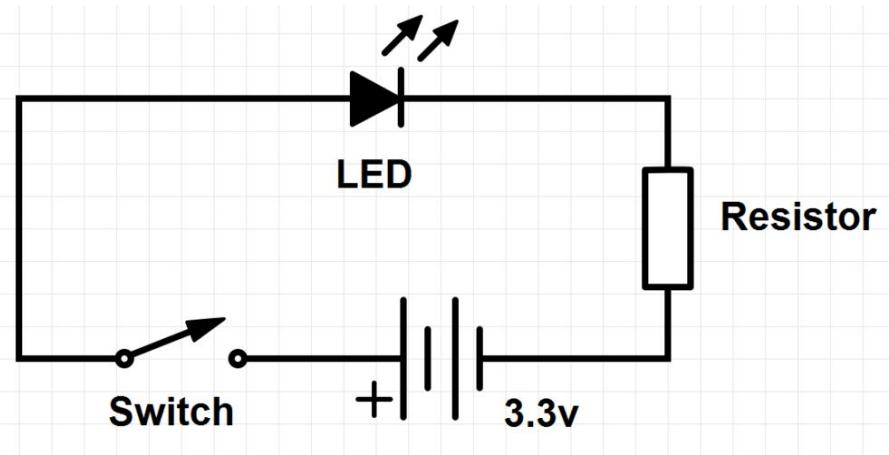


What is a circuit?

- Electricity in a circuit moves from the positive terminal of a battery to the negative terminal, also called ground
- Like water powering a water wheel, we can make electricity do work as it flows through the circuit
- A circuit is either closed (connected) or open (disconnected). We can use a switch to open or close a circuit



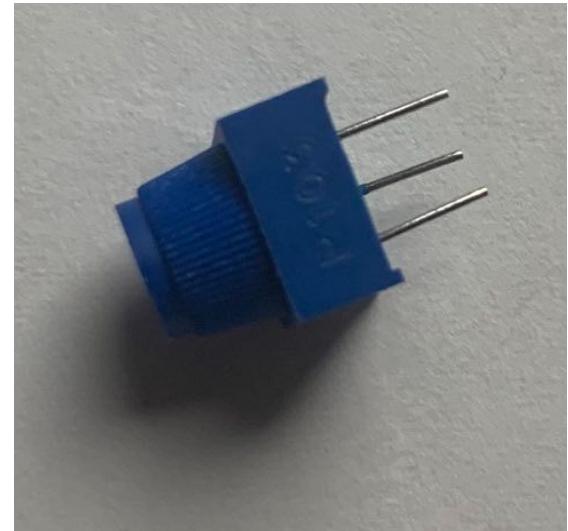
Resistor

- A resistor reduces the amount of electricity that's able to flow through
 - Measured in Ohms (Ω)
- Colored bands on resistors measure how much resistance is on it
- Prevent too much electricity from blowing up LEDs.



Potentiometer

- A potentiometer is like an adjustable resistor
 - You can change how much electricity flows through
- Potentiometers have adjustable resistance



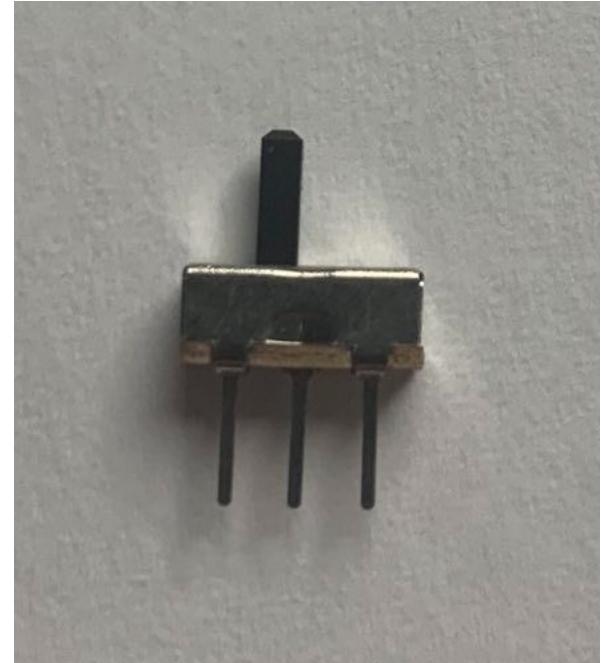
Light Emitting Diode

- LEDs (Light Emitting Diode) are powered by running current through a semiconductor die that emits photons
- 4 pins: Red, Green, Blue, and Ground



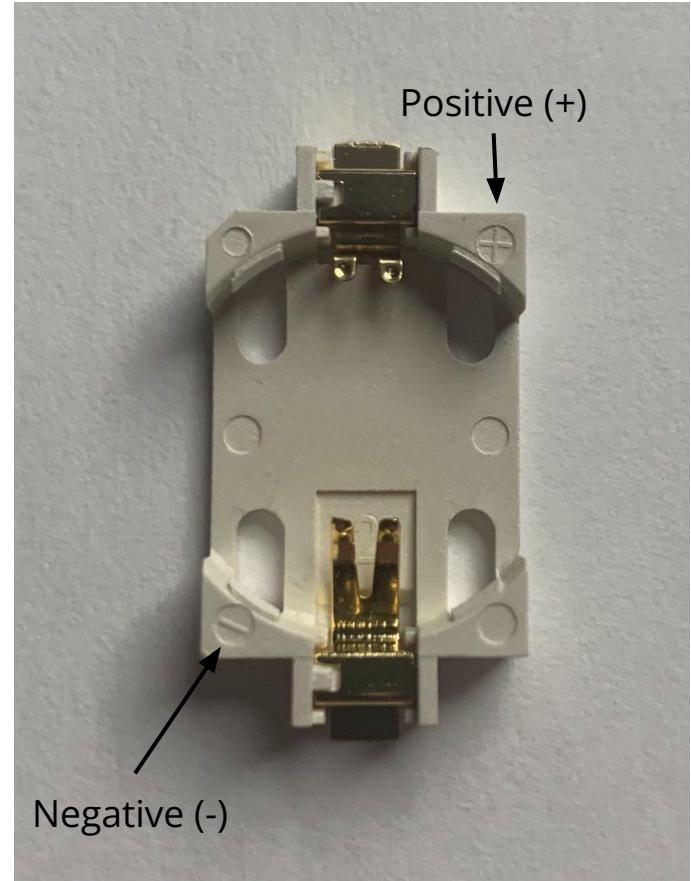
Switch

- Switches control whether a circuit is open or closed
- Allows current to move through by moving a metal plate into contact with another metal plate



Battery Holder

- A battery holder is exactly what it sounds like
- It connects the battery's negative and positive sides with the rest of the circuit



Soldering Safety

- Never touch the soldering iron element; it can reach temperatures of 750°F.
- Use safety goggles when soldering.
- Don't breath in the fumes.



How to Hold Your Iron

- Your iron is incredibly hot, only hold the handle
- All of the metal parts in the front get hot: NOT just the iron

Holding your soldering iron
CAUTION: HOT!



Good!



DON'T DO THIS!
this would be pretty painful

Quiz: Will They Get Burned?



Quiz: Will They Get Burned?



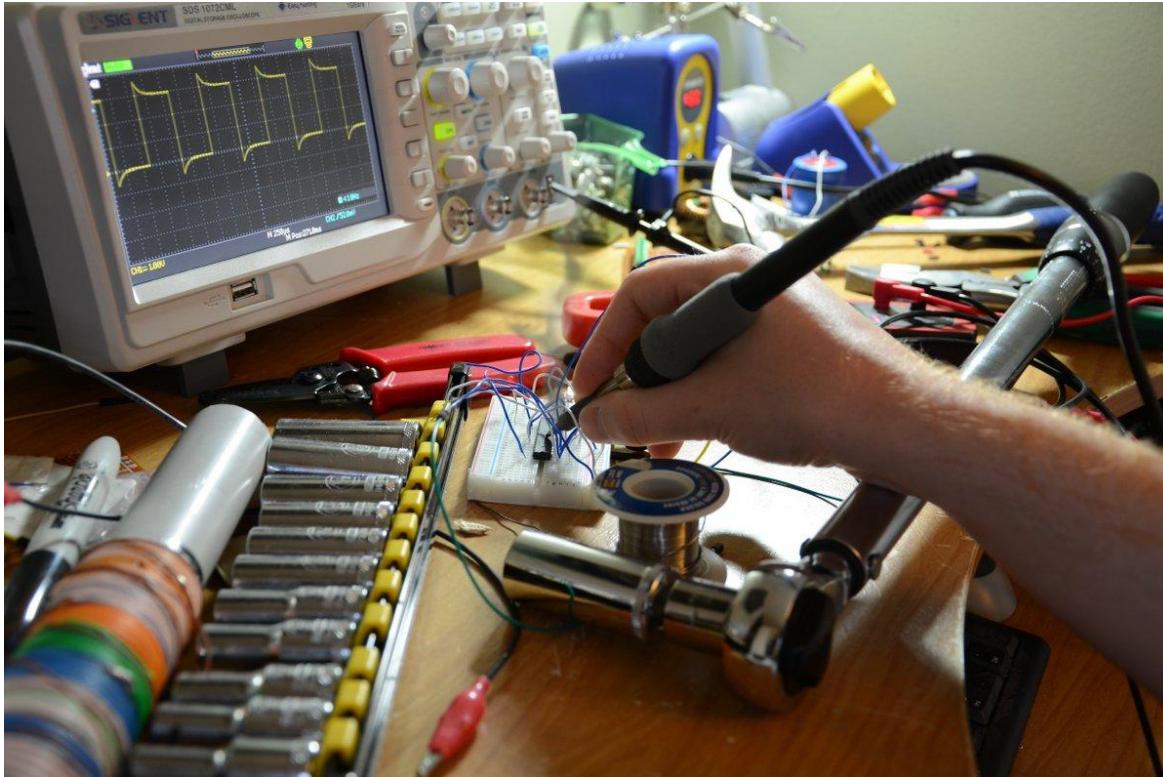
Quiz: Will They Get Burned?



Quiz: Will They Get Burned?



Quiz: Will They Get Burned?



Soldering Safety

- Your parts will get HOT while being soldered!
- Use tweezers or clamps to hold wires when heating them.



Clean Your Iron Between Soldering

- Keep the cleaning sponge wet while using the soldering iron
- If the soldering joints look messy or the soldering tip looks to be dirty, clean it on the wet sponge



Soldering Safety

- Wash hands with soap and water after soldering
- Always return the soldering iron to its stand when not in use; never place it on the table.
- Turn off and unplug the soldering iron when it's not in use.



Soldering Safety

- BE CAREFUL not to burn your power cable
- Tell a helper if you notice your soldering iron acting strangely



If You Get Burned

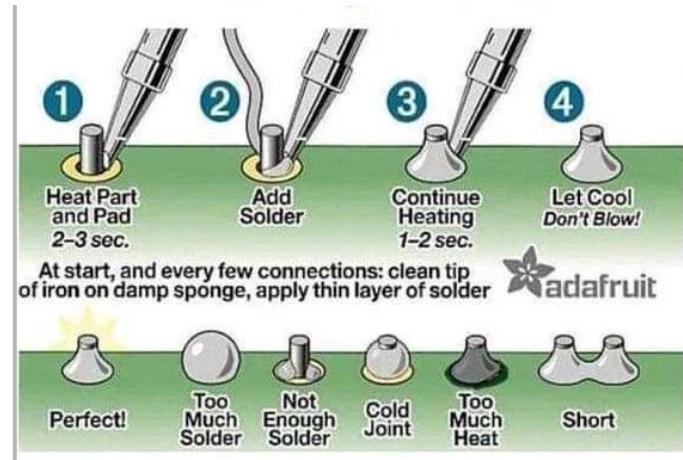
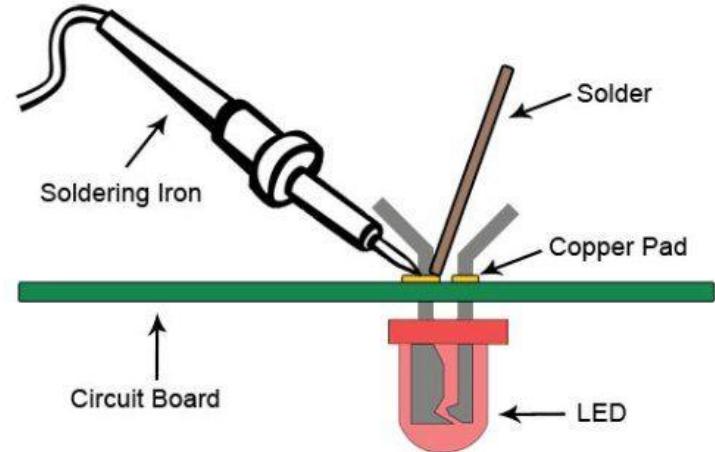
- Immediately cool burns under cold water for 15 minutes.
- Report deep or extensive burns to a helper; protect minor burns with a band-aid.

SKIN BURN TREATMENT



Soldering Correctly

- Careful not to use too much solder
 - Using too much solder will cause multiple pins to bridge
- If you do end up using too much, ask for help
- Too little solder will cause it to not make an electrical connection

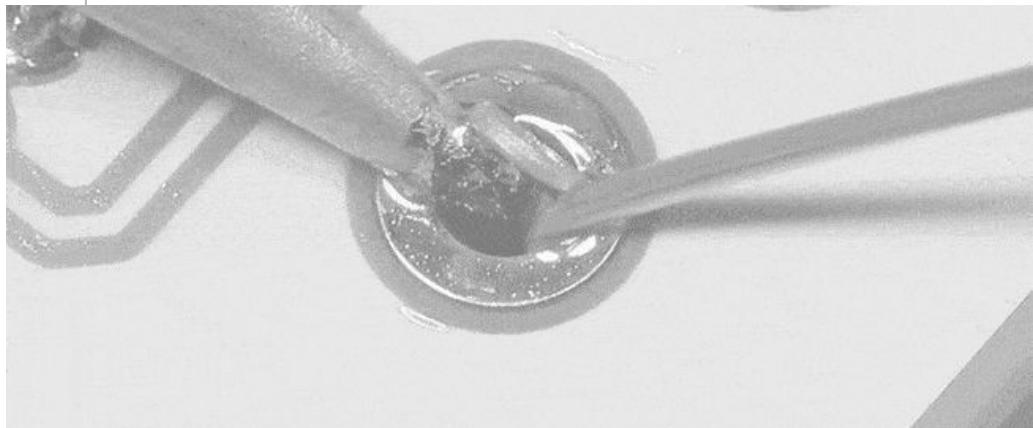
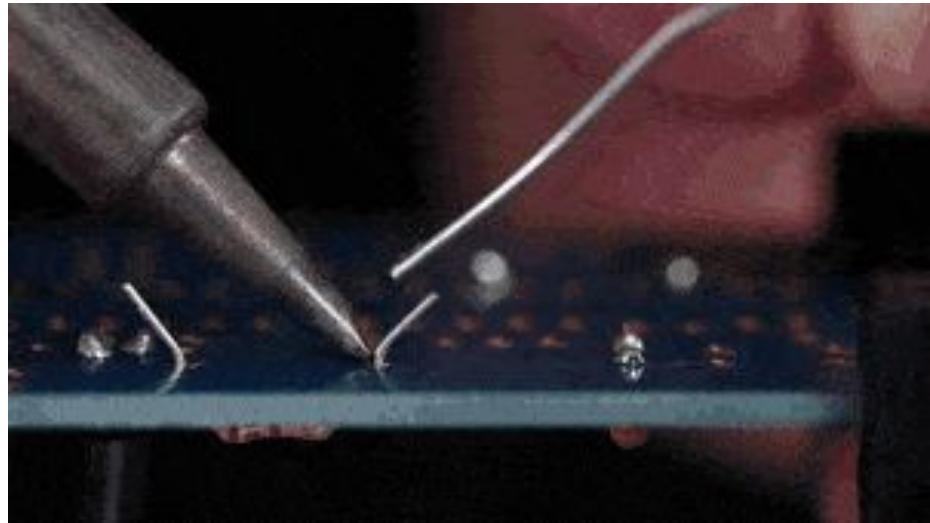


Let's Watch

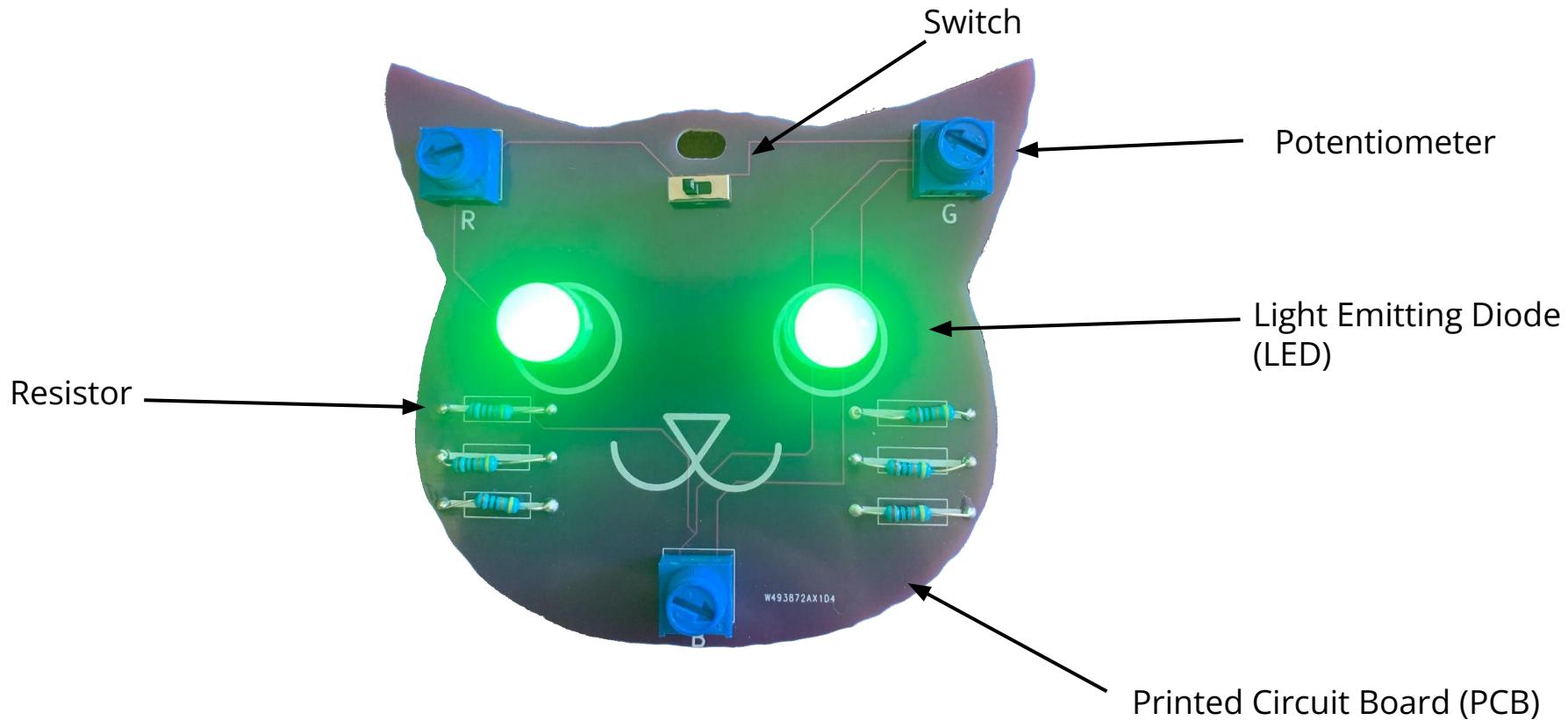


Solder your Meow Mixer!

- 6 Resistors
- 3 Potentiometers
- 2 LEDs
- 1 CR2032 Battery Holder
- 1 Switch
- 1 Meow Mixer PCB



Solder your Meow Mixer!



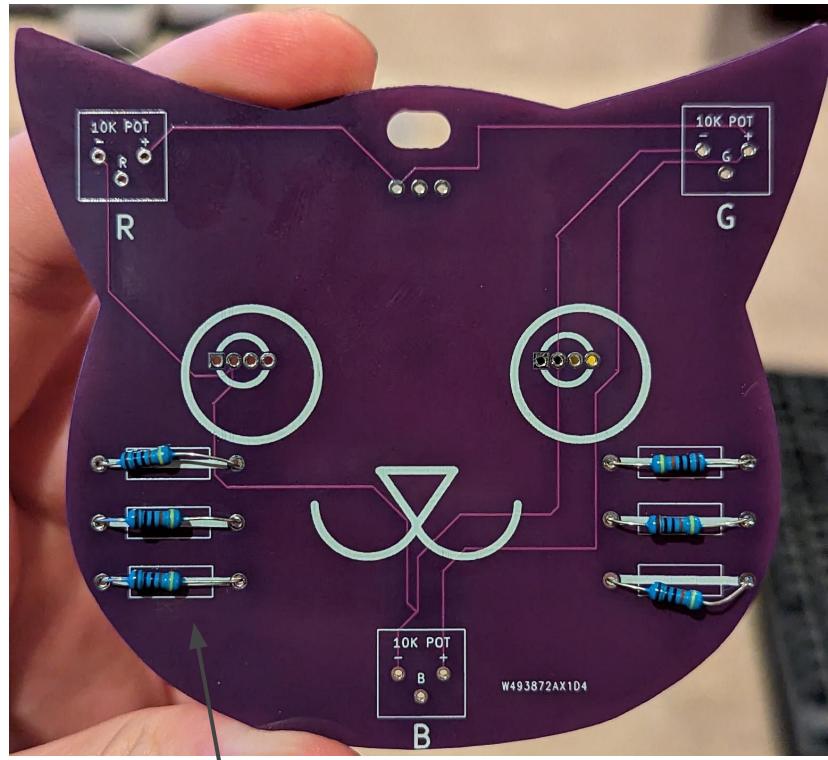
What if I mess up?

- Use a tool called a Solder Sucker to remove any solder that flowed to another pin on accident.
- Talk to a mentor and ask them for guidance.
- Ask one of us for help! We're here to help.



Step 1: Resistors

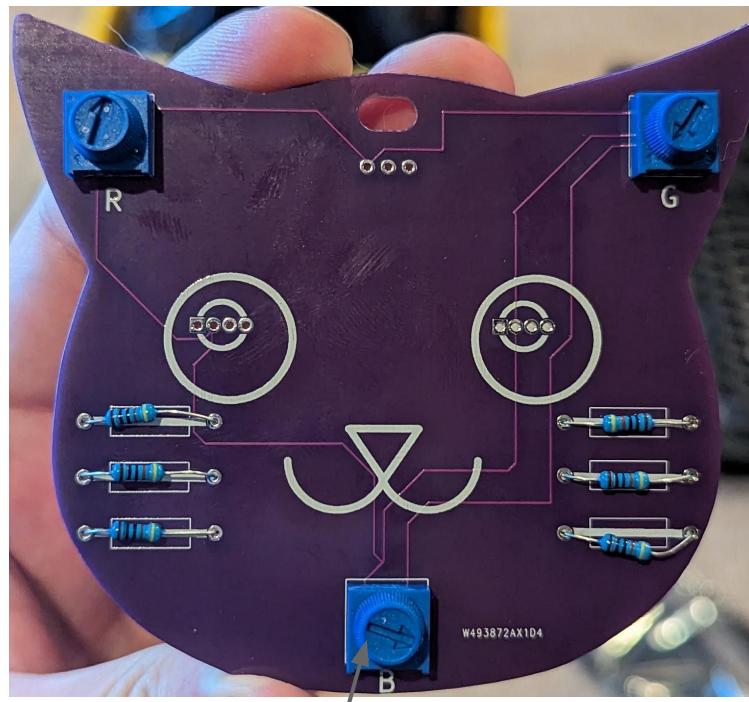
- Grab your 6 resistors
- Bend the pins so the resistor forms a “U” shape
- Solder only one in at a time
- Make sure the resistor is all the way down!



Resistor

Step 2: Potentiometers

- Grab your 3 potentiometers
- Place all 3 of them in and carefully flip the PCB over
- Solder them all in!



Potentiometer

Step 3: LEDs

- Check the pins on the LED- the longest one is negative (-)
- Look on the back of the PCB. There will be a label for the negative pin.
- Slot in the LED and *make sure* the negative pin is where it belongs!
- Solder in the LED



Step 4: Switch

- Look at the switch. On the front you will see a large notch. That's the front of the switch.
- Place the front of the switch in the pinholes at the top with the switch facing towards you
- Solder it in!



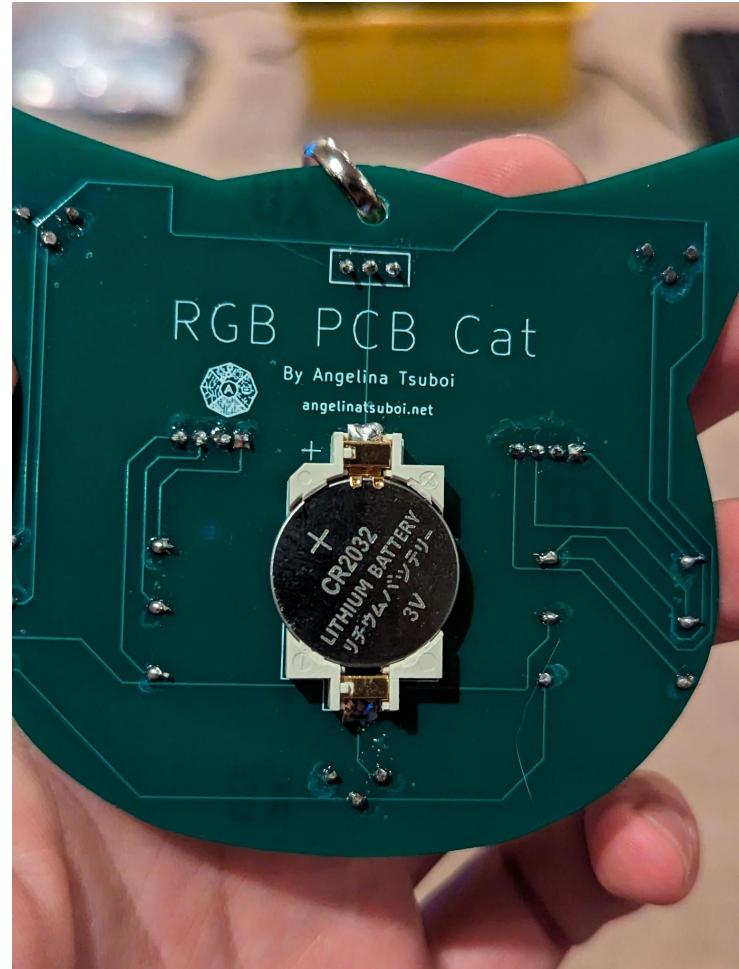
Step 5: Battery Holder

- Finally, the battery holder
- Place it down carefully so that the negative sign is on the bottom, facing towards you
- Align the metal tabs on the holder with the metal plates on the PCB
- Hold the battery holder steady and solder!



Step 6: Cutting the Pins

- Yowch! There's some sharp pins on the back!
- To get rid of them, grab a wire cutter and put on safety goggles.
- Carefully and with the board facing away from you cut the pins above where your solder is.



Step 7: Battery

- Now that you have the pins cut, you need to put the battery in
- Bend the two metal prongs at the + side of the battery holder up slightly
 - This is so the battery can fit!
- Put the battery in with the + sign on the battery facing up



Completed Meow Mixer

- Good job! You've soldered together your first circuit!
- Feel free to take it home with you!

