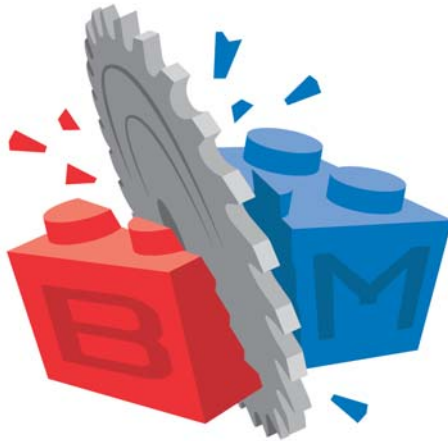




Washington, DC 2004

Brick Modification

Minifig Modification



Custom Lighting Mod

Skill Level: Advanced

Rob Hendrix

<http://www.brickmodder.net>



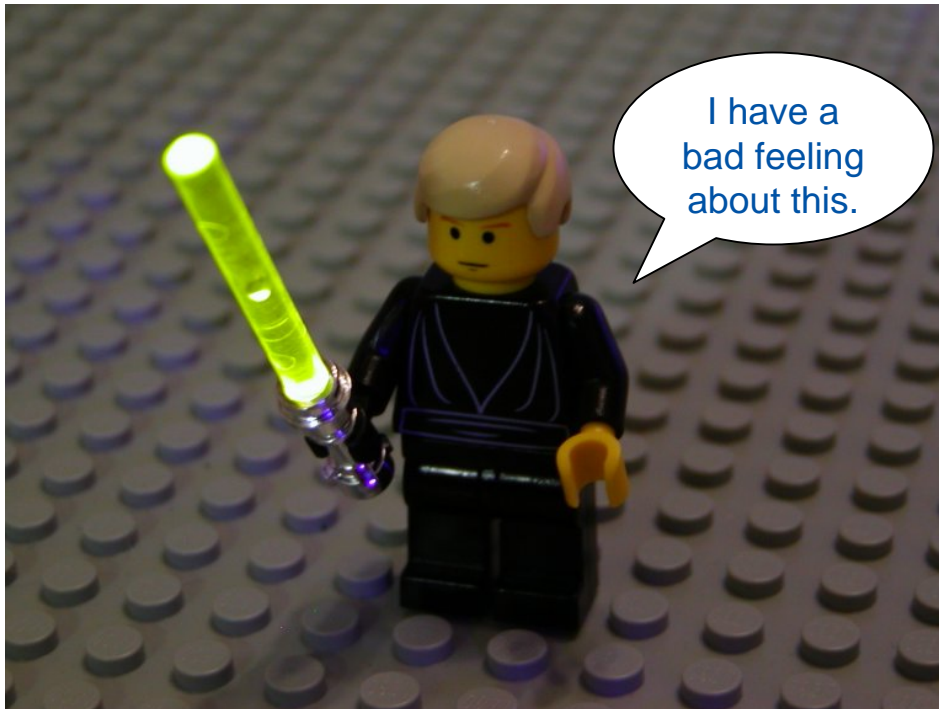
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Presentation Overview

In this presentation, you will learn how to add simple electronics to a LEGO Star Wars minifig to make a lightsaber glow at the flip of a switch.

Please use special care when performing this modification. Wear safety glasses when using power tools and work in a well ventilated area when cutting and soldering. ABS dust and solder fumes could be harmful to your health.

The Goal



- Make a minifig that appears “stock” on the outside.
- Install simple electronics inside the minifig to make the lightsaber glow.

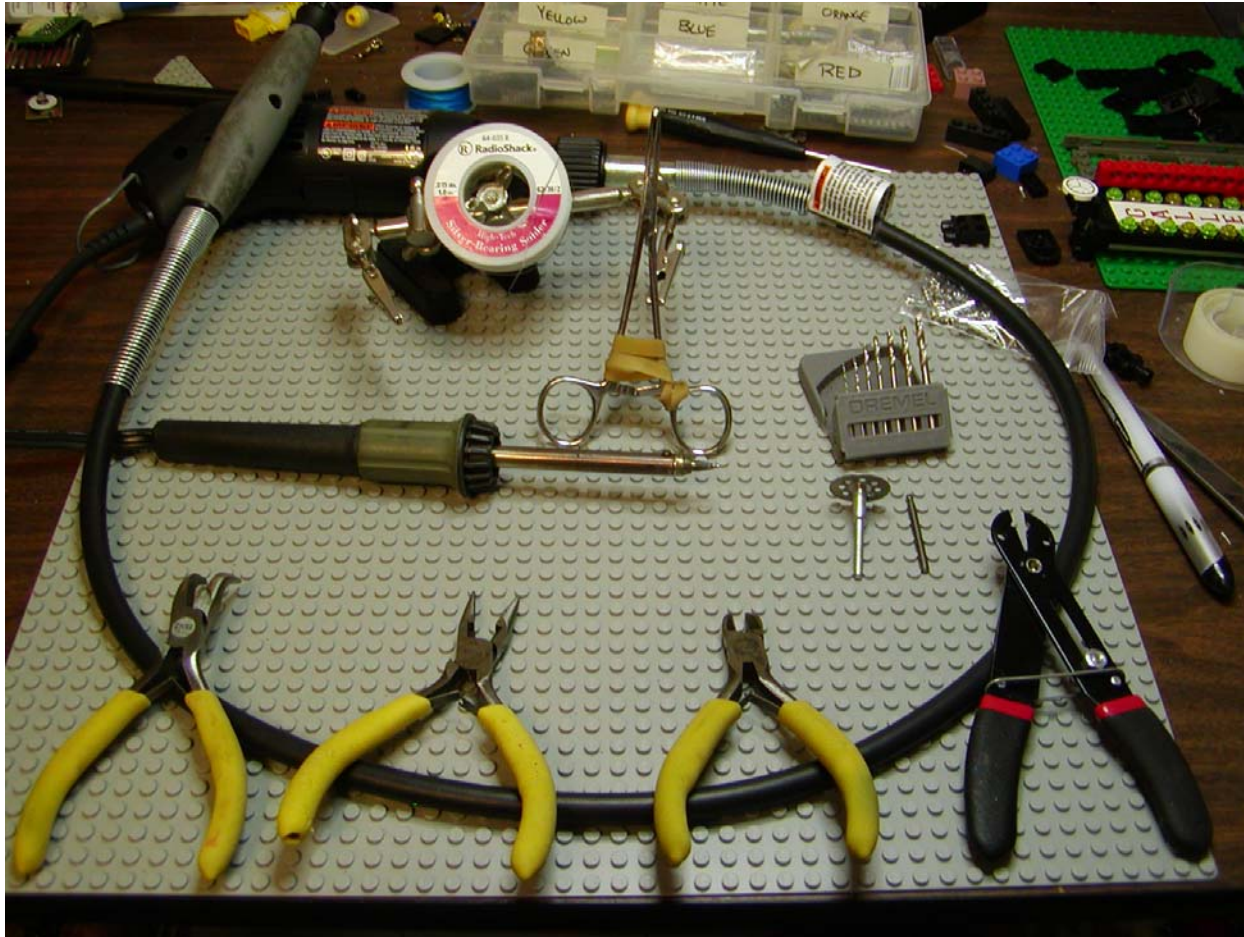


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Required Tools

- Dremel tool with various cutting and drilling bits.
- Low power soldering iron and low temp solder.
- Wire cutters, strippers, and pliers.
- “Helping Hands”, although not required, are very helpful.
- Magnifying lamp if needed.

Tool Examples



Putting it in Perspective



- Top left in the photo is an SMT LED (surface mount light emitting diode).
- This one is about 1.25 x 2 mm and emits green light. Yes, you'll be adding solder and wires to this.

Preparing the Hand



- Slowest speed on a multispeed Dremel is best.
- Take your time or you could slip or ruin the hand (your's AND the fig's!). Drill all the way through.

Preparing the Arm



- Slowest speed on a multispeed Dremel is best.
- Take your time or you could drill too far and out the back of the arm (into your finger!). Do not drill all the way through.

Preparing the Hilt – Step 1



- Slowest speed on a multispeed Dremel is best.
- Heat builds up as you drill, so again go slow as to not damage the piece. Do not drill all the way through.

Preparing the Hilt – Step 2



- Slowest speed on a multispeed Dremel is best.
- Go slow or you will hurt yourself. Drill at an angle to meet the previous hole. Do not drill all the way through.

Preparing the Transparent Rod



- Slow-Medium speed on a multispeed Dremel is best.
- Cut a “U” shape in the end of the rod so the LED will fit inside the cavity.
- You may sand the rod to refract light better.

Preparing the Legs



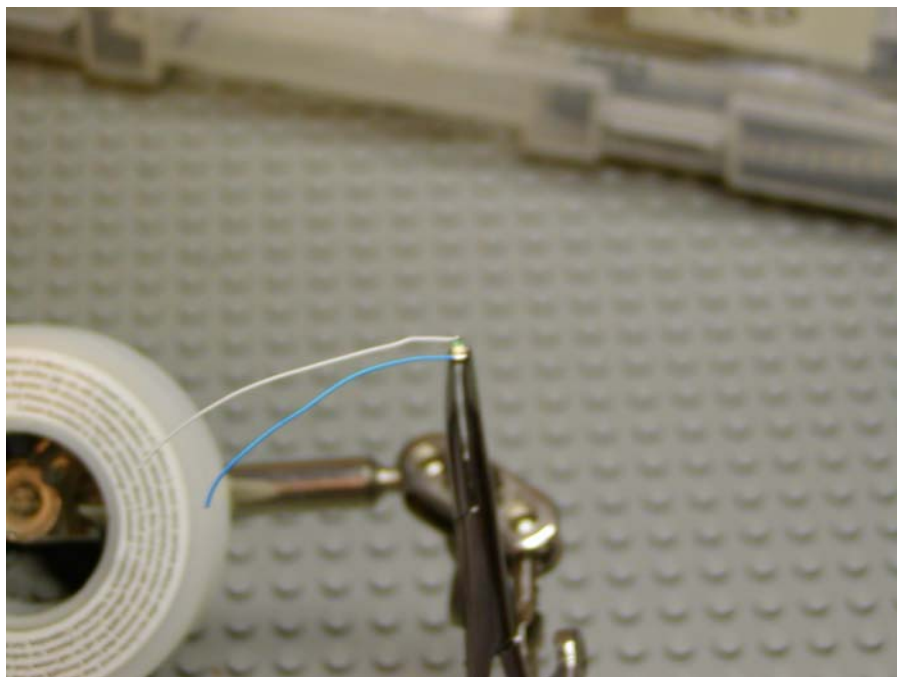
- Low-Medium speed on a multispeed Dremel is best.
- Go slow or you will hurt yourself. Hollow out the section between the studs. It is better to remove the legs before drilling.

Preparing the Torso



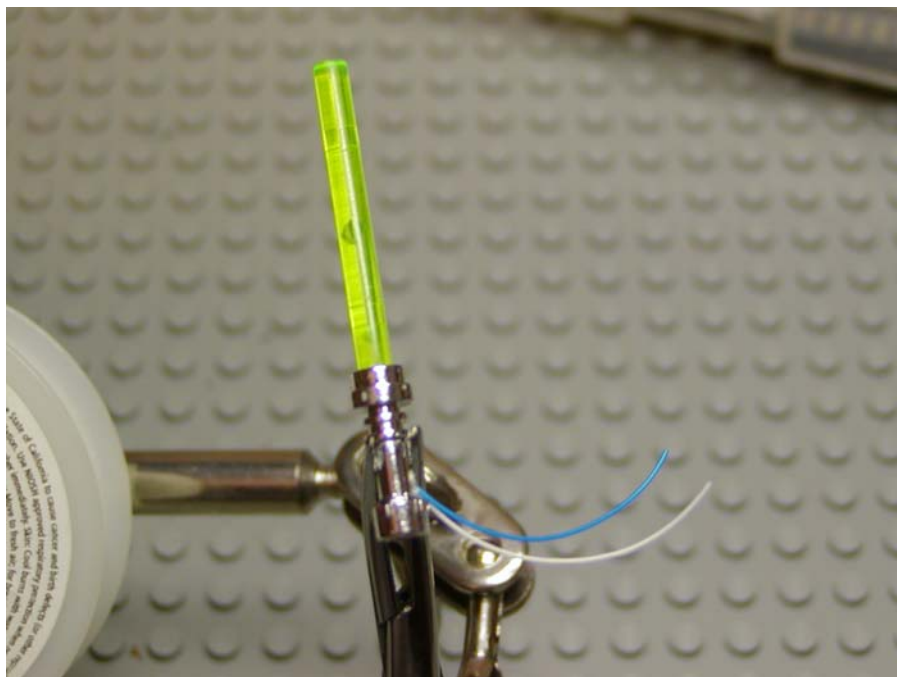
- Slow-Medium speed on a multispeed Dremel is best.
- Cut out the inner portion of the “X” pattern but leave at least 1mm of each edge.

Soldering the LED



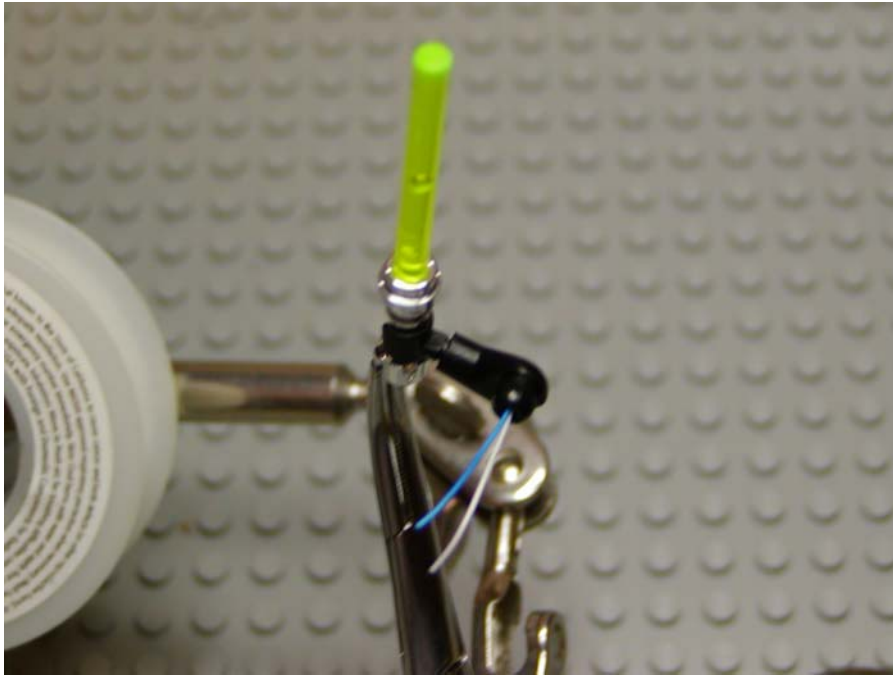
- Use approximately 2” 30 AWG wire for each connection.
- This is not a soldering lesson. Just remember that these SMT components are **VERY EASY** to ruin because of heat damage!

Assembling the Lightsaber



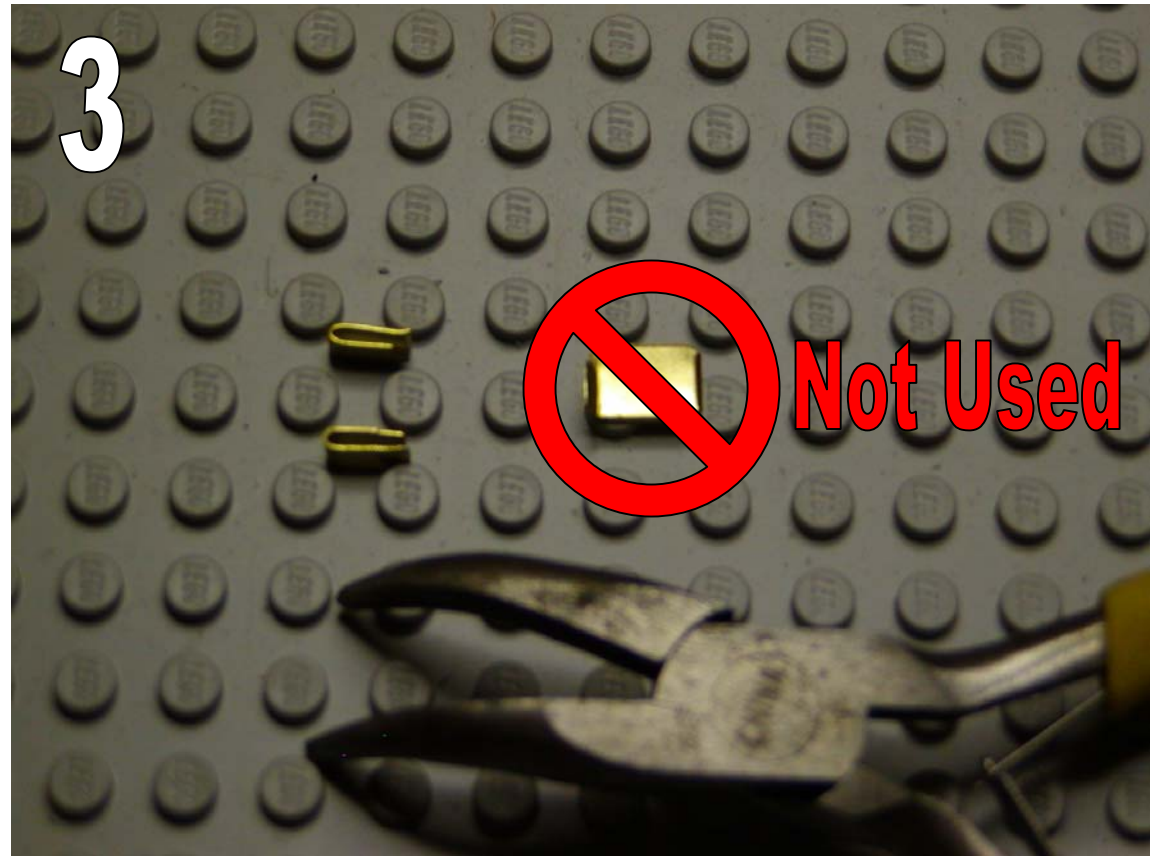
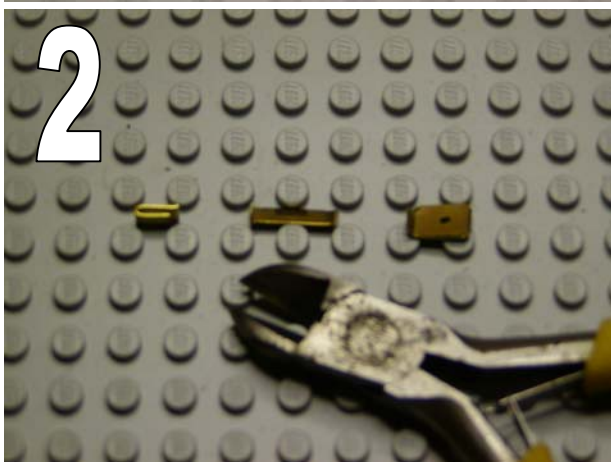
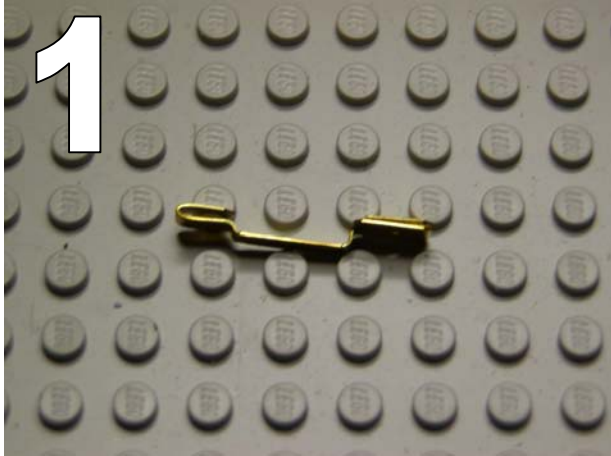
- Insert finished LED assembly into the end hole of the hilt and out through the hole you drilled in the side.
- Check for proper LED alignment and insert the transparent rod. Be sure you straddle the LED with the “U” notch.

Assembling the Right Arm

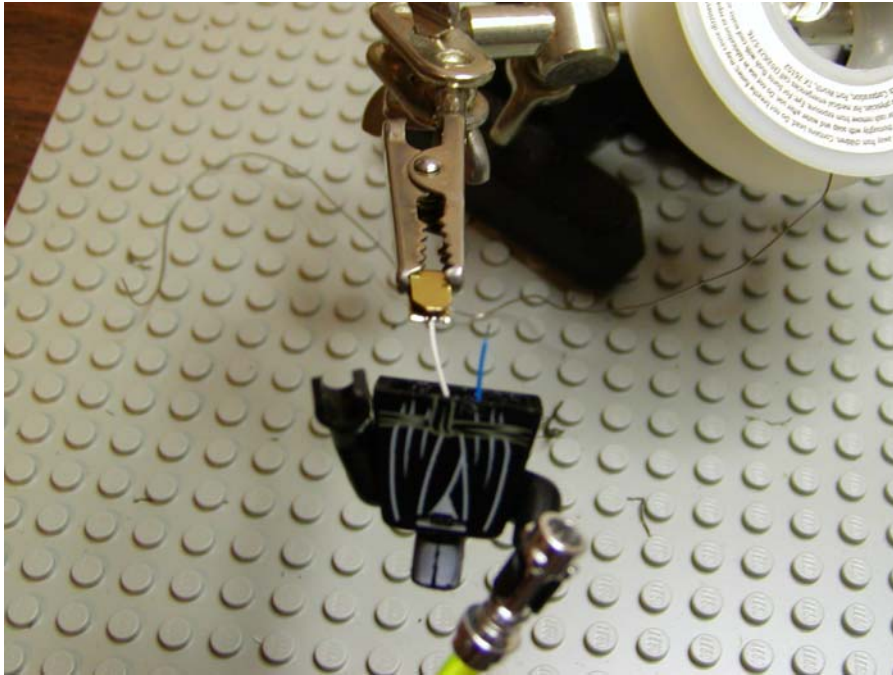


- Insert the wires through the hand and attach the hand to the hilt.
- Insert the wires through the arm and attach the arm to the hand.
- Insert the finished arm into the modified torso.

Preparing Battery Contacts

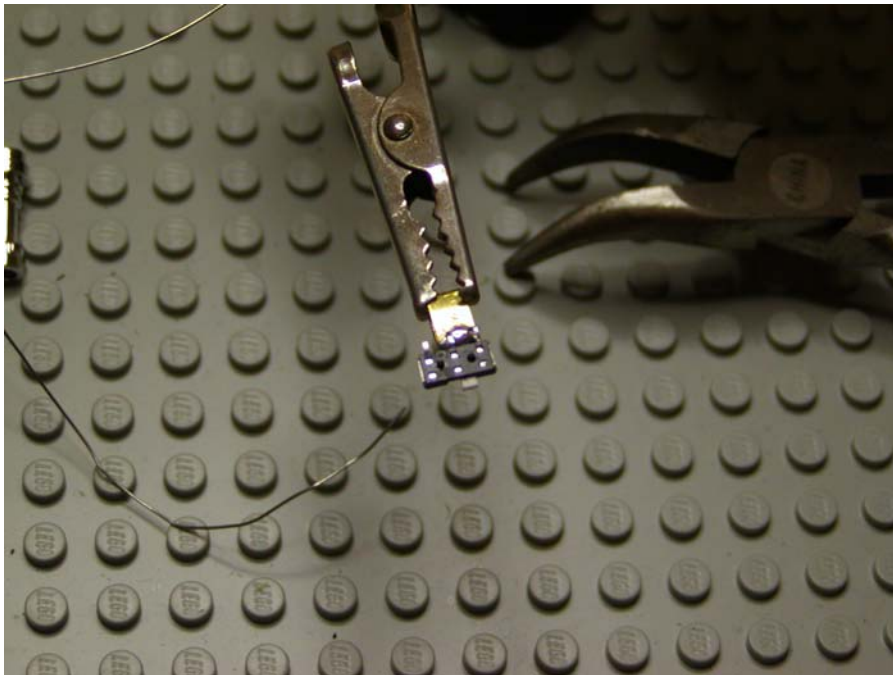


Soldering the Negative Battery Contact



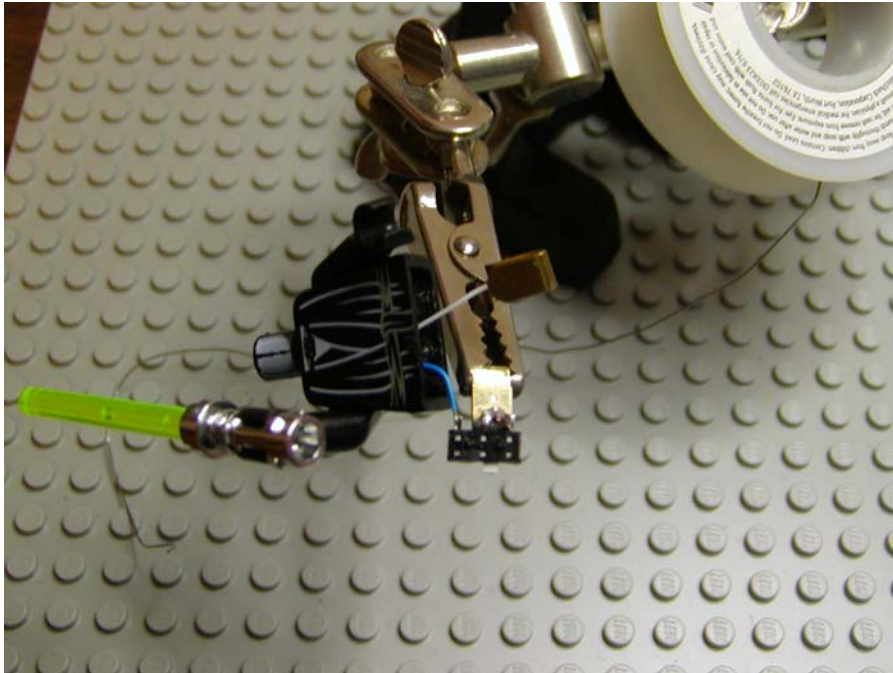
- Solder Cathode (-) connection to battery contact
- Be sure to make a clean solder point inside the “V”.

Soldering the Switch – Step 1



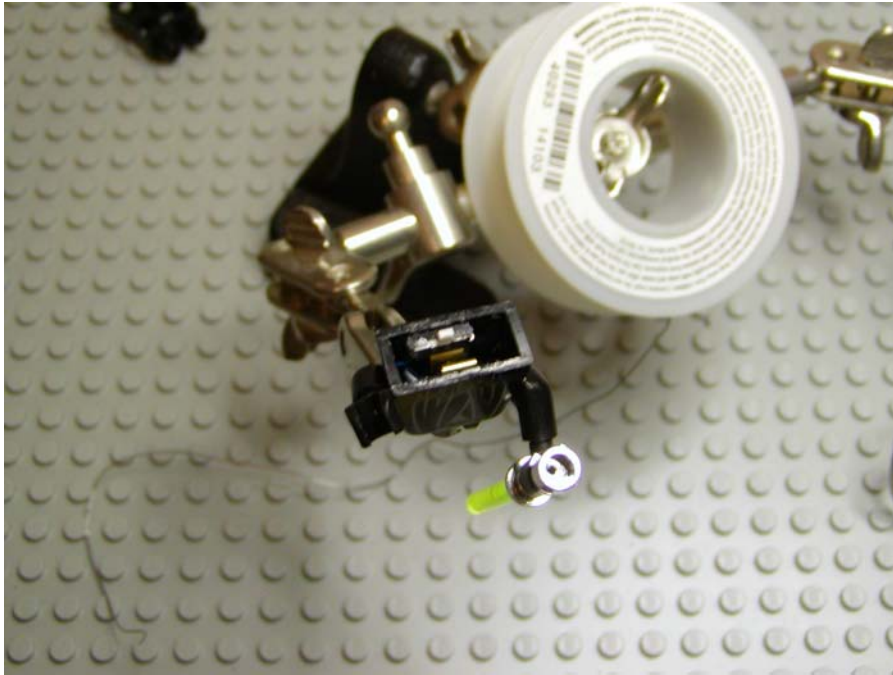
- Solder two points on the switch to a battery contact.
- Leave the other contact open to accept the anode (+) from the LED

Connecting the Switch – Step 2



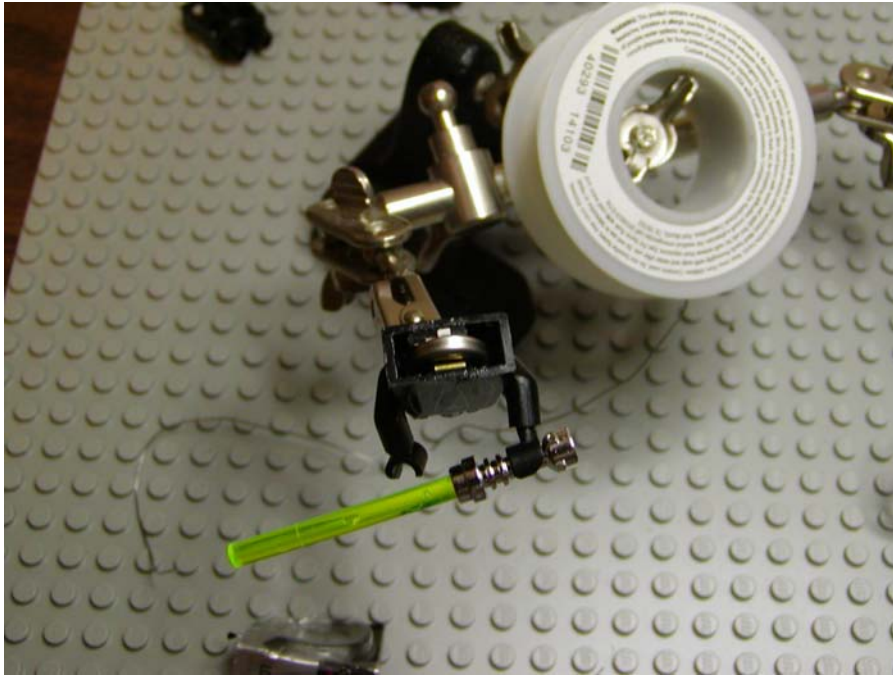
- Solder the Anode (+) to the open point on the switch.
- Almost there!

Assembling the Torso



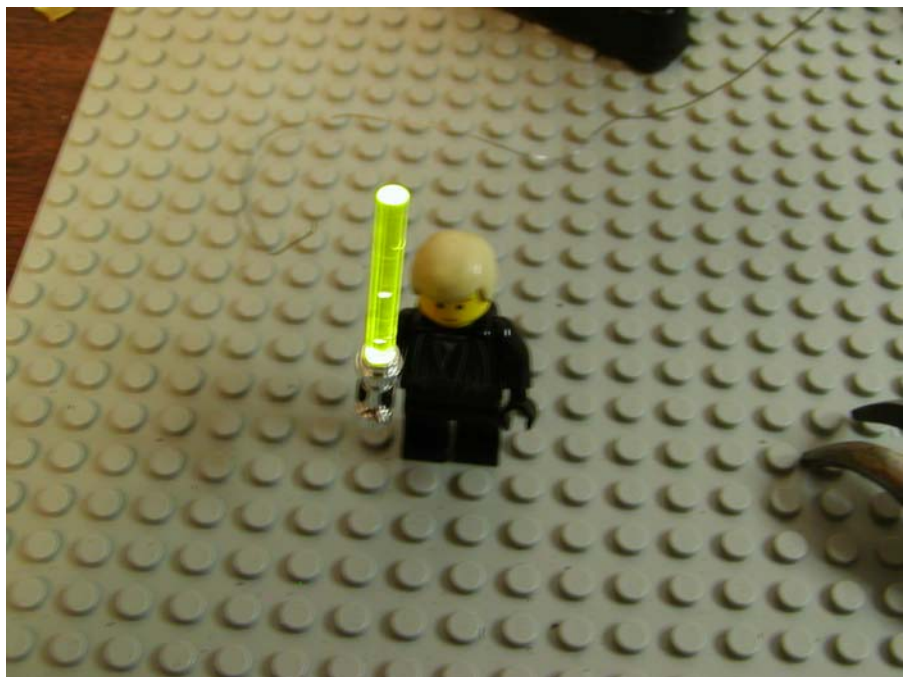
- Place the battery contacts into the torso in the “slots” left by the “X” removal process
- Personal preference: I always put the switch in the back (metal side towards the the other contact).

Inserting the Battery



- Place the button cell between the contacts.
- If you soldered your LED with the correct configuration, the battery (+) should face the switch. If not, just reverse the battery position.

Final Checks and Assembly



- Turn on your switch to see if the LED lights up.
- Attach the leg assembly to the torso assembly. Some final modification to the leg assembly may be necessary for proper fit.



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Thank you



You can breath now... It's over!