**Parts and Crafts** is a community-supported family makerspace and community workshop based in Somerville, MA. In our programs we encourage kids to play, think, make, and learn through the exploration of the arts, science, computer programming, and engineering – a cluster of disciplines we refer to as “the creative application of technical skills.”

We run school-vacation camps, a full-time school-alternative program, and afterschool and weekend classes and workshops, open-shop hours and other community and family events.

We also develop projects and project ideas, and try to get them out into the world. By buying a building a lightsaber you are not only making and building something awesome, you’re helping us show more kids how they can make, take-apart, and modify the world around them. Thank you!
STEP 1 - Insert Batteries
Each battery has a “+” and a “−” side on it. The “+” means “positive” or “power”, the “−” means negative or ground. The battery pack’s red wire is for power, the black is for ground. Place batteries in battery pack so that the “+” side of the batteries points towards the red wire and the “−” side towards the black.

STEP 2 - Wire it up!
Your battery pack comes with magnetically controlled red switch pre-attached to it. The reed switch is normally off, but turns “on” when a magnetic field is nearby. You will be wiring up your circuit so that electricity can flow from the battery pack, through the reed switch, into the LED strands, and back to ground terminal on the battery pack.

Troubleshooting – My lightsaber doesn’t work!
Basically, we need to make sure that power flows out of the red wire of the battery pack, into the positive side of the LED strand, through the LEDs, into the negative side of the LED strand, into the reed switch, through the reed switch (when the magnet is nearby), and into the negative side of the battery pack.

If your lights won’t turn on:
First, take your handle apart, pull the circuit out, and wave the magnet next to the reed switch where you can see them both.

If it turns on when the magnet is nearby, and off when the magnet is not, then everything is working properly. Probably your magnet-collar and your battery-pack/ reed-switch became misaligned somehow -- probably because you didn’t pack enough material in the empty space in your handle so your battery pack could slide.. Put it all back together, and try again.

If it still does not turn on, a few things could be wrong.
1) Your batteries can be in wrong. Or dead. The flat [-] side of the batteries should be up against the spring, and the + side of first battery should be against the - side of the second [so the batteries are in series, providing 3V from two 1.5V batteries.]

If they are in right, you should either find some other piece of electronics to test them with (or a multimeter) or try fresh batteries.

If your batteries are in correctly, and not dead:
2) Your LEDs can be wired backwards.

LEDs are diodes so they only allow electrons to flow through them in one direction. To test if they are backwards, just switch the LED to battery pack connections, so that the side that was connected to “+” is not connected to “−” and vice versa.

3) There can be a short circuit somewhere:
A short circuit is basically any piece of metal that allows electricity to flow from the positive side of the battery pack to the negative side of the battery pack without going through the LED strands. Electrons are lazy. It takes more work for electrons to flow through the LED and produce light than it does for them to flow through the bare wire. So they will always pick the shortest path from power to ground that they can find.

Basically one side of your circuit is the “power” side and the other is the “ground”. The “power” side is all of the positive legs of the LEDs, as well as the red wire coming off of the reed switch. The “ground” side is all of the negative legs of the LEDs as well as the black wire coming off of the battery pack.

Look at all of the wires, connections, LED legs, and terminals. If any of the metal bits on the “plus” side of the circuit are touching any of the metal bits on the “minus” side of the circuit, you have a short. Separate them physically, and if you need to, use tape or some other material to keep them apart. Put the circuit back together and see if it works.

4) Your reed switch can be broken.
If you hear your reed switch making squealing noises when the magnet is nearby, if the lights don’t respond to the magnet but are constantly on or turn on or off randomly when you move the lightsaber around, you probably have a broken reed switch.

If this is the problem, there’s not much you can do to fix it. Let us know. If it’s definitely broken we’ll send you a new reed switch+battery pack or talk you through replacing it yourself.
Inside the glass tube of the reed switch are two thin, conductive, magnetic filaments, normally separated by an incredibly small distance, that are pulled into contact when near a magnetic field.

STEP 3 - Test Circuit

LED’s will only work when wired with the correct polarity - this means electrical current will only flow through them in one direction. This means the “power” lead of the battery pack must connect to the “power” side of the LED strand and same for the “ground” lead and “ground” side of the LEDs.

Test the strand by placing your magnet near your reed switch.

If your LED strand lights up, great! Otherwise, swap the red and black leads connected to the LED strand.

Once your LED strand is lighting, wrap tape around each connector individually to secure them and insulate them from each other.

STEP 4 - Assemble Handle: A New Handle

Push small PVC piece onto bottom of polycarbonate tube.

This piece should sit flush with the bottom of the tube.

Press this end into slotted end of main handle assembly.

Push the PVC collar onto the bottom of the main handle.

Slide the collar to the very top of the handle.

Your blade should now be snugly attached to your handle.
STEP 5 - Assemble the Handle: The Handle Strikes Back

Let’s put the whole thing together by sliding the entire working electrical circuit in to the handle assembly and secure it in place.

Slide acrylic tube onto LED strand
Slide circuit into handle assembly from the bottom as far in as possible
Use folded up paper to fill the gap between the battery pack and the bottom of the handle

STEP 6 - Assemble the Handle: Return of the Handle

Now we need to attach the magnet so we can easily turn our light saber on and off. The magnet fits into a collar that slide around the outside of our handle.

Slide magnet collar onto handle
Push magnet into hole in magnet collar - tape or glue if it’s sitting loose
Push end-cap onto bottom of handle

STEP 7 - Align magnet and switch

The lights will turn on when the magnet is close enough to the reed switch. You should be able to find a post near the top of the handle where you can turn your lights off and on by rotating the magnet-collar without moving it up and down.

Slide magnet collar up and down to find where switch is activated on the handle
The collar should turn around the handle, but not move up or down.
Rotate collar for on and off

STEP 8 - Finishing Touches

You can sand the outside of the polycarbonate tube to obscure the LEDs from view when the lightsaber is turned off and to provide additional diffusion when it is on.

With your magnet in place, you can wrap tape around the handle to prevent from sliding up and down. Decorate to your liking and wave around in the dark!