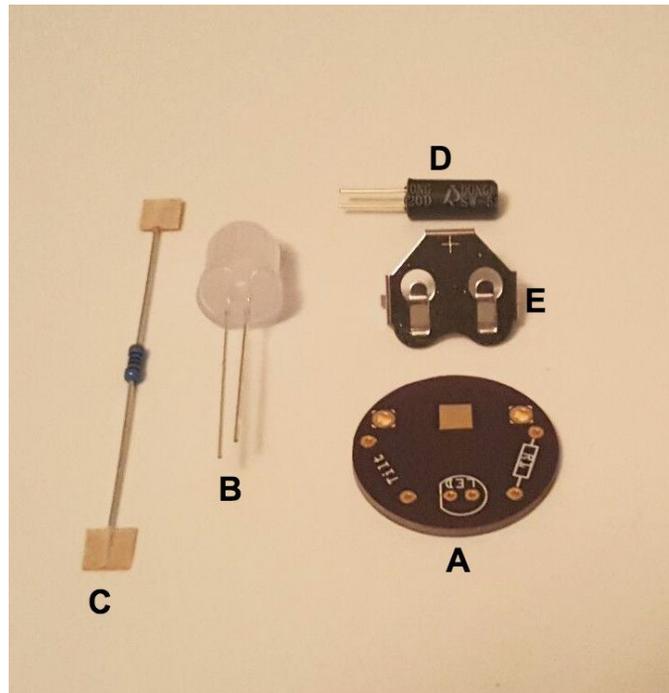


# Firefly Jar

## Learn to Solder Kit

### Parts



- A. Firefly Jar PCB
- B. 10mm Flickering LED (White or Yellow)
- C. Resistor
- D. Tilt Switch (Black or Green)
- E. Battery Holder
- F. Velcro (*Not Pictured*)
- G. Jar (*Not Pictured*)
- H. 3V Battery CR1632 (*Not Pictured*)

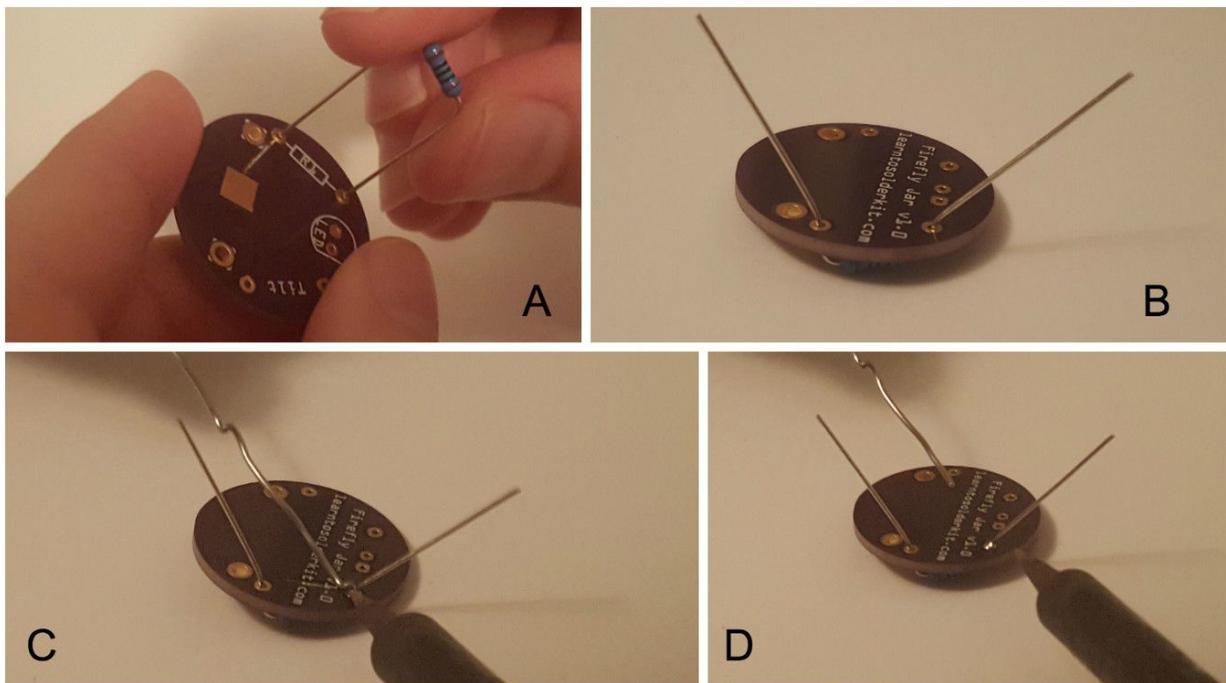
### Tools

- A. Soldering Iron
- B. Solder
- C. Safety Glasses
- D. Wire Cutters or Snips
- E. Helping Hands (*Highly Recommended*)
- F. Solder Sucker or Solder Wick (*Optional*)

## Technique

To create a strong solder joint heat both the solder pad (gold circle on the board) and the leg of the part being solder. It is ok to touch the soldering iron to the purple PCB, it is designed to withstand heat. Touch the pad and lead with the soldering tip at the same time. Next introduce the solder, place your fingers about 4 to 6 inches from the end of the solder wire. Hold the soldering iron in place on the PCB and pad as you move the solder around the pad. The solder should liquify almost instantly, if the solder is not melting check the your soldering iron is hot enough (at least 450F and less than 700F). As soon as you see the solder melt into the joint slowly remove first the solder then the soldering iron. The solder joint should cover the entire gold pad and be in the shape of a mountain or Hershey kiss. If your solder joint doesn't cover the whole pad or isn't in the shape of a mountain heat again and introduce more solder. Be patient, it may take a few times to get it right but with enough practice it will become second nature.

## Step 1



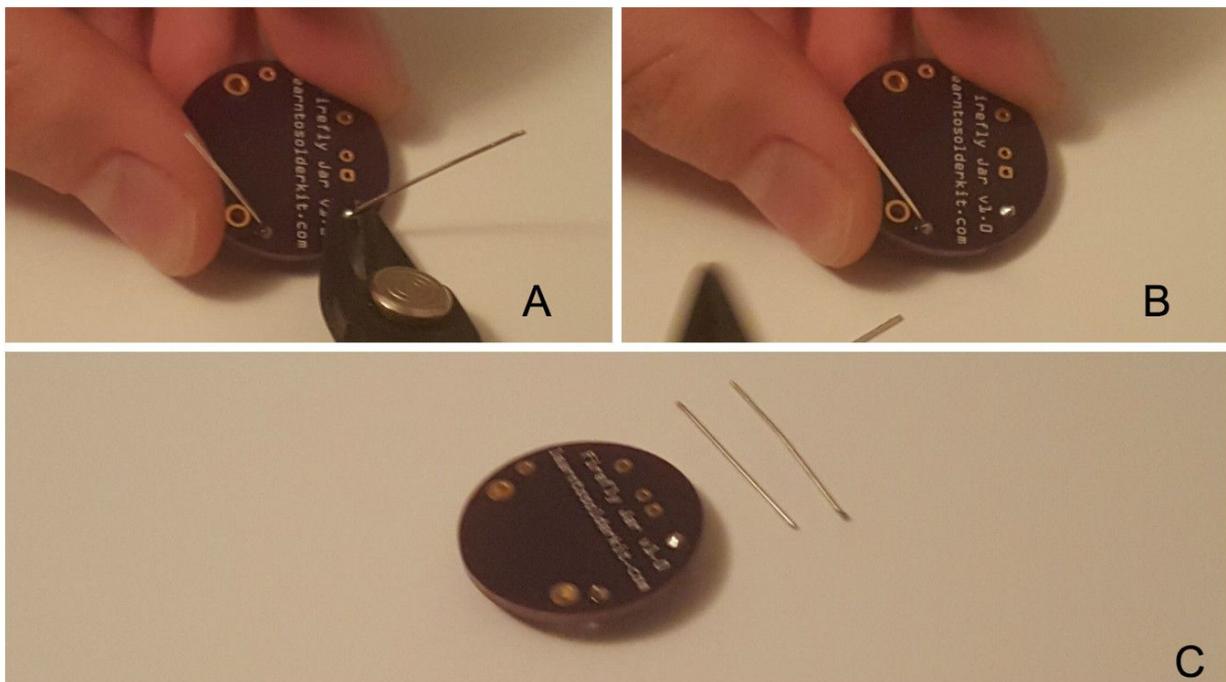
Start with the resistor. This resistor is going to go into the place on the board labeled R1. First remove the tape on both ends of the resistor leads. Then, bend the legs of the resistor and slide it into its place on the printed circuit board. Once the resistor is in place it helps to bend them slightly outwards so the part doesn't fall out.

Now it's time to start soldering! Flip over your board so that the legs of your resistor are sticking up in the air and turn on your soldering iron. Be careful it will get hot!

Give yourself a length of solder, 4 to 6 inches. Then, holding the solder in one hand and your soldering iron in the other, use the tip of your iron to heat up both the leg of the resistor and the gold ring around the hole. Slowly feed in your solder into this joint until you've made a solid connection. Viola! One solder joint complete! Do the same on the other leg of your resistor.

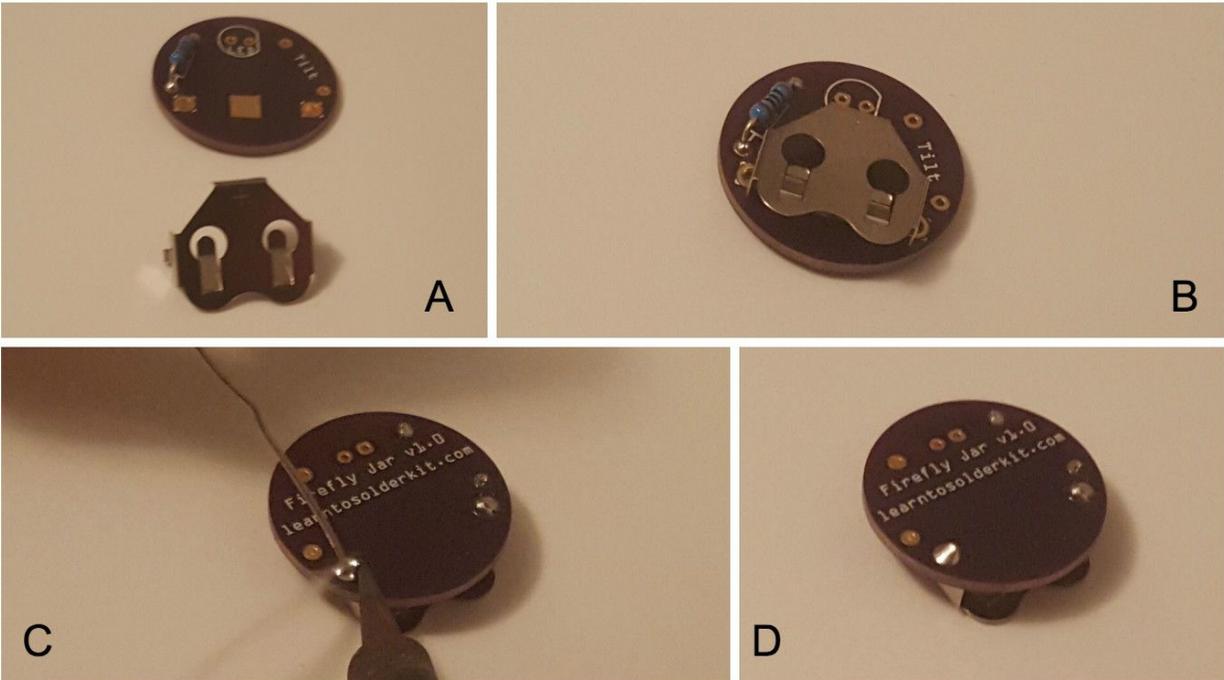
*Note: Resistors are bi-directional. It doesn't matter which way they're rotated when you place them.*

## Step 2



Use wire snips or scissors to cut the extra length of resistor leg that is not needed. Be careful not to cut too close or you might damage your solder joint. The ideal place to snip is where the solder joint ends. Be sure to keep the legs of your resistor, we are going to use them in a later step.

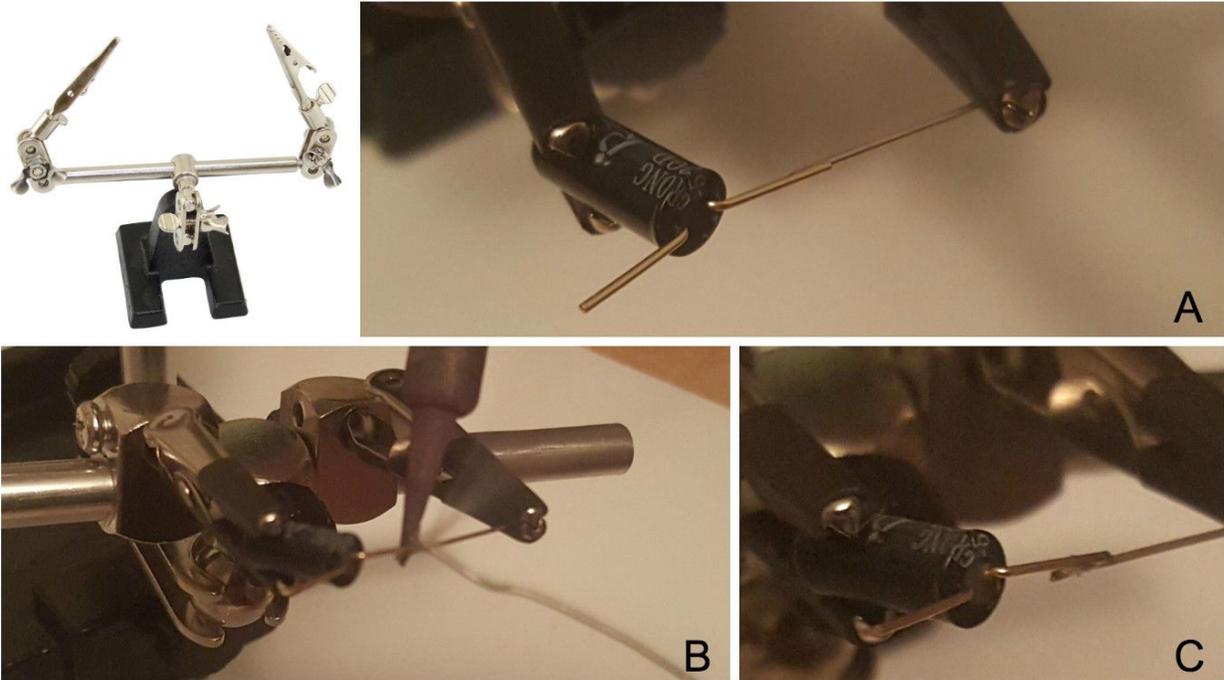
### Step 3



Next comes the battery holder. Place the legs of the battery holder through the PCB holes. Do not place the battery in the batter holder yet. Batteries should not be heated with a soldering iron, it can make them unstable. Once the part is solder you will be able to slide in the CR1632 battery. The semi-circle cutout on the battery holder should face the outside of the circular PCB. This will allow you to easily slip in the battery.

## Step 4

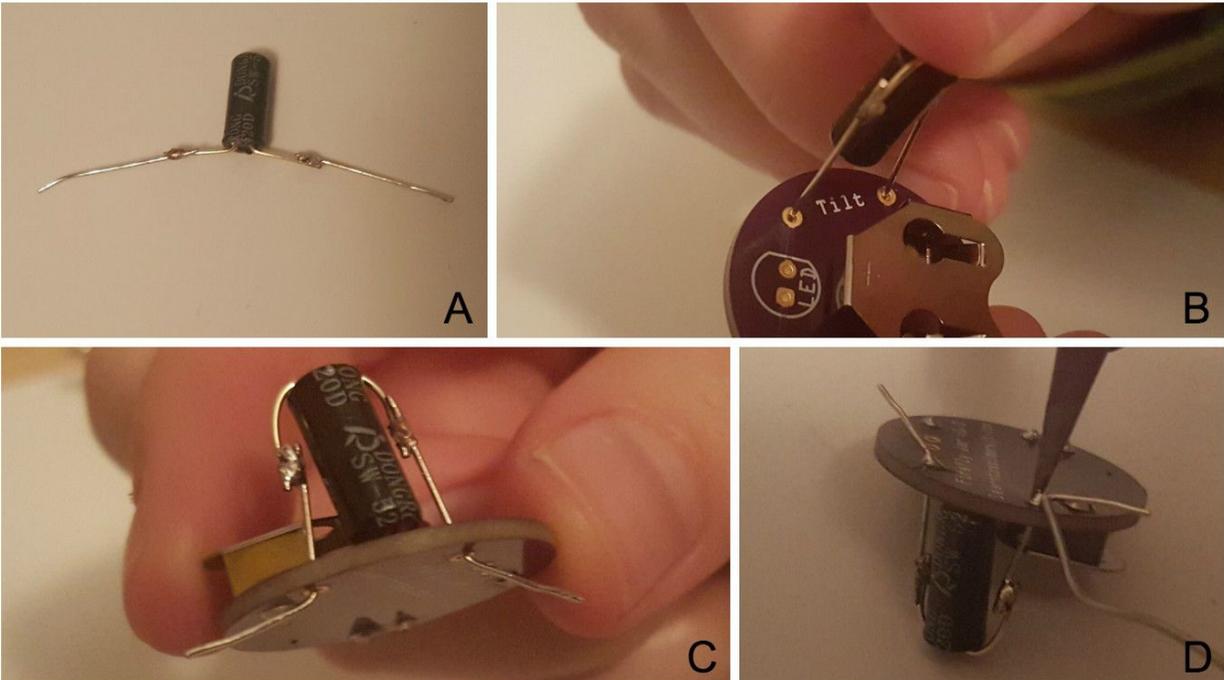
**Product Update! We are now shipping with a NEW tilt switch. If you received the GREEN tilt switch SKIP Step 4 and Step 5. Please scroll to the end of the instructions to see your updated tilt switch instructions!**



Extending the legs of the tilt switch. This is the trickiest step of the Firefly Jar Kit. We highly recommend using a set of helping hands to complete this step. Place the tilt switch in one clamp and the extender leg in the other, bringing them close together. Place a small amount of solder at the connection point of the two legs.

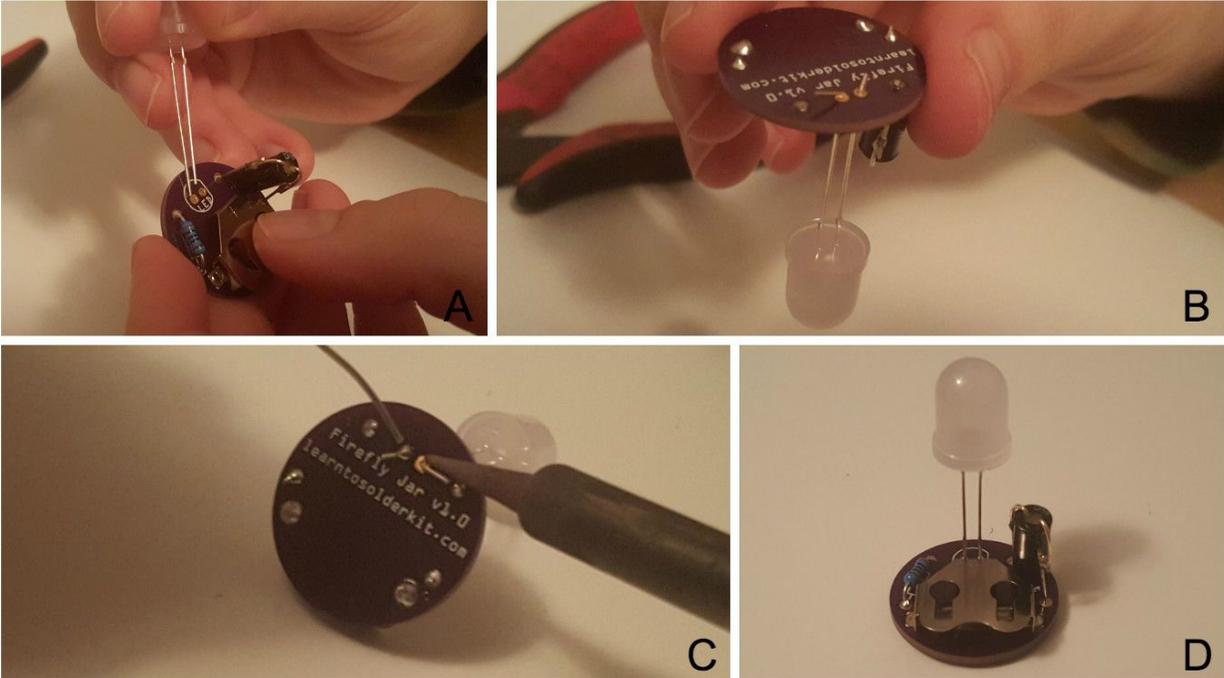
If you do not have helping hands available you can dab a small amount of solder to the resistor leg. Then use tweezers to hold it next to the tilt switch leg while remelting the dab of solder with your soldering iron. Wait for the solder to harden and the connection to be made. Do not hold the leg with your bare fingers while soldering. It will get hot!

## Step 5



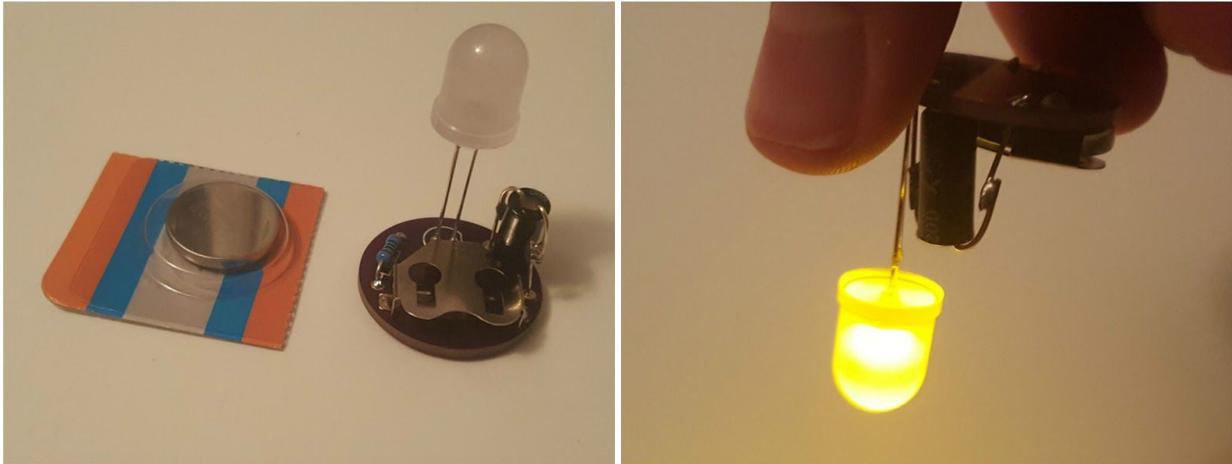
Next attach the tilt switch to the Firefly Jar PCB. Place the tilt switch such that the legs are pointing away from the PCB. This will make it so the jar light is on when the jar is upright and off when the jar is upside down. Carefully bend the legs back alongside the tilt switch so you can solder it into place. It is best to bend close to the base of the tilt switch and not at the leg extenders you have just add because the joints may break. Once you have solder the tilt switch into place use your snips to remove the excess leads.

## Step 6



Now for the LED. The direction of the LED leads *does* matter. The short leg goes through the hole closest to the flat side of the white circle drawn on the PCB. The long leg is known as the Anode and is the positive (+) lead. The short leg is known as the Cathode and is the negative (-) lead. Keeping the base of the LED away from the PCB creates a fuller lighting effect for your jar. Choose a distance that looks good to you.

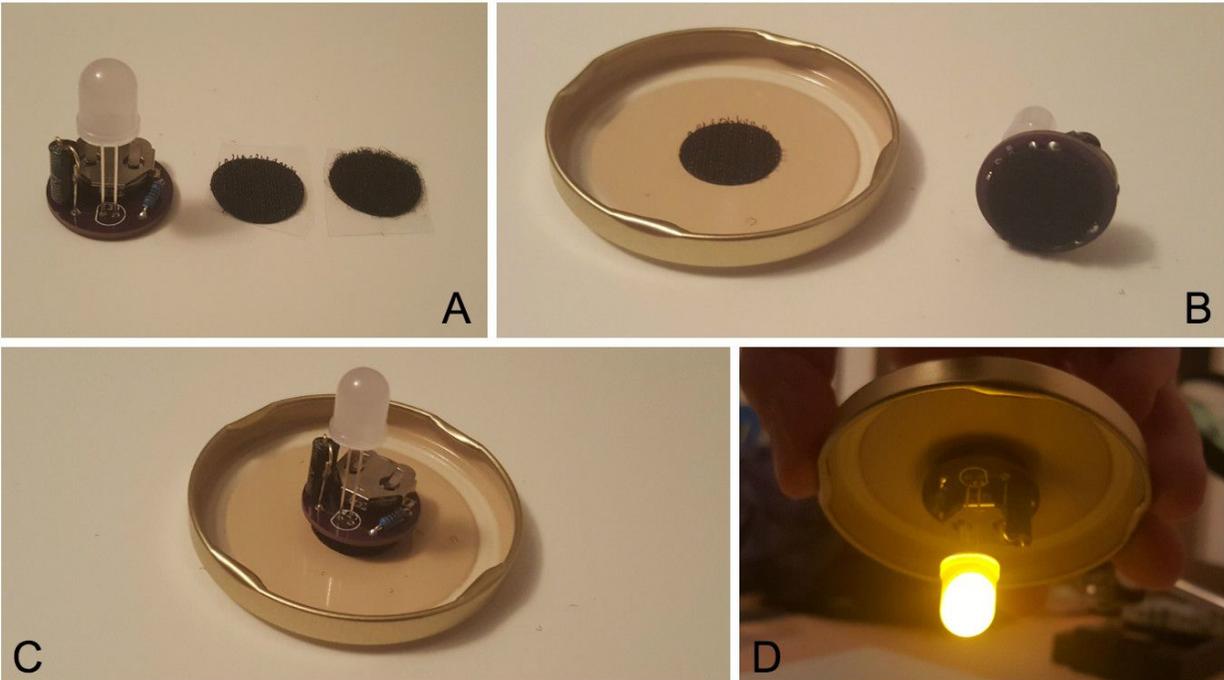
## Step 7



Now we can light it up! Insert the coin cell battery into the battery holder positive (+) side up. Flip it over so the LED is pointing down. Your LED should now light up in a flickering pattern. If you flip the PCB the other way the LED should turn off.

If your LED doesn't light up don't worry. There may be a connection that was missed. Double check all the connections on the back of the board. Are there any not fully completed? Fill them in and try again. Still not lighting up? Flip over the battery, does the LED light up now? If it does it means you've reversed the direction of the LED, you put the long leg in the round hole! Don't worry you can still enjoy your project. Be sure to remember your battery goes in upside down.

## Step 8



Use the velcro to attach the PCB to the inside of the jar lid. This will allow you to easily remove the PCB if needed to change batteries or even switch your project to another jar!



**Complete! Nice job!**

**Questions? Comments?**

Contact Rocket Department at [ideas@rocketdept.com](mailto:ideas@rocketdept.com). We are here to help :)

## Green Tilt Switch Instructions



Congratulations! You got the newest version of our kit. The green tilt switch is easier to install compared to the old black tilt switch. Note that one leg is silver and one leg is gold on the green tilt switch. The switch needs to be installed with the gold leg being longer. This will allow the small ball inside to roll down and make a connection when the board is flipped. The tilt switch can be placed in either way, it is not direction specific. Slide the silver leg through one hole getting the part as close to the board as possible. Then bend the part creating a 45(ish) degree angle. Bend the gold leg all the way back and put through the other hole. Solder into place. It should look like the picture above (without the LED because you have not installed it yet). Now go to Step 6 to complete the kit.