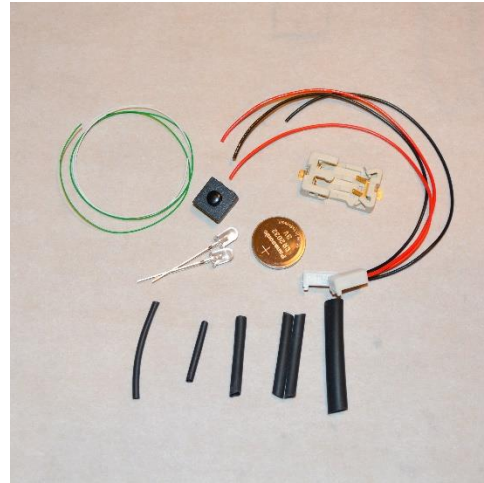


Assembling the LED Light Harness

Things you'll need:

- Unassembled LED Kit
- CR232 Coin Cell Battery (included with kit)
- Wire strippers, or sharp knife
- Soldering Iron / Solder
- Heat gun, hairdryer, lighter, or other source of heat
- Hot glue & Parchment Paper



Note: actual parts may vary slightly, depending on current availability, but their function, and attachment process is essentially the same, regardless.

This guide covers assembling the LED Light Harness kit, and assumes you have basic experience using a soldering iron. It also focuses on the 2-LED model, but the idea is the same for kits which have more LEDs.

The LED kits DO NOT include resistors. If you wish to add resistors to the circuit, contact me for the relevant data for the LED color you chose, so you can calculate the proper resistor. This is a best practice, but not entirely necessary for a couple of lights, running on a 3v battery. Resistors will also require you to obtain some more shrink tube.

A Word on the LEDs

As with any bright light, staring directly into it is bad for your eyes. Exercise caution when working with LEDs. For most colors, I use Ultra Bright LEDs. The advantage of the Ultra Bright is that they are still really bright, even after diffusing them. These LEDs should be sanded down on the top of the lens, to diffuse the light, and give a better focused “glow” effect. I also HIGHLY recommend painting all sides, except the sanded top, with black acrylic paint. This is so that the light does not shine back into your eyes, which is really important for actually being able to see out of the mask, and also just to keep your eyes happy.

Before You Get Started

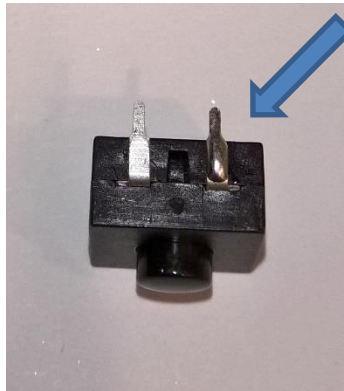
In this guide, positive wires are Green or Red, and negative wires are White or Black. Yes, I know, those aren't all the proper colors to use . . . it's a long story. ☺

The Green and White wires are 30AWG Solid. The Red and Black are 26 AWG Stranded. If you don't have wire strippers which go that small, a sharp knife will do, but you have to be extremely careful not to damage the wire itself, especially with the Green/White.

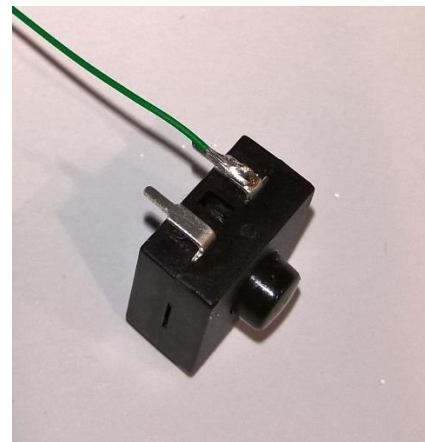
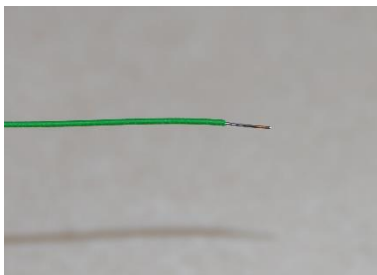
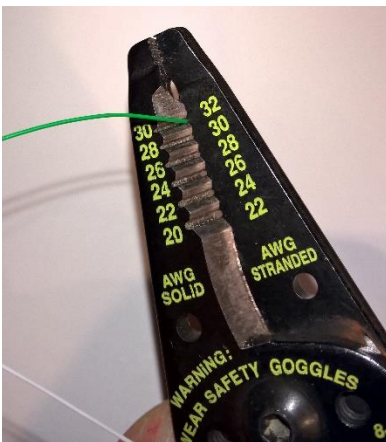
Sort out all the parts, and ensure everything is present. Let me know if something is missing, or if you need longer wires for your application.

Wiring the Switch, and Battery Holder

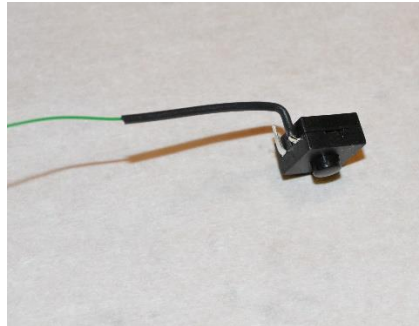
With the switch sitting in the position shown below, tin the right-hand lead.



Strip about 3/16" off of the GREEN wire, and solder it in place.



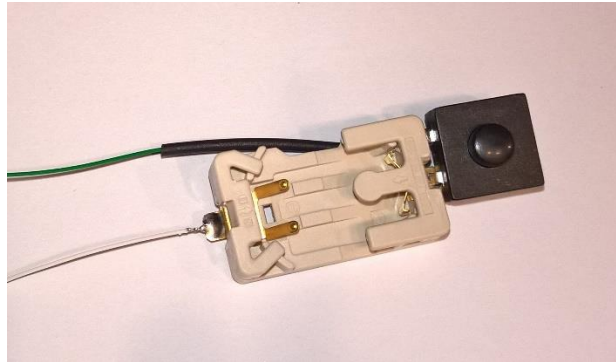
Place the 1/16" shrink tube, which is approximately 1.5" long, over the connection, and shrink it. Before it cools down, bend the wire away from the switch, as shown.



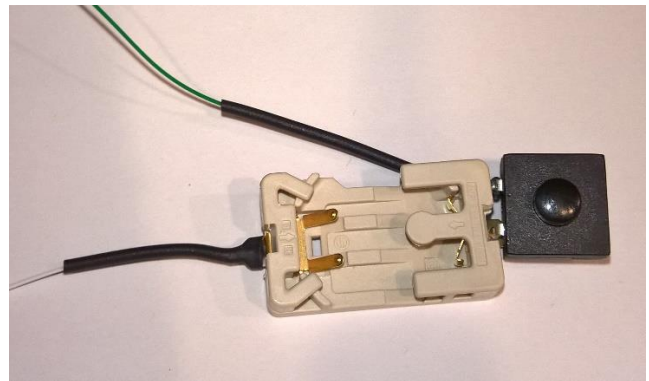
Orient the switch, and battery holder so that the rounded tab of the battery holder, is on the same side as the switch. This is the POSITIVE side of the battery holder. Then place the unwired leg of the switch into the hole of the positive terminal, flip it over, and solder the connection.



Strip about 3/8" off the white wire, insert it through the hole in the negative terminal of the battery holder, twist, and then solder in place.



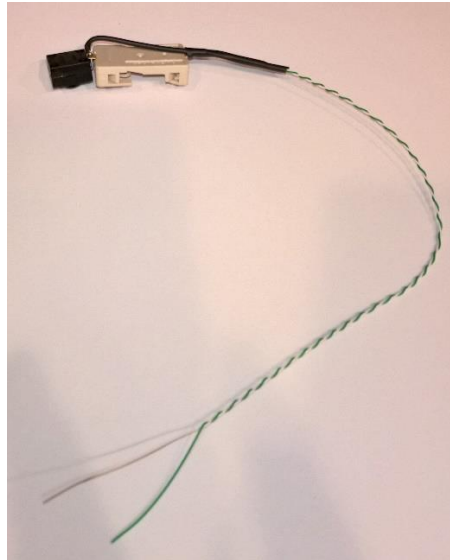
Place the shorter piece of 1/16" shrink tube over the white wire, and try to fit it over the terminal as well. If you're careful, it should just fit. Then shrink it in place.



Now place one of the 3/32" pieces of shrink tube over both the white and green wires, and secure them together. This size tube should fit over both wires, and the negative terminal as well. Try and get the green wire to align below the white wire, as shown below, before heating the tubing.



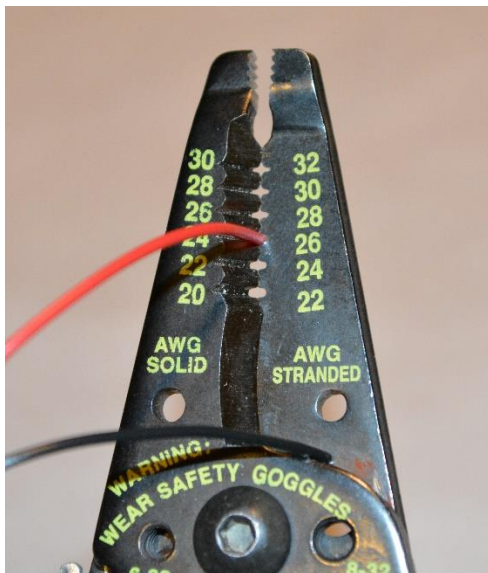
Finally, twist the white and green wires together, leaving the last inch or two untwisted. Then strip about 3/8" off the end of each wire.



Attach the Plugs

NOTE: If you are adding resistors, this is the place to do it. Contact me if you decide to do it, and have questions.

Strip about 1/4" off the ends of all the Red and Black wires, and then twist like colors together. Solder these, so they don't come undone.



**** IMPORTANT ****

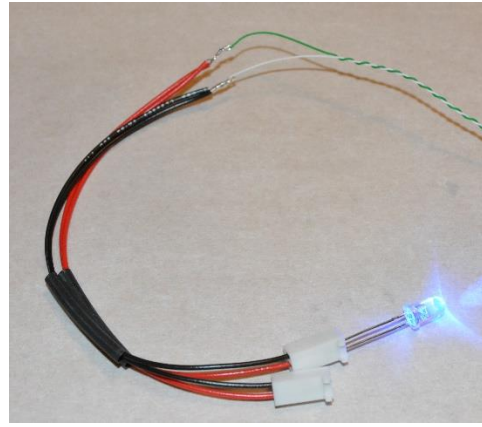
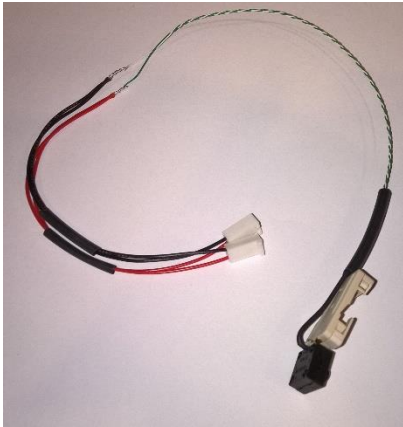
Before going any further, place the remaining pieces of shrink tube on the wires. Slide one length of the 3/32" tube over the Red wires, and one over the Black wires. Then slide the 3/16" piece over the Green/White wires.

**** IMPORTANT ****

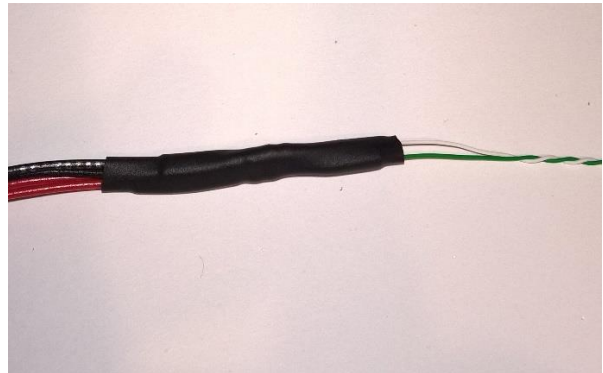
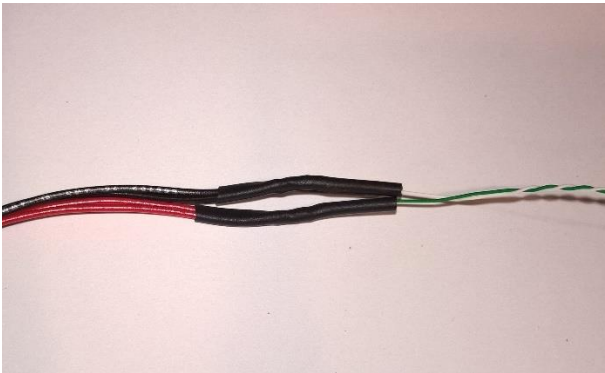
Twist the GREEN wire, onto the RED wire

Twist the WHITE wire, onto the BLACK wire.

Now is a good time to test your work, so insert the 2032 battery in the battery holder (+ side up), and insert an LED into the plug. The LONG LEAD matches with the RED wire. You may need to toggle the switch. Try both plugs, and if the LED works in each, go ahead and solder the connections.



Slide the 3/32" shrink tube down over the connections, and shrink them in place. ALLOW THE TUBING TO COOL FOR A FEW MINUTES. Then slide the 3/16" tubing over the top of both of those, and shrink it in place as well. If you don't allow the first layer of shrink tubing to cool a little, you can end up with a short-circuit here. E.g. if the first layer of tubing is still soft when you shrink on the second layer, the wires can press through, and screw up your circuit.

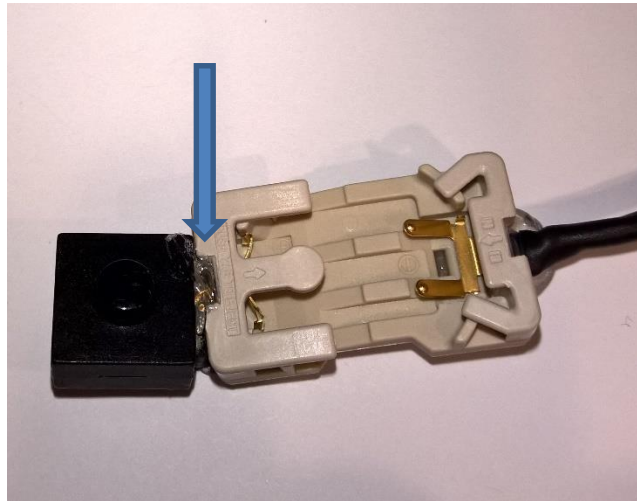


If there is any exposed Green/White wire which is left untwisted, go ahead and twist it up, just to finish it up nicely.

Wrapping Up

Now that all the connections are made, and protected, it's time to secure the switch. This is optional, but a good idea.

From the top of the switch/battery assembly, inject a little hot glue between the switch, and the battery holder.

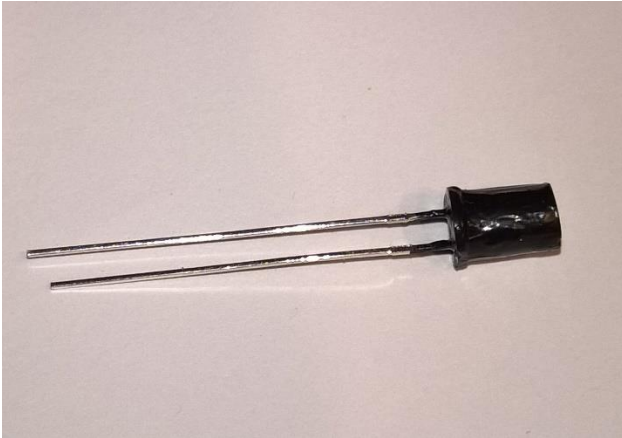


Once that sets up, flip it over, and get some parchment paper, if you have some. Why parchment paper, specifically? Because hot glue doesn't stick to it.

Apply hot glue over the connections, and the length of the wire across the back. I like to then quickly turn it back over, and press everything, glue-side down, on a piece of parchment paper. This gives a nicer, thinner, surface to the glue on the back, which will help down the road, when mounting it in your mask.

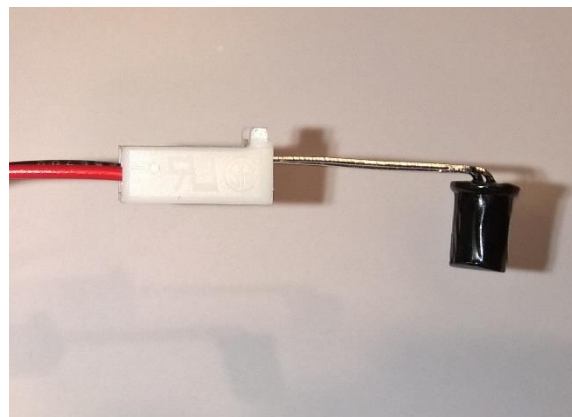
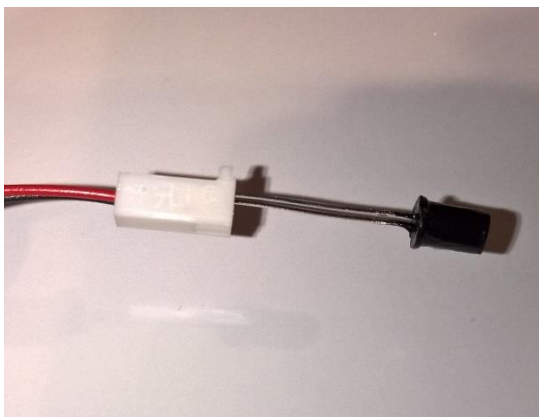
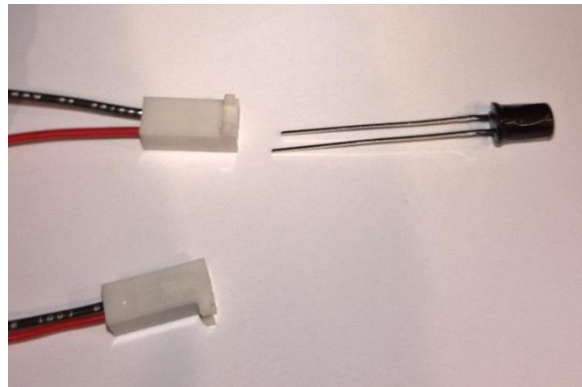


Paint the LEDs, if you haven't already. It's not entirely necessary to sand down the top of the lens, but I prefer how that ends up looking. The top can be taken down pretty quickly with 220 sandpaper, and then I like to run it on 800, to get rid of the deeper scratches.

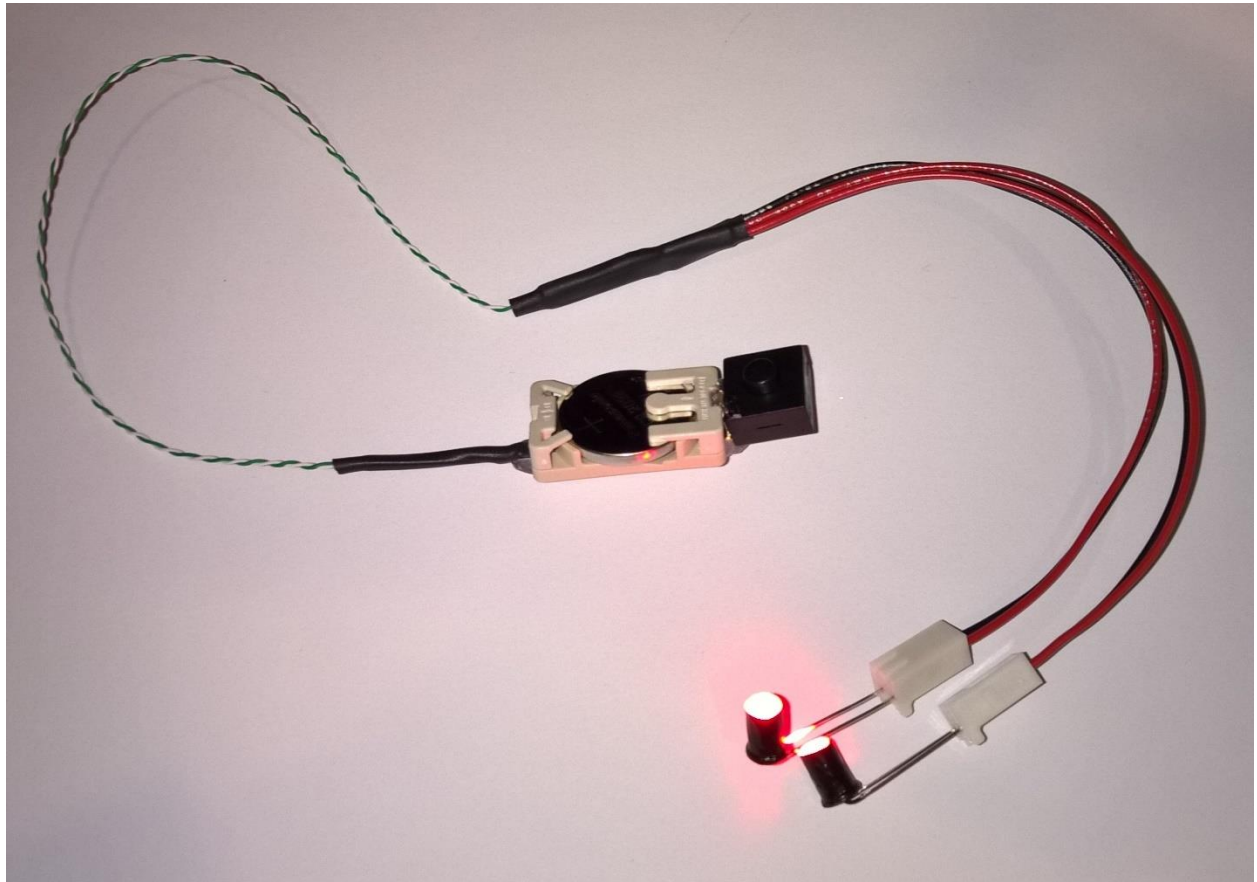


Finally

Insert the LEDs, matching the anode (long lead) with the red wire, and then bend the lens down to a 90-degree angle. Note that there are a couple of standoffs on the plugs. These should face UP, and the LED should bend the other way.



Test and make sure everything works!



For the next steps, see the separate installation guide.