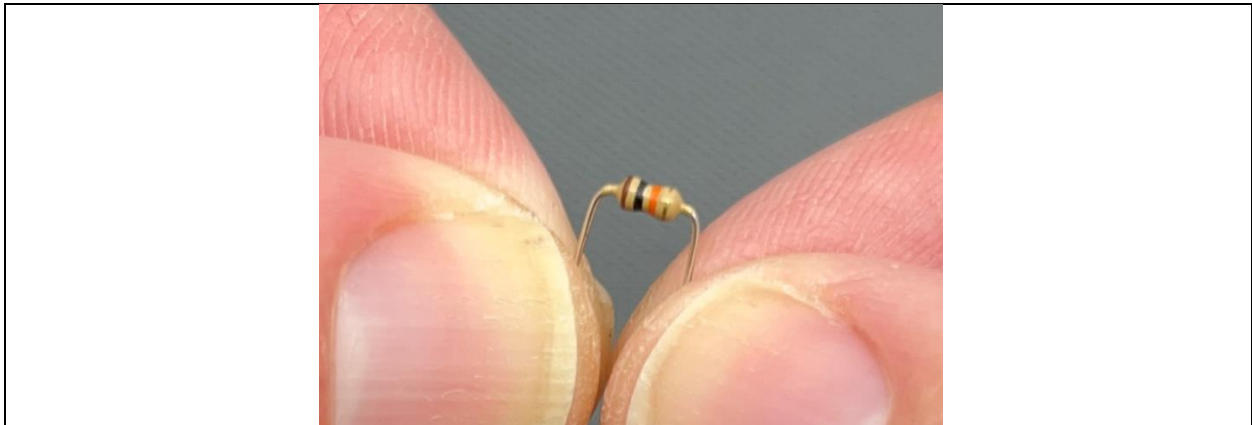
Step 7: Solder and trim Resistor R2 leads

Solder the two wires. When done, trim the wire ends with side cutters, as before.


Step 8: Identify and prep Resistor R3

Identify the 10K resistor (Colour code stripes: Brown, Black, Orange). As with the previous resistors, bend the wires straight down.

Files available at https://makersmakingchange.com/project/OpenAT-Switch-Latch/
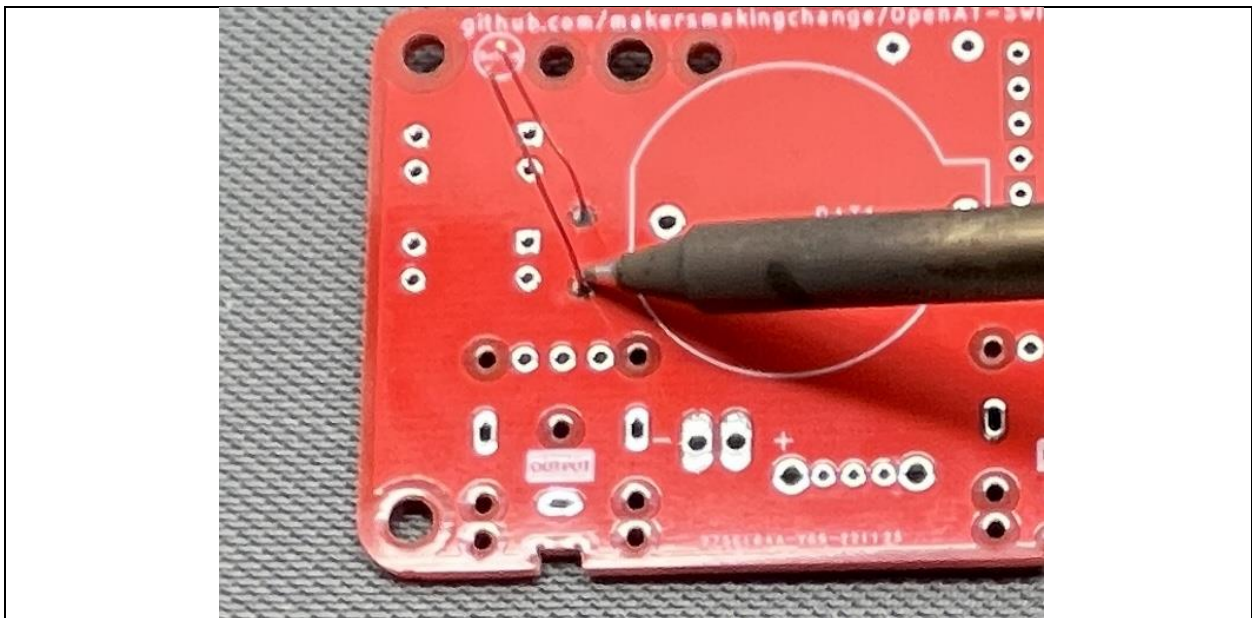
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Step 9: Insert Resistor R3 Into PCB

Insert the 10K resistor (Colour code stripes: Brown, Black, Orange) into the holes marked "R3" on the PCB. Once again, bend the wires apart.
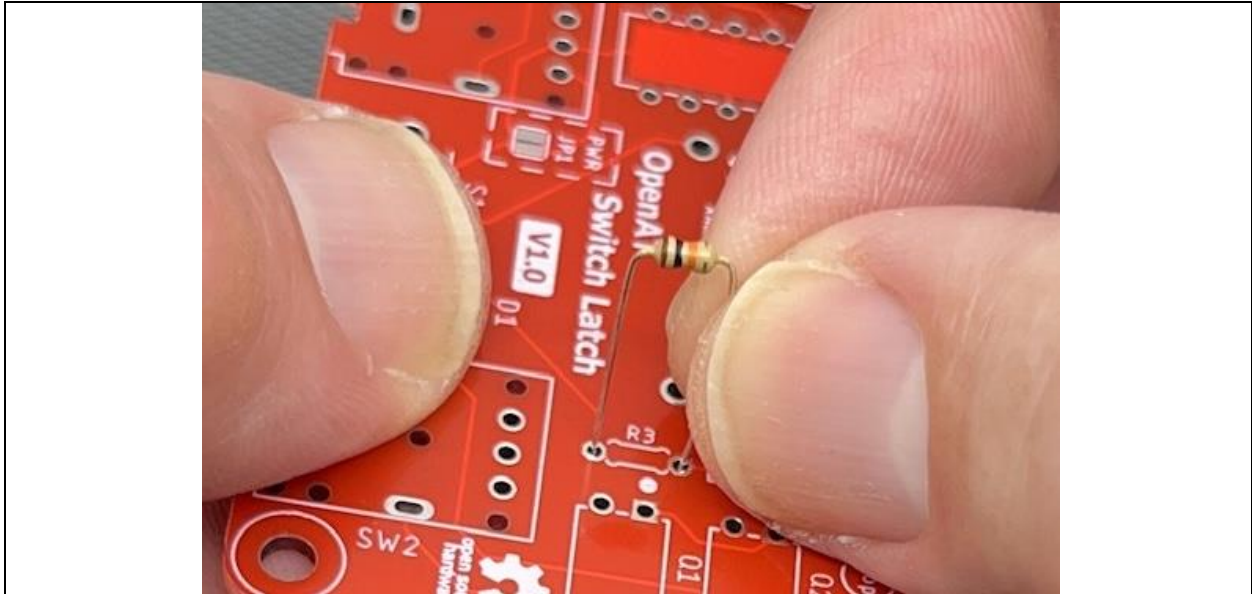
Step 10: Solder and trim Resistor R3 leads

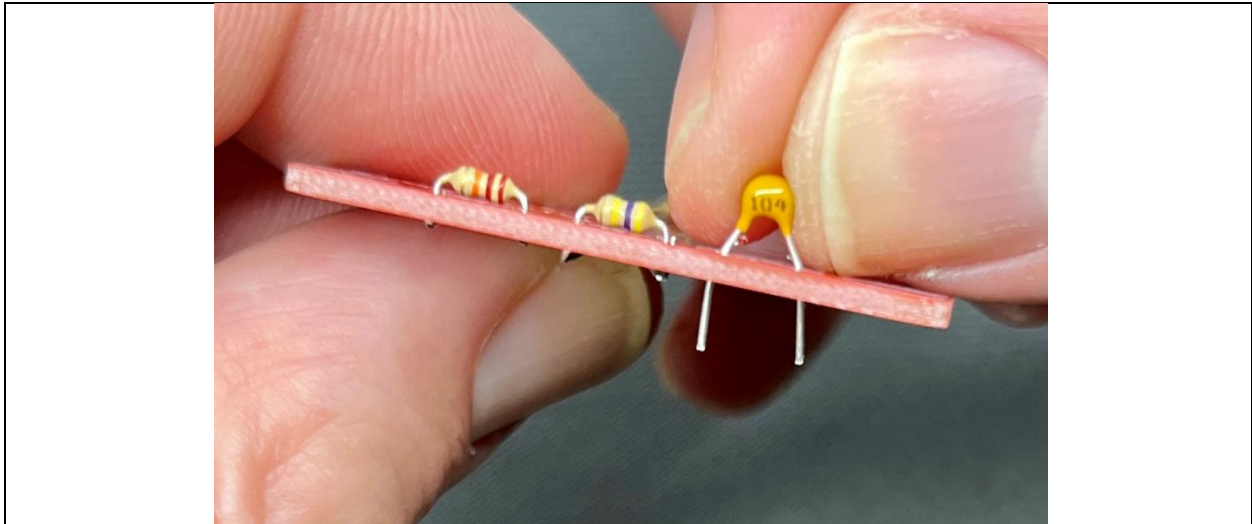Solder the two wires. When done, trim the wire ends with side cutters.

Step 11: Identify and insert Capacitor C1 into PCB

Insert 0.1uF capacitor (the smaller capacitor marked "104") into holes for location C1 on the PCB.

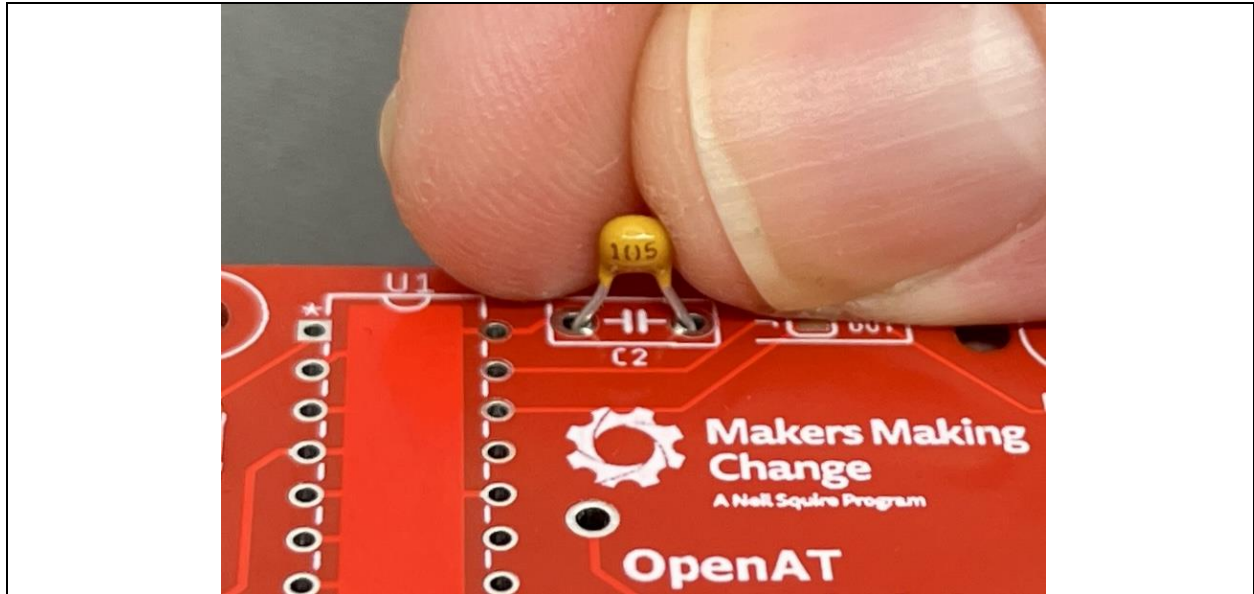### Step 12: Solder and trim Capacitor C1 leads

Solder the two leads. When done, trim the wire ends with side cutters.

Files available at https://makersmakingchange.com/project/OpenAT-Switch-Latch/
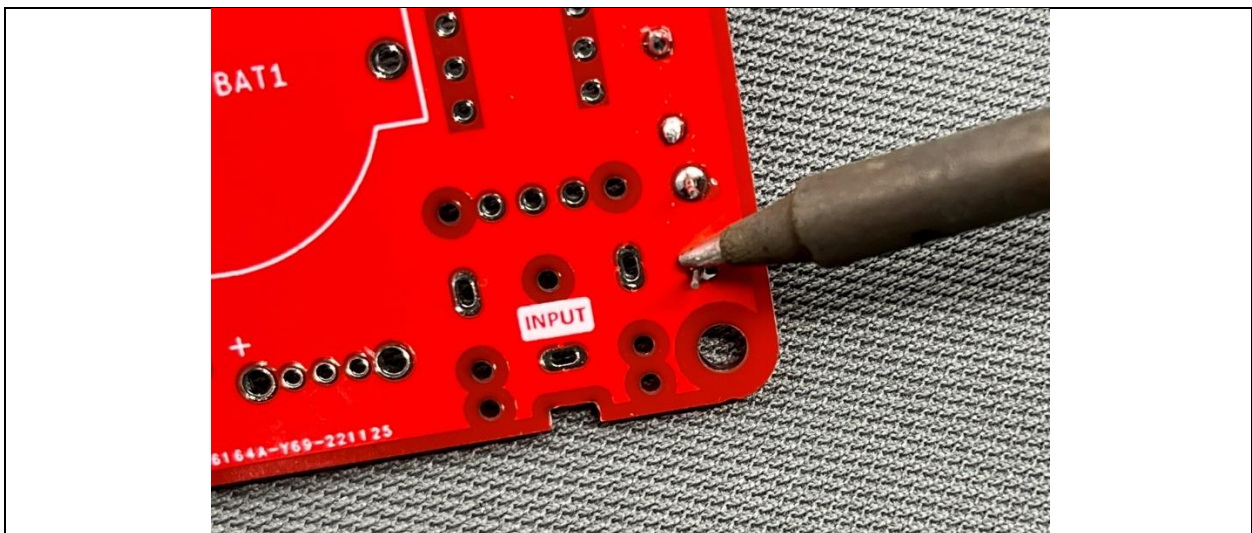
Step 13: Identify and insert Capacitor C2 into PCB

Insert 1uF capacitor (the larger capacitor marked "105") into holes for location C2 on the PCB.

Step 14: Solder and trim Capacitor C2 leads

Solder the two leads. When done soldering, trim the wire ends using side cutters.

Files available at https://makersmakingchange.com/project/OpenAT-Switch-Latch/
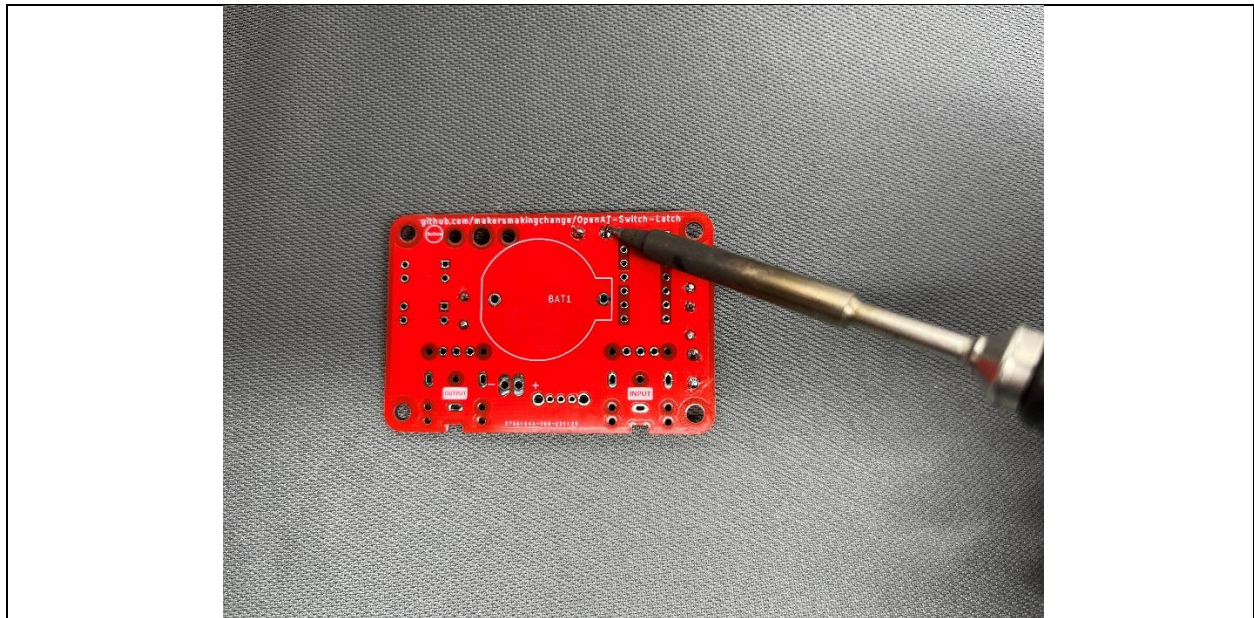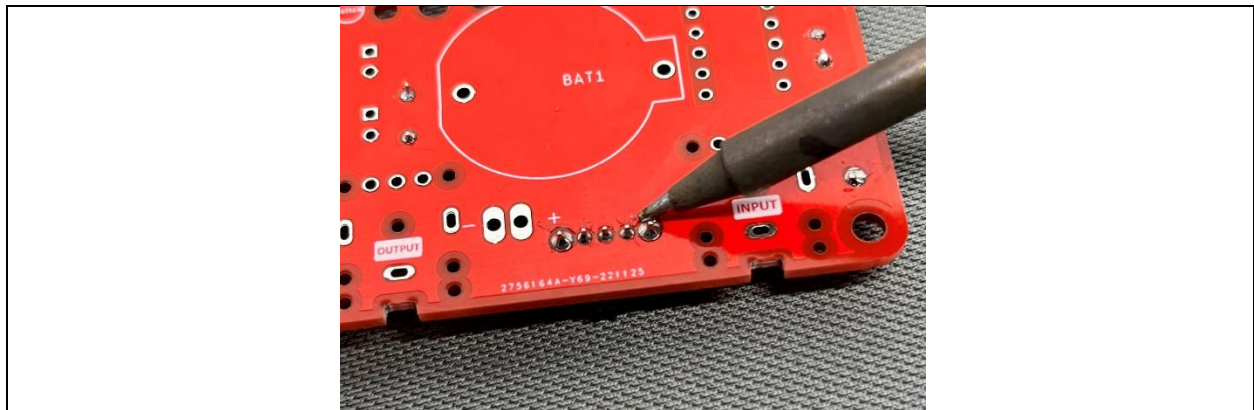
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Step 15: Insert Switch S1 into the PCB

Insert the Switch into location S1 on the circuit board. Ensure the switch toggle is facing towards the edge of the board as shown below. To aid in soldering (next step), it may help to use tape or Blue Tack to hold the switch in position.
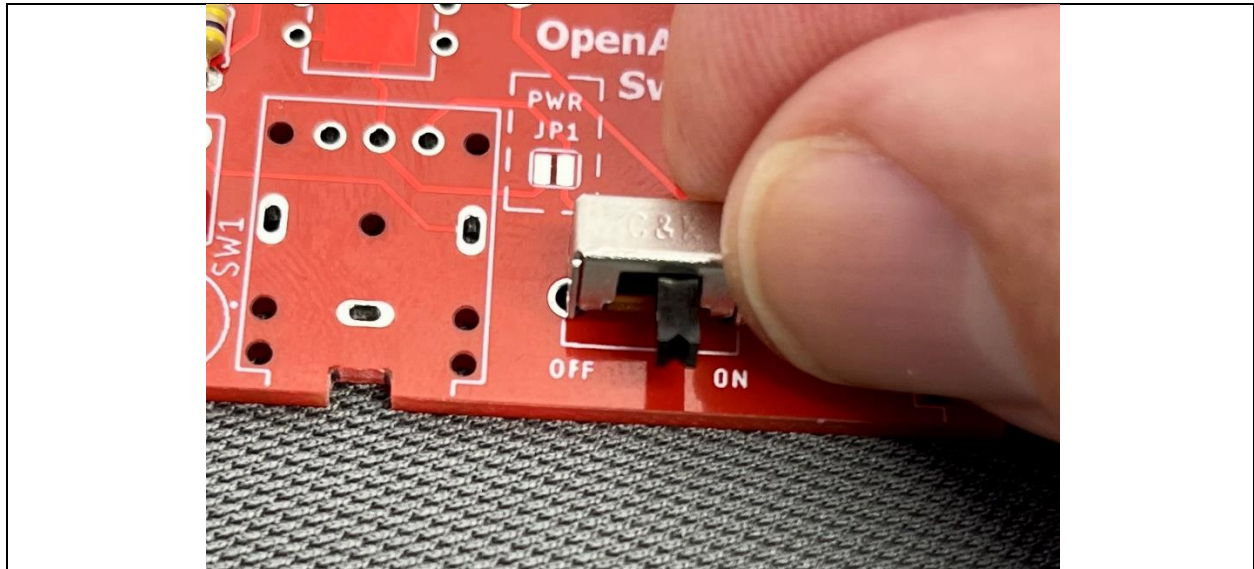
Step 16: Solder S1 pins

Solder the switch into place by soldering middle terminal first. Confirm the switch is aligned on the component side of the board, and then solder the remaining 4 pins.
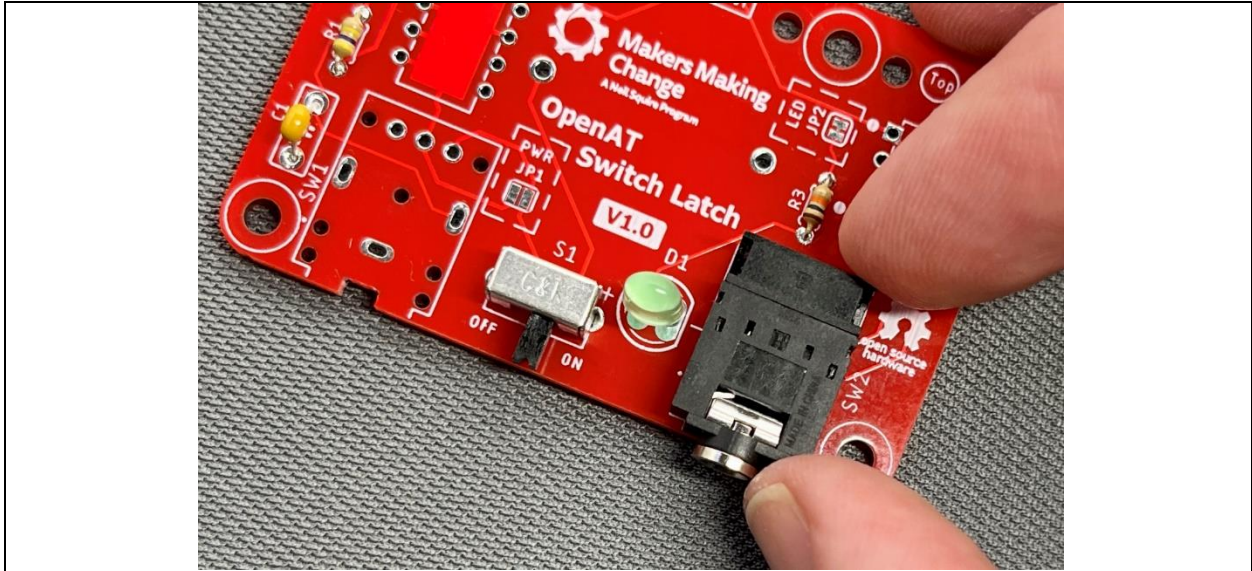
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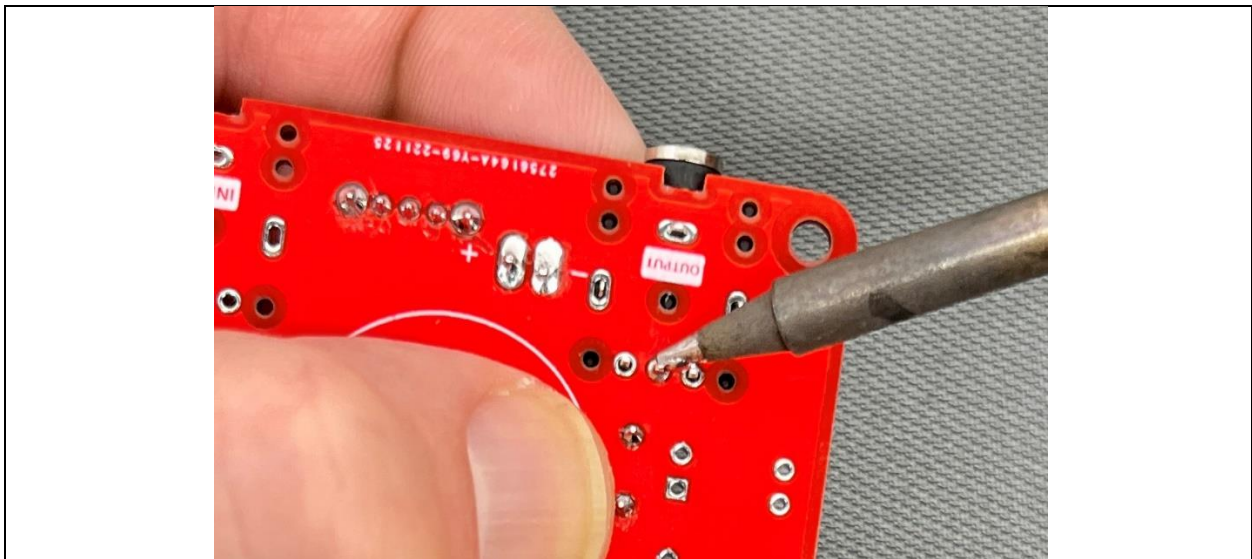### Step 17: Insert switch Jacks SW1 and SW2 into PCB

Insert both jacks into positions SW1 and SW2 (shown). Jacks should be held in place during soldering (next step).

Step 18: Solder SW1 and SW2

Solder one jack pin first. Confirm the jack is properly positioned on the component side of the board, and then solder the remaining pins.

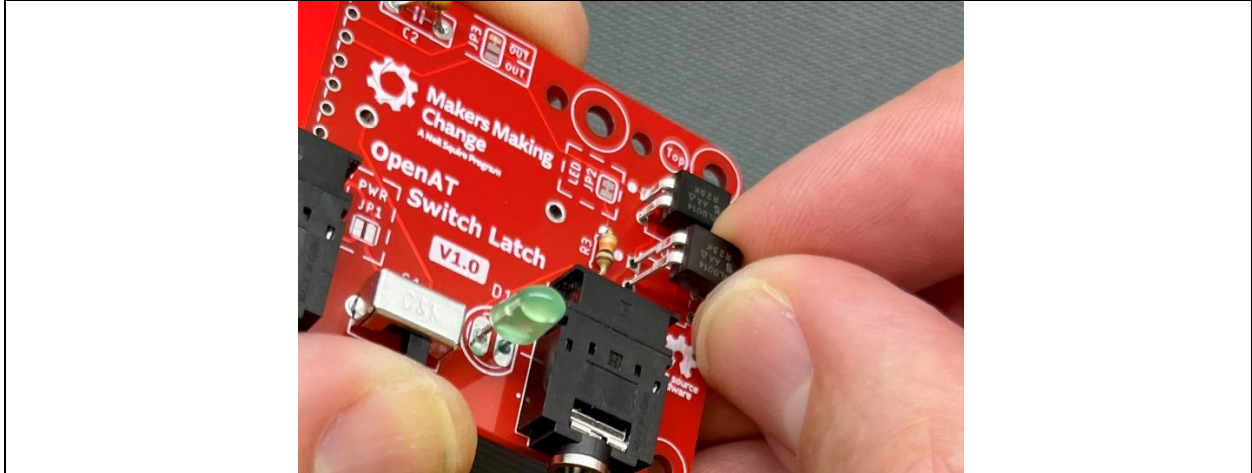Repeat these steps for the second jack.

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Step 19: Insert MOSFETS Q1 and Q2 into PCB

Insert both MOSFETS into positions marked Q1 and Q2.

IMPORTANT: The MOSFETS are polarized and must be oriented correctly. The tabbed side of the MOSFETS should go in closest to the right edge of the PCB. Note, the pins on the MOSFET may also need to be bent inwards slightly, to fit into the holes of the circuit board.

Step 20: Solder Q1 and Q2

Solder one MOSFET pin first. **Confirm the MOSFET is properly oriented** on the component side of the board, and then solder the remaining pins.

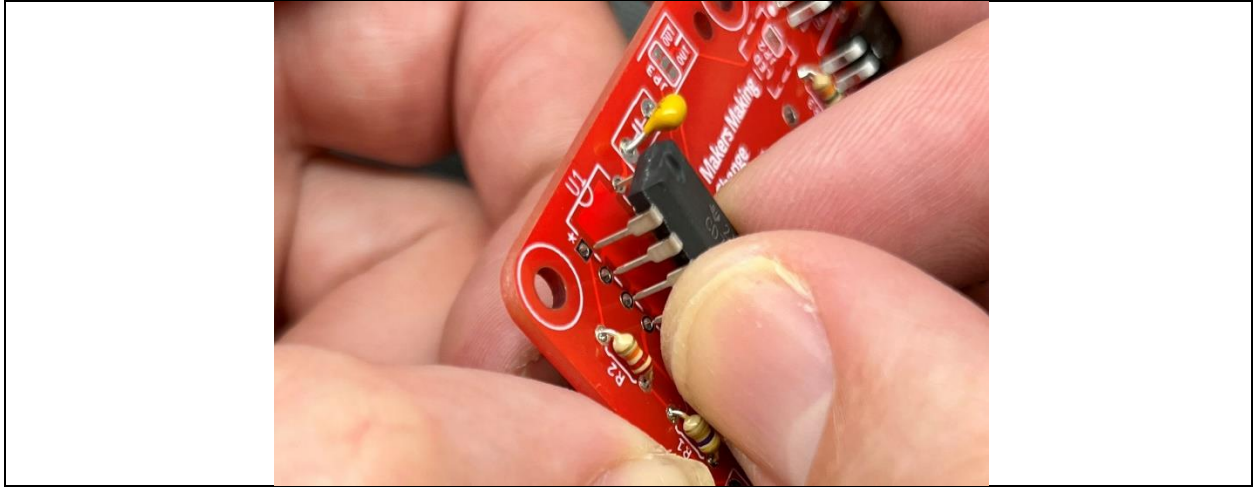Repeat these steps for the second MOSFET.
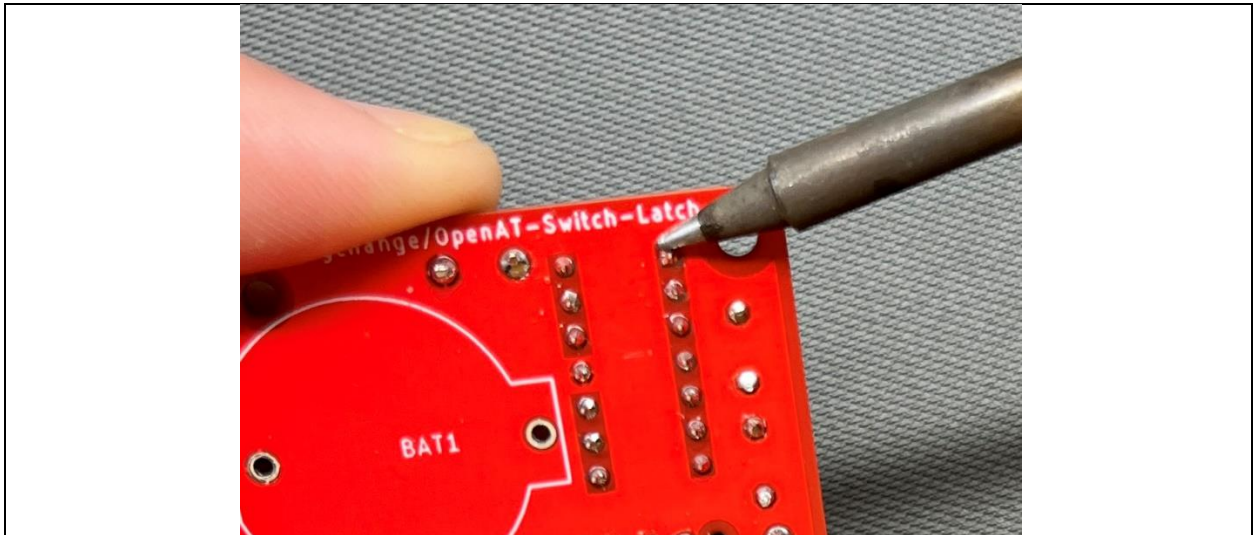
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Step 21: Insert IC U1 into the PCB

Insert the IC into position U1. **IMPORTANT: The IC polarized and must be oriented correctly.** Pin 1 of the IC should go in closest to the left edge of the PCB. Note the physical U-shaped notch on the IC should go over the U shaped notch printed on the PCB (see photo below). Note, also, the pins of the IC may need to be bent inwards slightly, to fit into the holes of the circuit board.

Step 22: Solder U1

Solder one IC pin first. **Confirm the IC is properly oriented** (see previous step). If the IC is positioned correctly, solder the remaining pins. Repeat these steps for the second MOSFET.
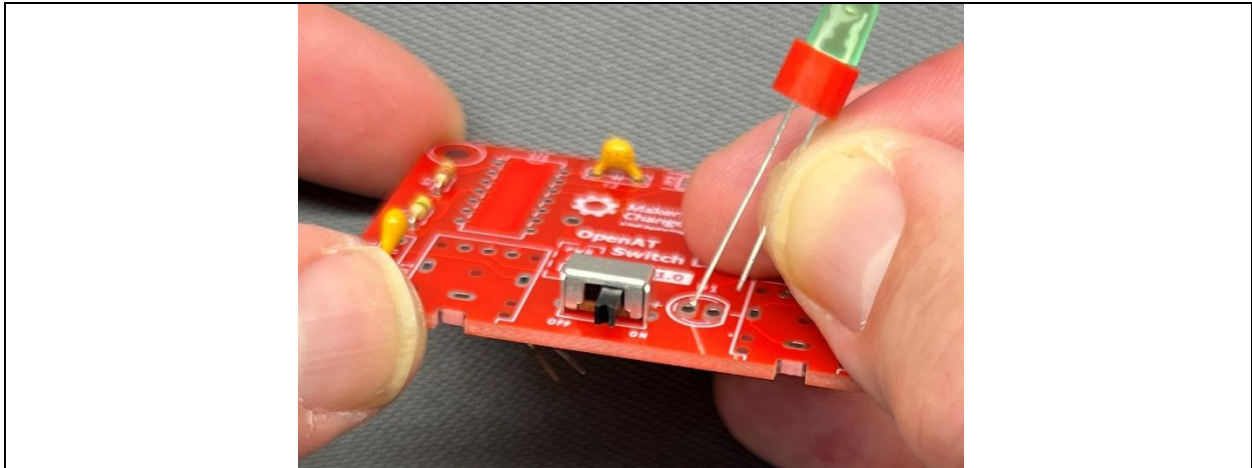
Files available at https://makersmakingchange.com/project/OpenAT-Switch-Latch/

### Step 23: Insert LED through LED Spacer and into PCB

Slide the spacer onto the LED, and then slide the LED into location D1 on the board.

Important! The longer wire of LED (positive lead) MUST be placed into the hole marked + (as **shown in the photo below).**

Step 24: Solder and trim LED

Before soldering, hold the LED into position, so that the body of the LED is pressing against the spacer and the circuit board. Solder the LED into place by soldering the longest lead (+) first. Confirm the LED is properly positioned on the component side of the board, and then solder the remaining lead. When soldering is complete, trim off the LED leads with side cutters.
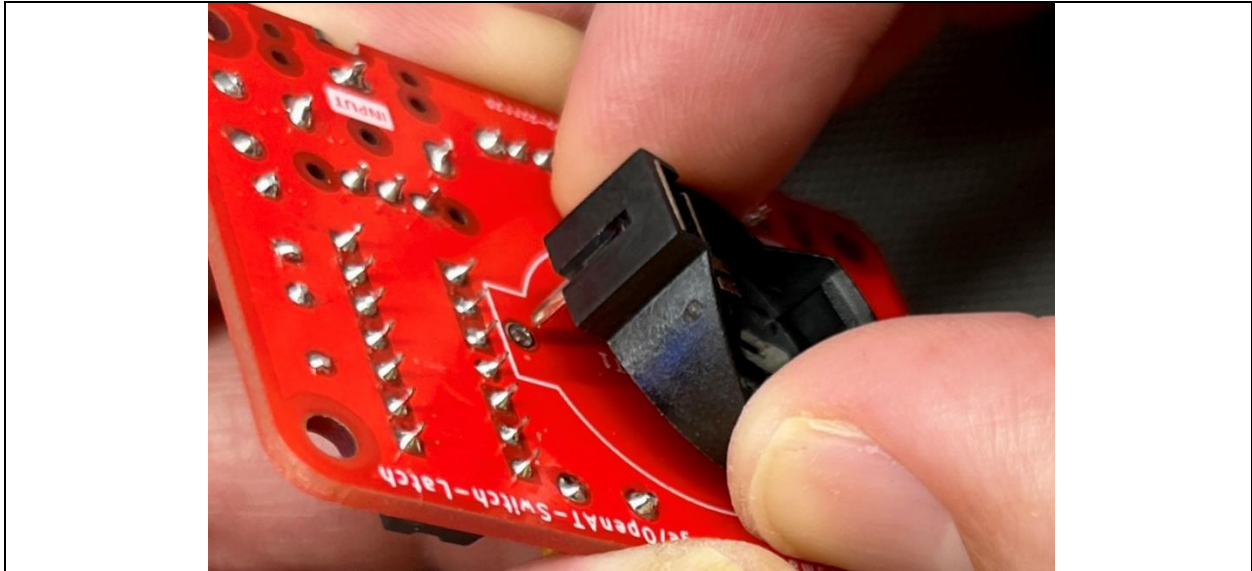
Page **14** of 19
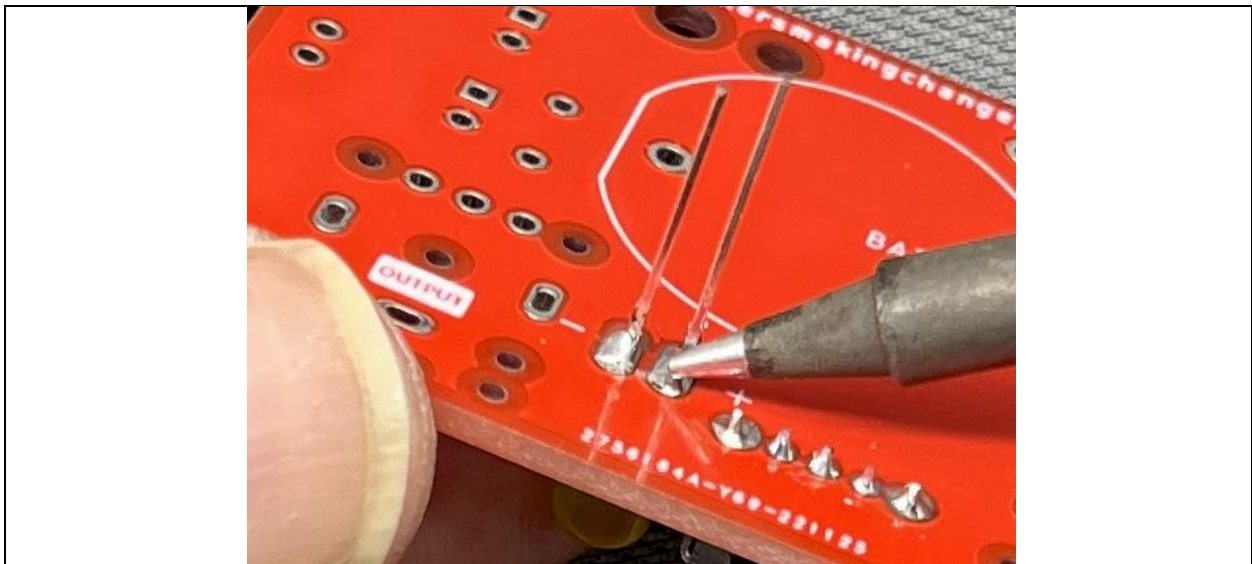
Step 25: Insert Battery Holder into PCB

Insert the battery holder on the **solder side** of the circuit board. Note the rectangular end of the battery holder should match the corresponding outline printed on the circuit board.


Step 26: Solder Battery Holder pins

Solder one battery holder pin first. Battery holder should match the corresponding outline printed on the circuit board. Then solder the second battery holder pin.

Files available at https://makersmakingchange.com/project/OpenAT-Switch-Latch/
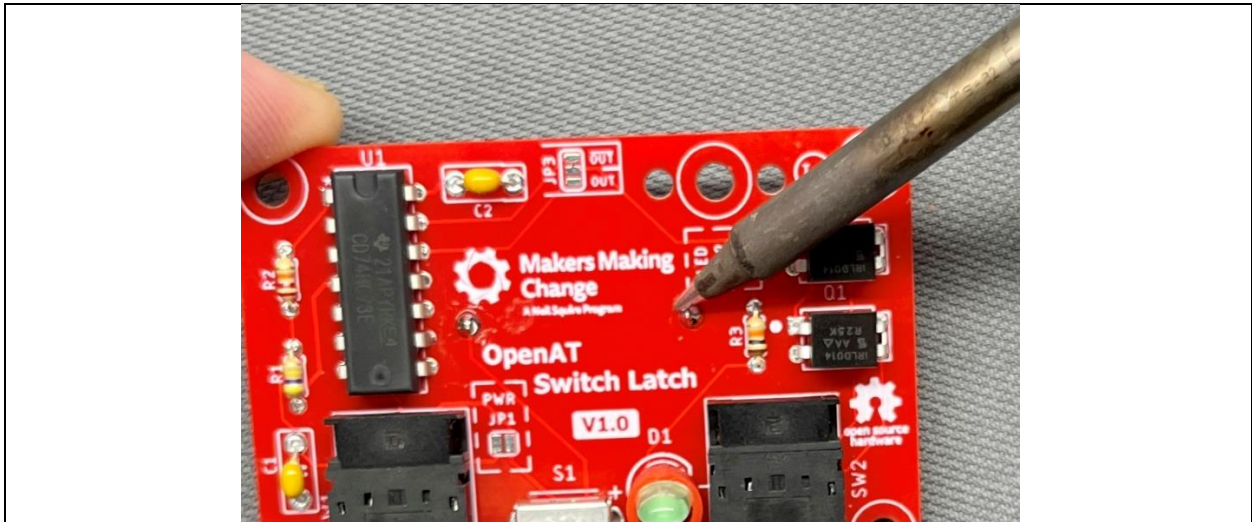
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## Step 27: Insert Battery into Battery Holder

Insert a 3V lithium coin cell, type CR2032, into the holder. Ensure the positive (+) side of the battery is facing up, and that the battery is fully inserted.
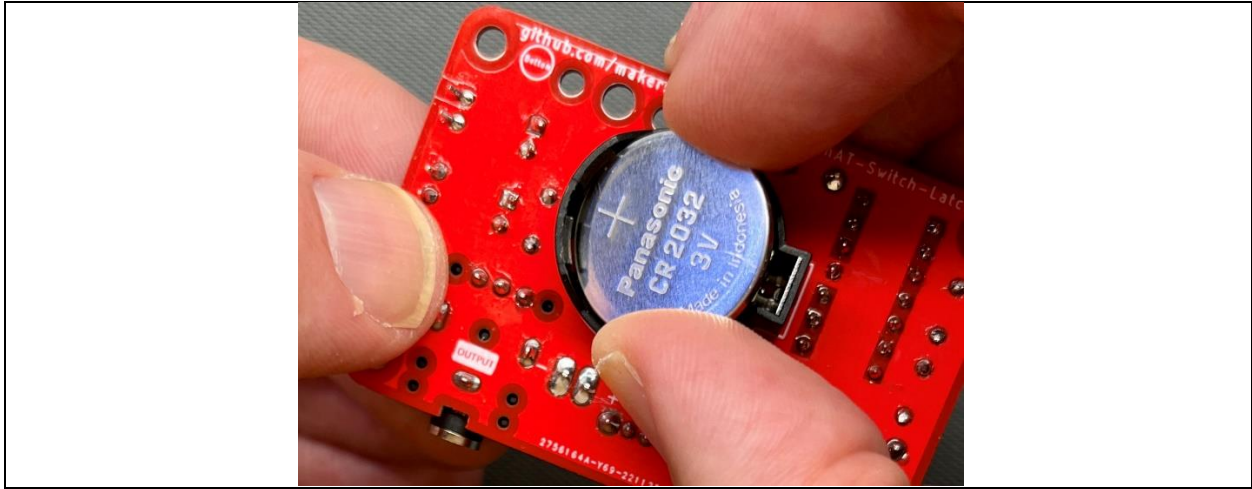
Step 28: Preliminary Test with Assistive Switch

Insert the 3.5 mm plug end of an assistive switch into the input jack. Turn on the power switch (move switch toggle right) Tap the button. The LED should turn on (or off), and stay that way, until the next button tap.

If the LED doesn't operate as expected, stop and troubleshoot before proceeding to the next step.

Files available at https://makersmakingchange.com/project/OpenAT-Switch-Latch/
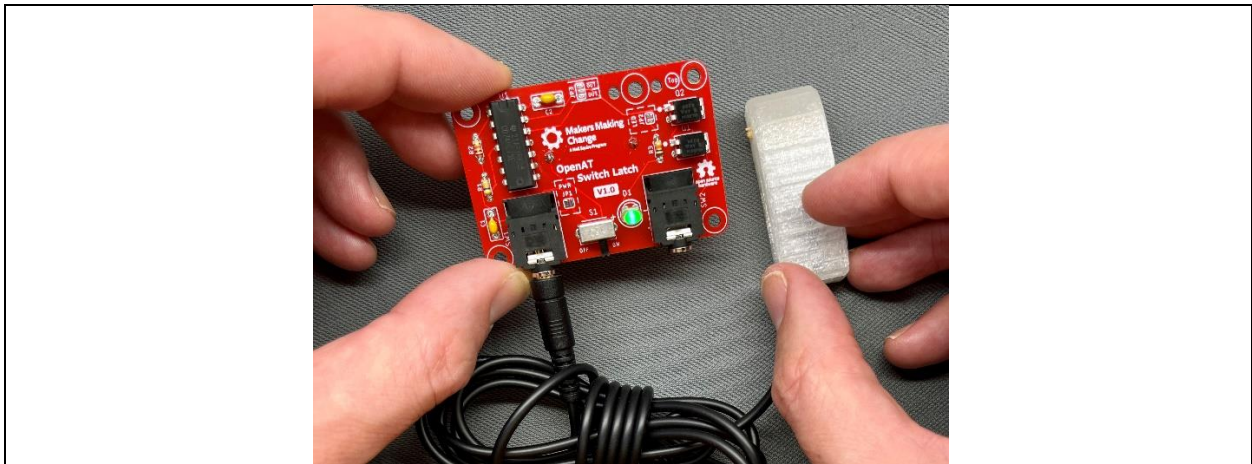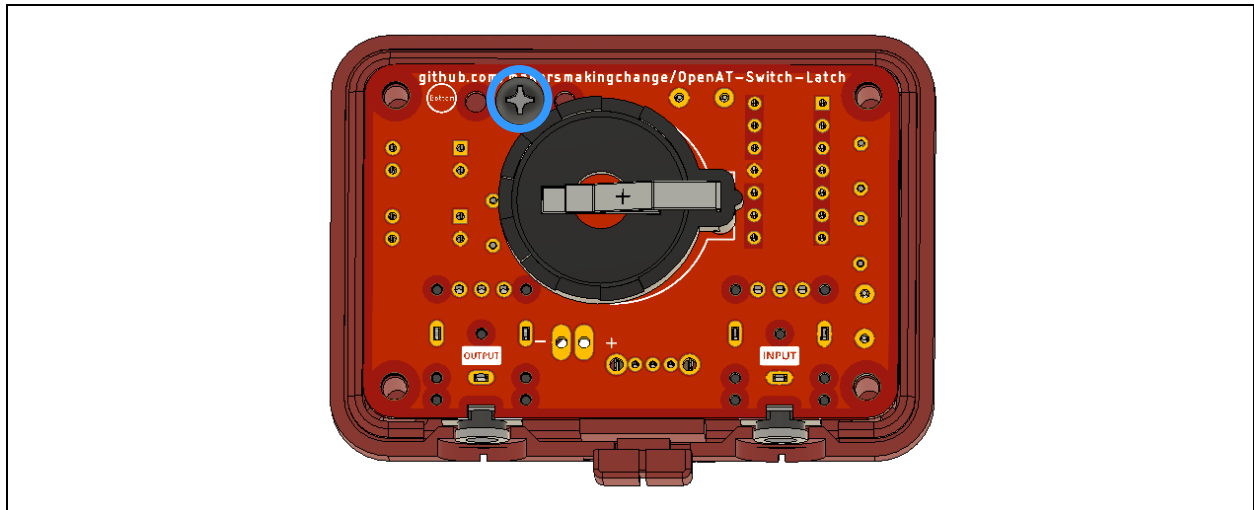
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Step 29: Insert Switch Slide into Enclosure Top

Position the Enclosure Top with the 'OpenAT Switch Latch' logo facing down. Insert the Switch Slide into the groove and slide it into the off position.
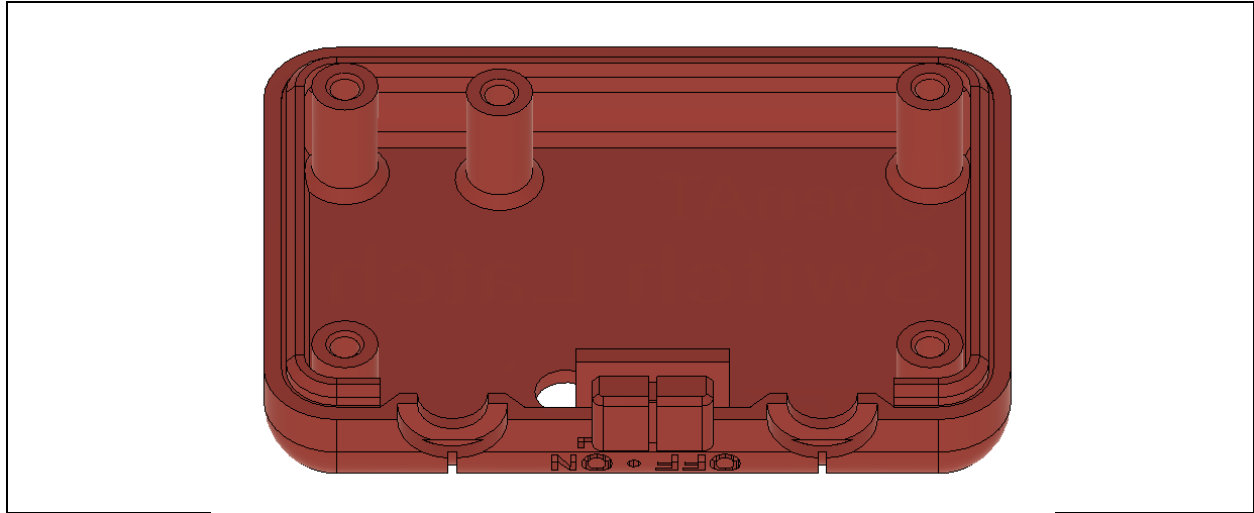
Step 30: Secure PCB into Enclosure Top

Flip the PCB so the bottom side is face up and insert into the Enclosure Top, aligning the LED with the hole. Secure with ONE #4-3/8" screw in the hole beside the battery holder.
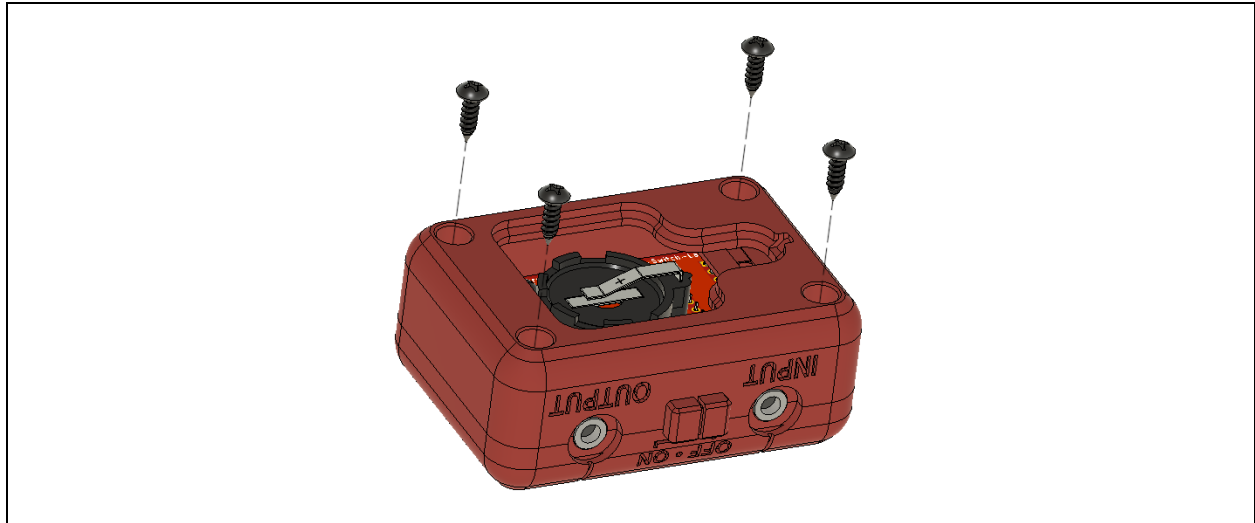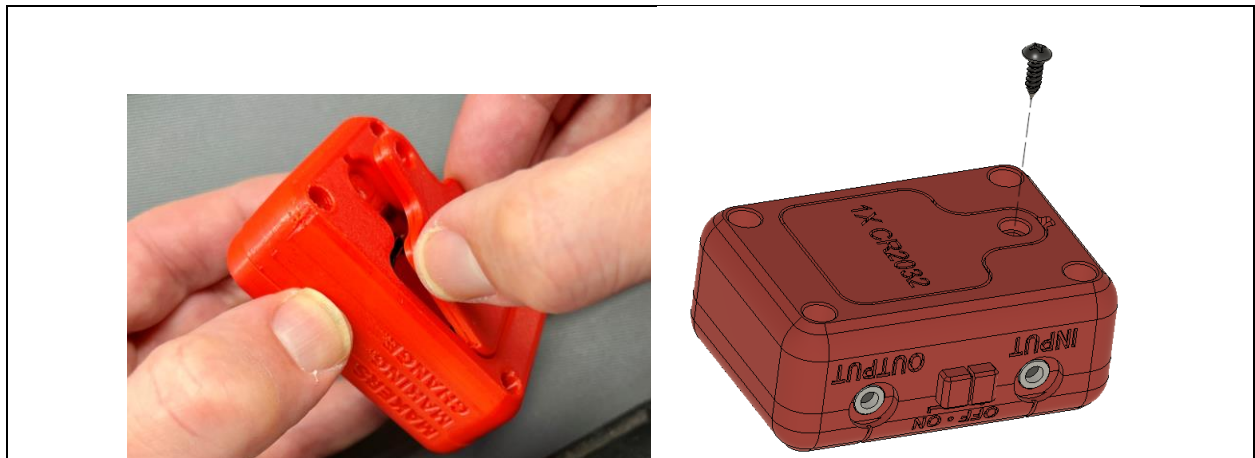
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Step 31: Secure Enclosure Bottom to Enclosure Top

Line up the Enclosure Bottom over the Enclosure Top. Fasten with FOUR #4 x 3/8" screws.

Step 32: Attach and Secure Battery Cover to Enclosure Bottom

Insert the Battery Cover into the Enclosure Bottom. Secure with ONE #4 x 3/8" screw.

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Testing

Final Test

Attach a switch to the input jack and an output device to the output jack. Slide the power switch on. Activate the switch. The LED should turn on and remain on and the output device should also activate. Activate the switch again. The LED should turn off and remain off and the output device should turn off.