

# Rocket Kit - Beginner Solar Powered + LED

by [lumenjewelry](#) on August 18, 2014



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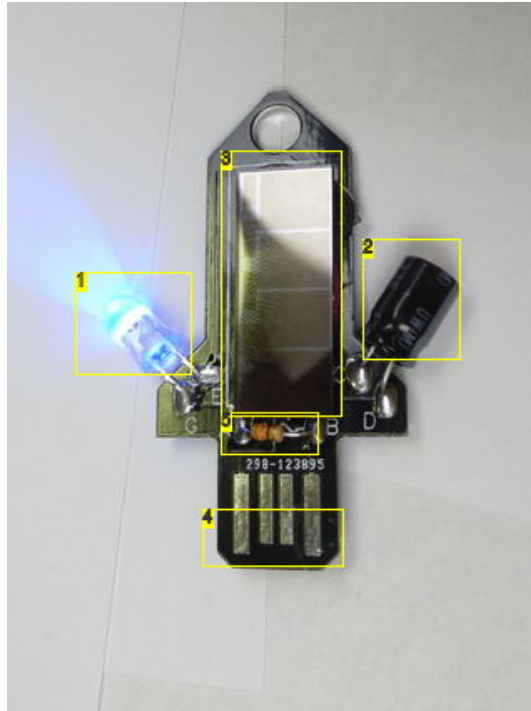
We're life-long tinkerers, siblings, and fourth generation engineers. We're not quite sure which of us had the idea of putting LED's on jewelry and powering them with solar cells, but once Marty proved it could be done there was no stopping us. That idea became Lumen Electronic Jewelry. Marty is now the Chief Geek, Robin is the Design Diva.

## Intro: Rocket Kit - Beginner Solar Powered + LED

This instructable is for a solar powered Rocket Kit. It measures about 2" by 1", including the USB tab. It has one hole through the top of the board, making hanging easy. We show it as a necklace, but you could make yours into earrings, a keychain, bond on a pin, or hang it in a window. The possibilities are up to you, and we'd love to see what you do with them.

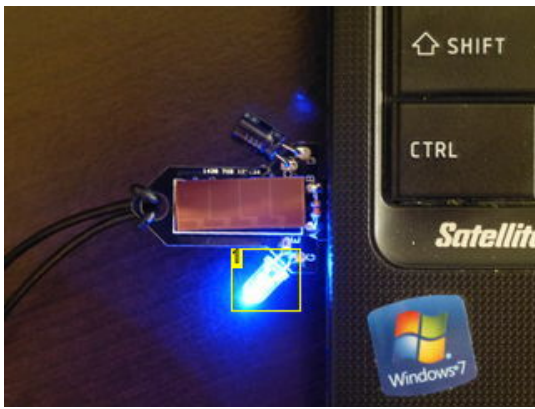
The schematic and parts list are included. You are welcome to wire up your own, copying is the sincerest form of flattery. We also have the kit available in our [Store](#) for only \$15.

If you have soldered projects before, this will be super duper easy. There are only 4 pieces to solder onto the board. Depending on your soldering savvy it may take anywhere from 15 to 20 min.



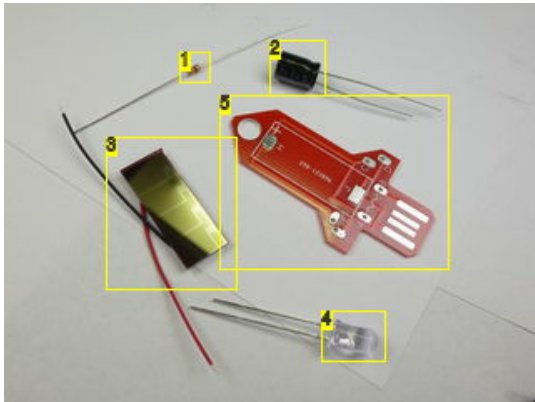
### Image Notes

1. Blue LED
2. Capacitor (power storage)
3. Solar Panel
4. USB tab for optional quick charging.
5. Resistor



**Image Notes**

1. Charged!



**Image Notes**

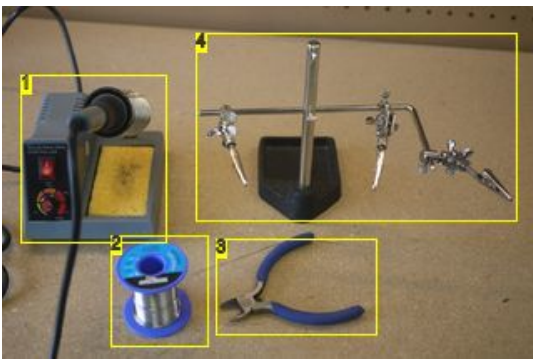
1. Resistor
2. Capacitor
3. Solar Panel
4. LED
5. Rocket Circuit Board

**Step 1: Tools**

Here's what you need:

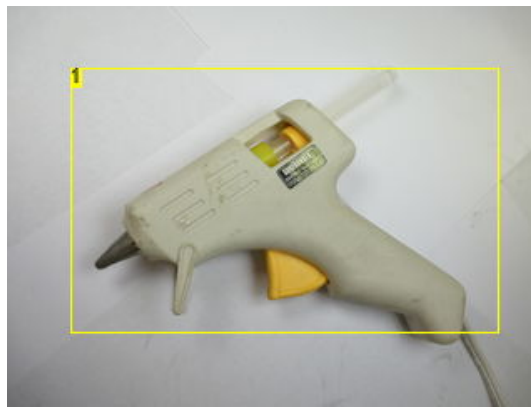
1. A soldering iron
2. Solder
3. Diagonal cutters
4. Hot glue gun and glue

Helping hands and needle nose pliers are optional, but helpful.



**Image Notes**

1. Soldering Iron
2. Solder
3. Diagonal cutters
4. Helping Hands



**Image Notes**

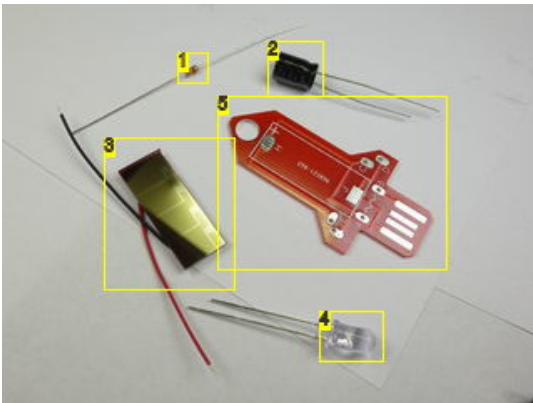
1. Hot Glue Gun

**Step 2: Schematic and Parts**

Schematic is above

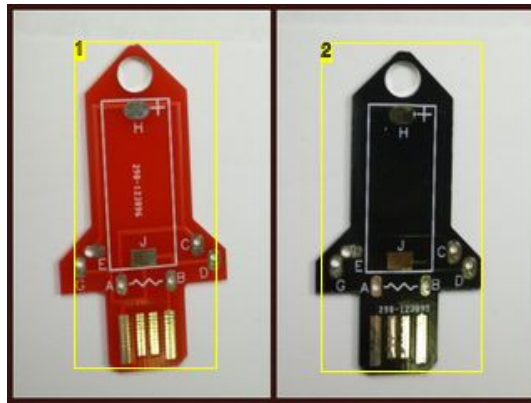
Parts list is below

- Red or Black Rocket Circuit Board
- 330 Ohm Resistor
- 1.0 F Capacitor
- Blue LED
- Solar Cell



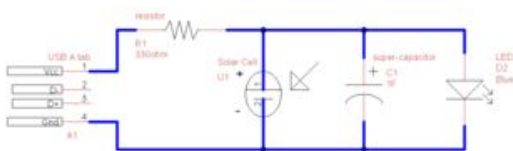
**Image Notes**

1. Resistor
2. Capacitor
3. Solar Panel
4. LED
5. Rocket Circuit Board



**Image Notes**

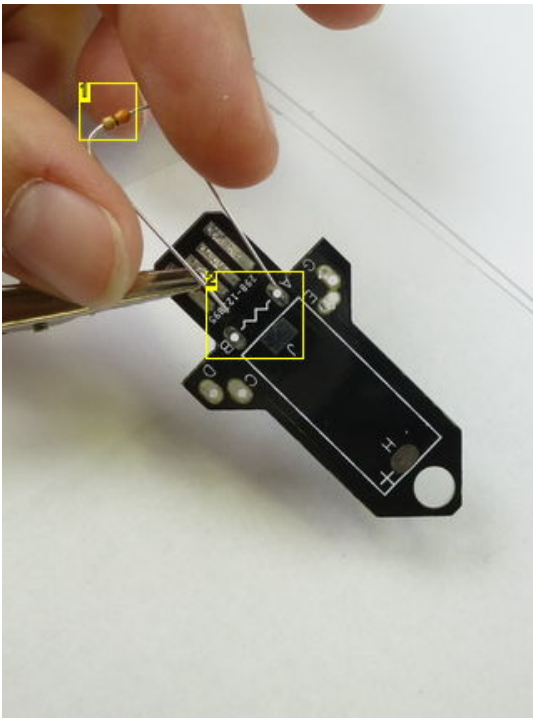
1. Red Rocket Board
2. Black Rocket Board



**Step 3: Resistor**

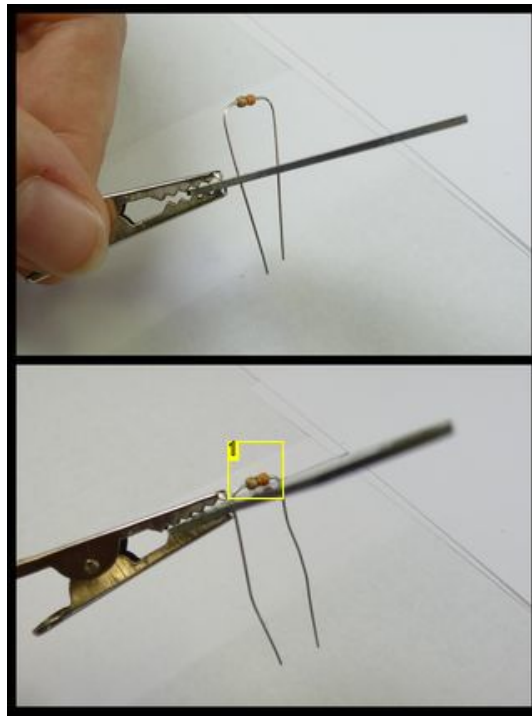
Start with the resistor.

1. Bend the leads down into a U shape as shown.
2. Insert the resistor through pads A and B. It doesn't have a polarity, so it doesn't matter which wire goes in which hole.
3. Take the soldering iron and hold it where the resistor wire touches the pad. The tip of the iron needs to touch BOTH the wire and the pad in order to heat up both. Hold it in place for 2 to 3 seconds.
4. Touch the tip of the solder wire to the pad you just heated. If it is hot enough, you will see the solder melt immediately. It is important that the solder melts onto BOTH the resistor wire and the pad to create a connection.
5. Once the pad and wire are covered in solder, remove the solder wire first and THEN remove the iron.
6. Allow the solder to cool. Do not bump it until the solder is solid (it will still be hot). This will take a second or two and if you watch closely, you will be able to see the solder solidify.
7. Repeat steps 3-6 for pad B. Congratulations, you now know how to solder!



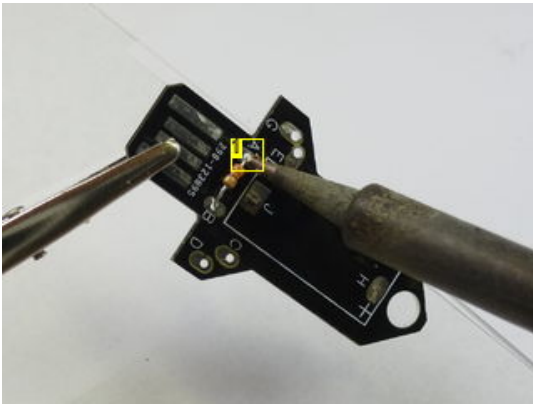
**Image Notes**

1. Resistor, bend leads
2. Ends go in pads A and B



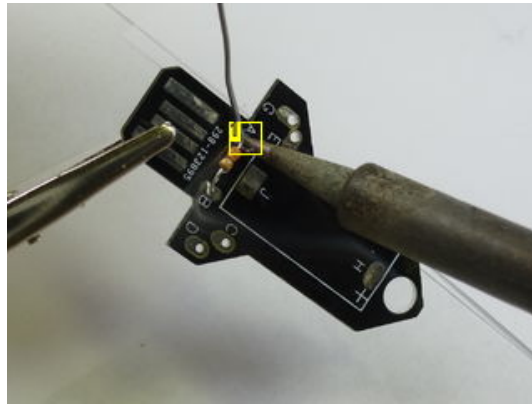
**Image Notes**

1. Pull through board.



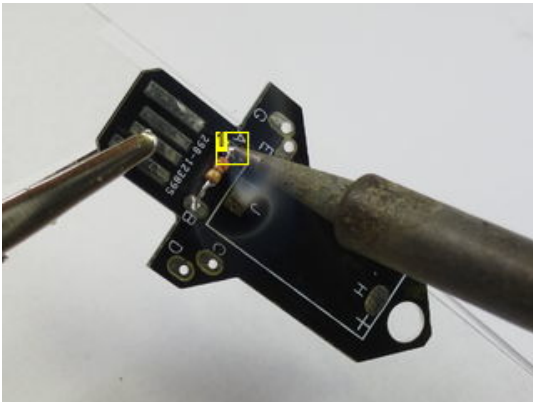
**Image Notes**

1. Touch tip of soldering iron to pad A and resistor wire to heat them both.



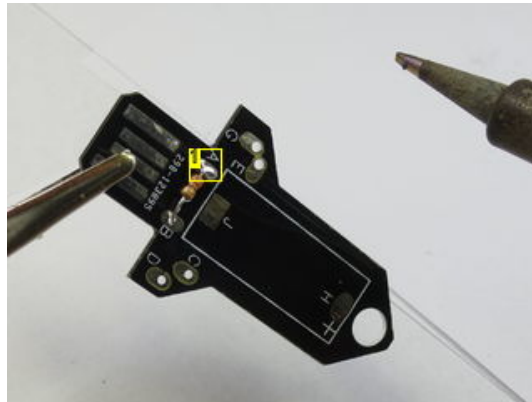
**Image Notes**

1. Apply solder to pad. It is hot enough if you see it melt and smoke rises.



**Image Notes**

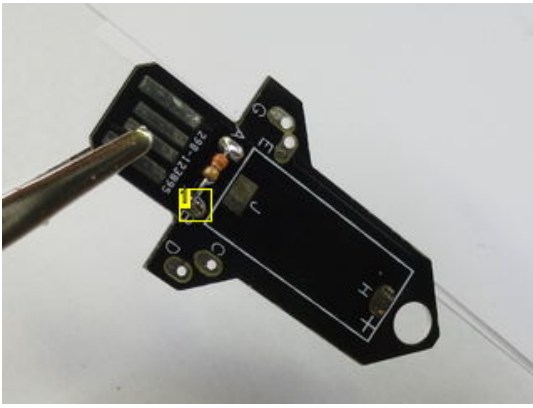
1. Remove solder wire.



**Image Notes**

1. Remove soldering iron and allow solder to cool. You will see it solidify.





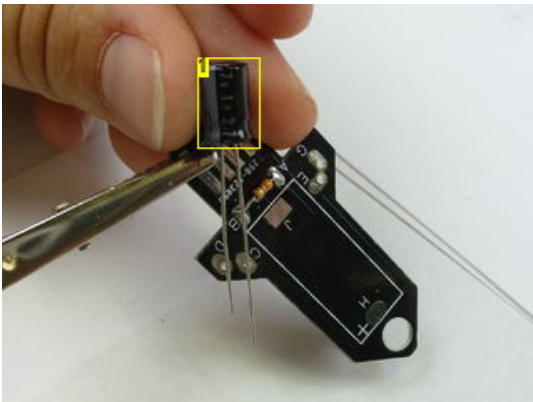
**Image Notes**

1. Repeat soldering process for pad B

**Step 4: Capacitor**

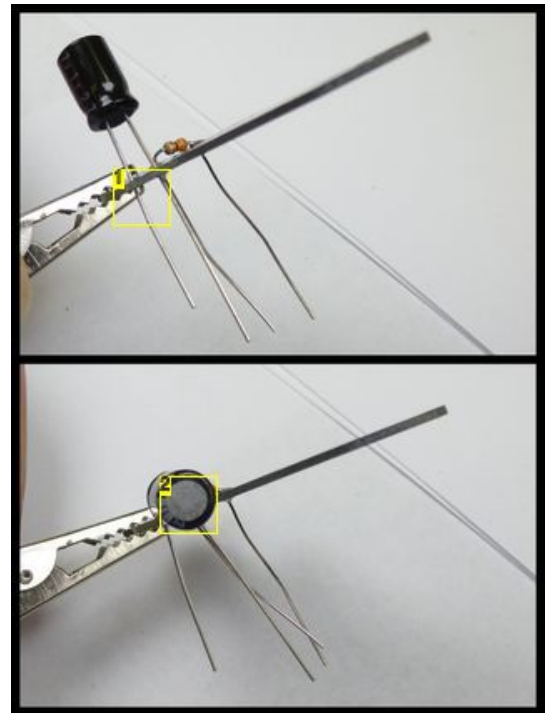
Orientation is important on the capacitor (unlike the resistor). The capacitor has one positive wire and one negative wire. There is a minus sign on one side of the black capacitor (cap) with the negative wire. The minus sign should face away from the center of the rocket ship. Another way you can tell the wires apart is the shorter one is the negative wire.

1. Stick the wires part way through holes C and D (positive wire in C, shorter negative wire in D). Bend the wires as shown. This will look cool and be easier to solder.
2. Solder on one wire and then the other as you did with the resistor.



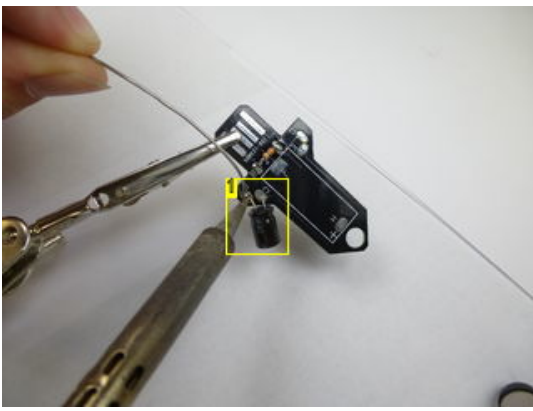
**Image Notes**

1. Capacitor. Gray strip indicates negative wire. Negative wire is also shorter. Negative goes in pad D as shown.



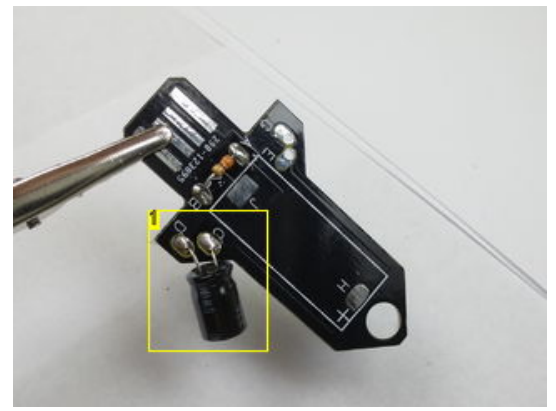
**Image Notes**

1. Insert Capacitor into board part way
2. Bend over capacitor as shown.



**Image Notes**

1. Bent over capacitor. Solder pads C and D same as A and B.



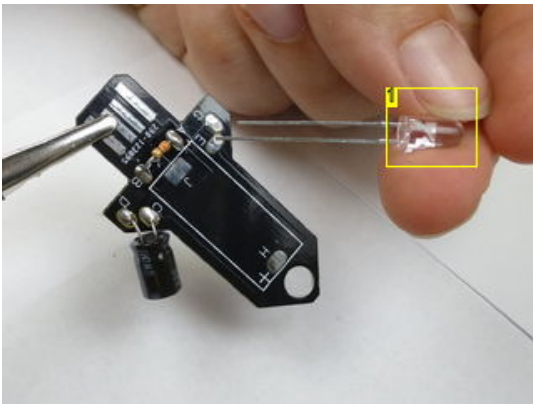
**Image Notes**

1. Soldered capacitor.

**Step 5: LED**

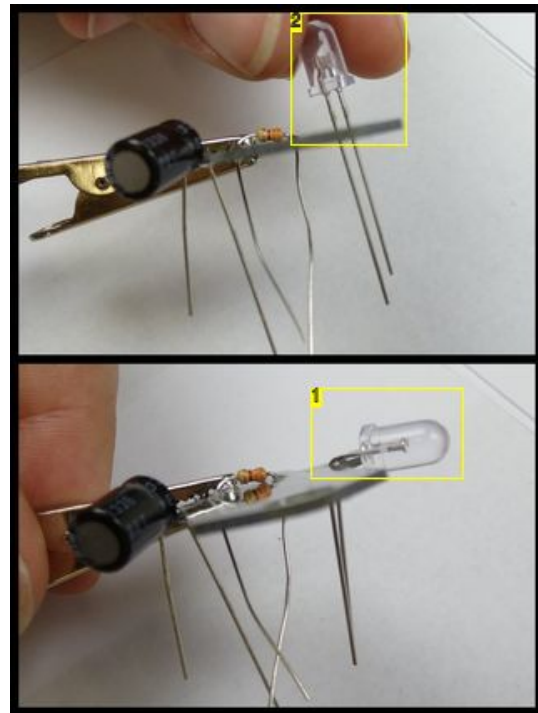
Again, orientation is important. There is a flat edge on the LED light, this is the negative end. It goes AWAY from the center of the board and the solar cell. Again, you can also look at the length of the wire to figure out the orientation (the shorter wire is the negative).

1. Stick the wires in part way through holes E (positive wire) and G (negative wire) and fold it down as you did with the capacitor. This will look cool and make it easier to solder.
2. Solder on the wires as with the resistor and the capacitor.



**Image Notes**

1. Blue LED. The negative wire is the shorter one. Negative goes in pad G as shown.

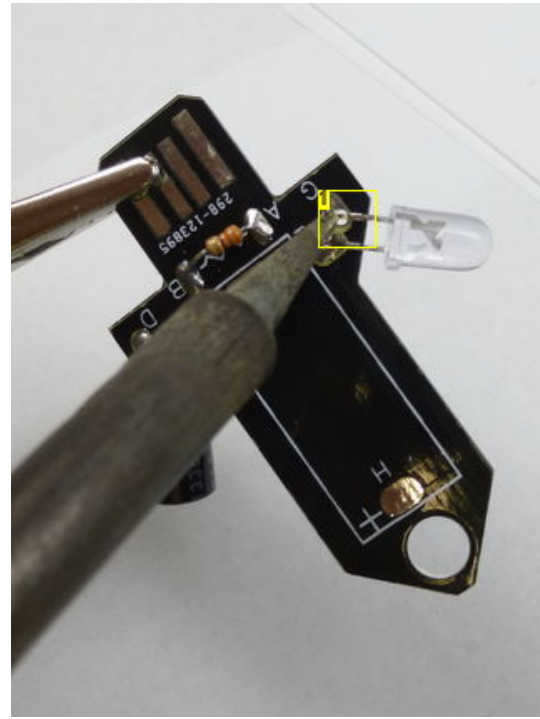


**Image Notes**

1. Bend over LED.
2. Again stick LED through pads E and G part way



**Image Notes**  
1. Bent over LED.



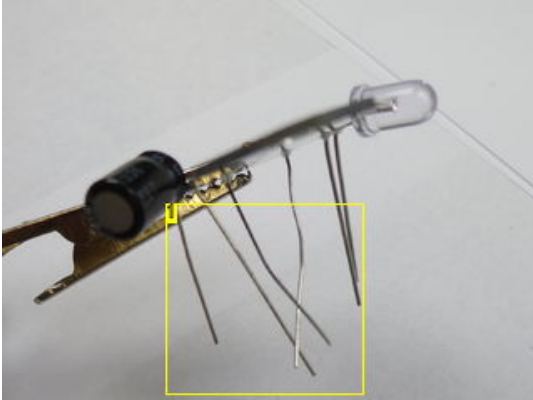
**Image Notes**  
1. Solder pads E and G



**Image Notes**  
1. Soldered LED

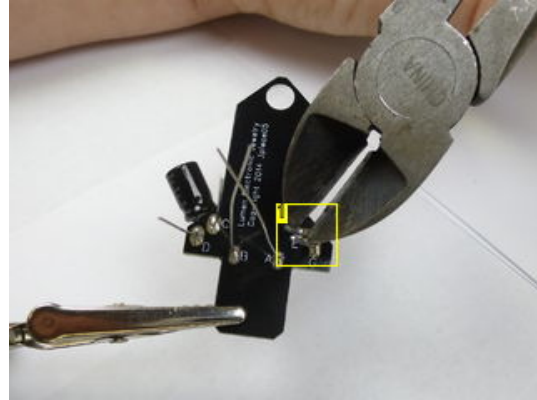
## Step 6: Trim the wires

Now trim the wires. Flip over the board and cut the wires as close to the back of the circuit board as you can. Don't worry if a short bit of wire sticks out, we will cover these later.



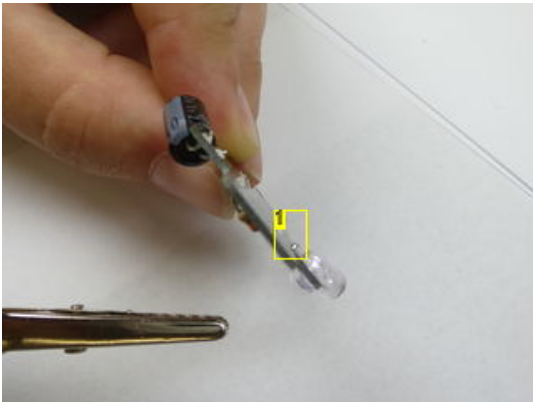
### Image Notes

1. Lots of wires!



### Image Notes

1. Cut the wires as close to the circuit board as you can.



### Image Notes

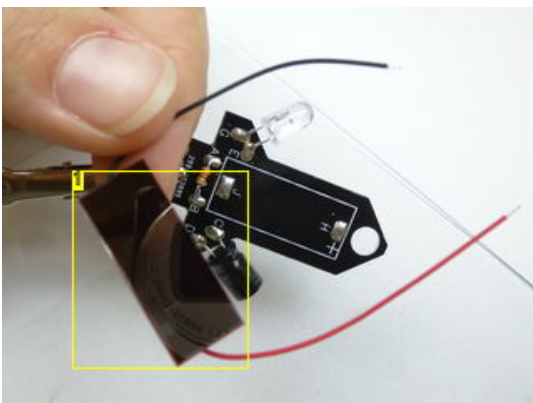
1. You may have some wire sticking up, this is OK. We will cover them later.

## Step 7: Solar Panel

**IMPORTANT: soldering procedure is different for this part.**

The solar cell also has a positive and negative wire. The red wire is the positive end and is soldered onto pad H on top of the rocket. The black wire is the negative and is soldered onto pad J at the bottom of the rocket.

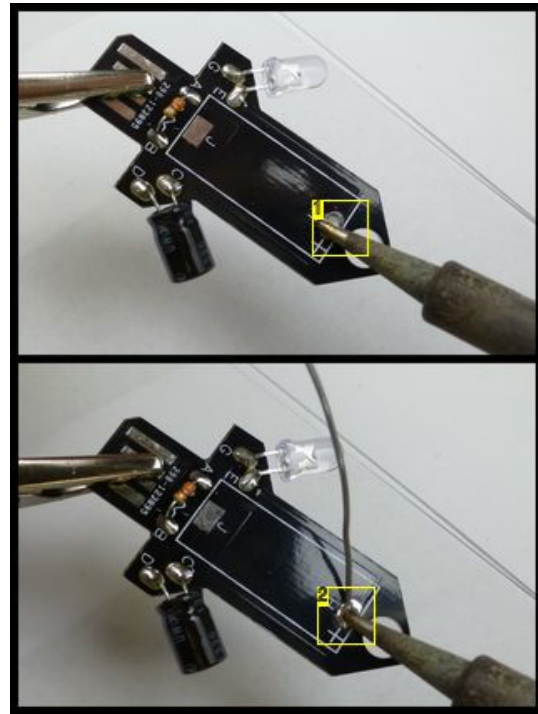
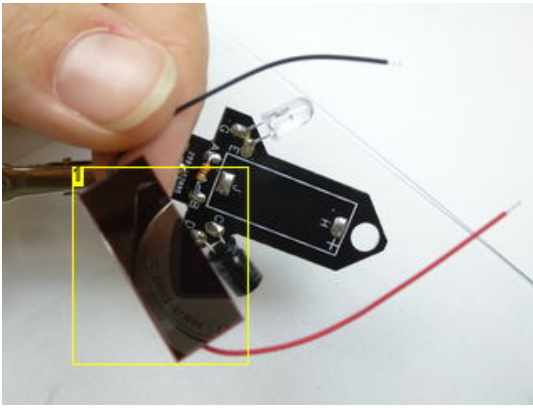
1. Melt solder onto one pad, then the other, as shown in the pictures. Make sure they are a nice fat pillow.
2. Next take the red wire in one hand, and with the soldering iron re-melt the solder pillow on pad H.
3. Stick the red wire into the melted solder and hold it steady.
4. Remove the soldering iron. Allow the solder to solidify around the red wire before you release it.
5. Repeat steps 2-4 with the black wire on the solder pillow J.
6. You're done with the soldering!



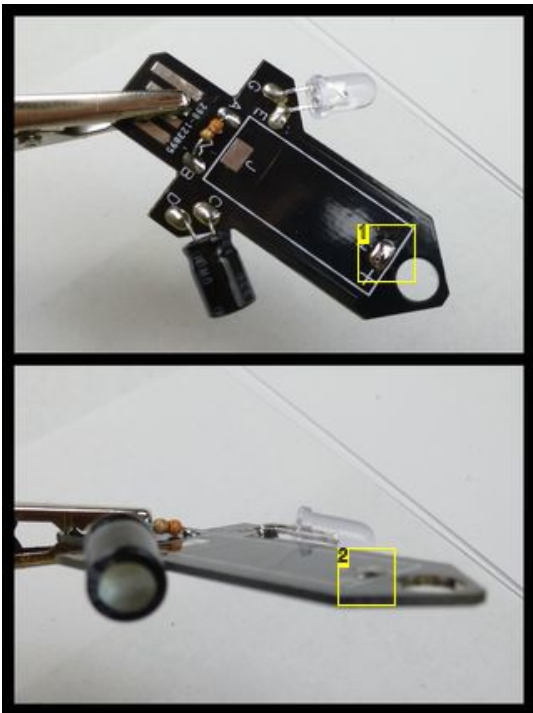
### Image Notes

1. Solar Panel

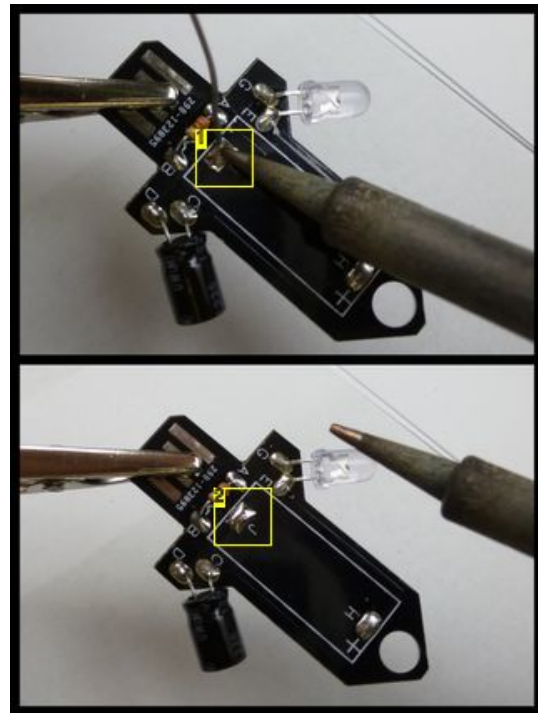




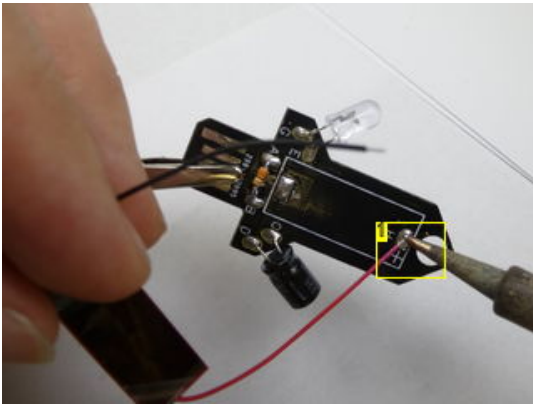
**Image Notes**  
 1. Heat Pad H  
 2. Apply generous amount of solder to pad H



**Image Notes**  
 1. Allow solder to cool.  
 2. Solder pillow!

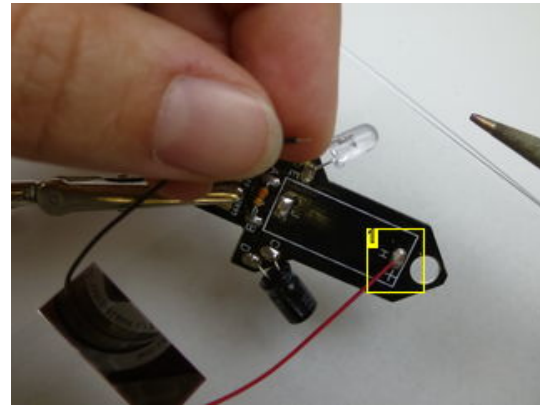


**Image Notes**  
 1. Add solder to pad J  
 2. Allow to cool.



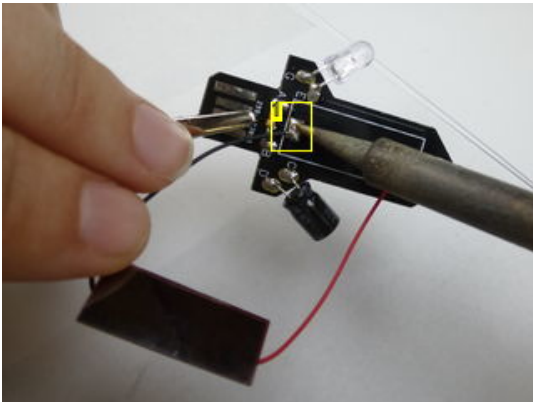
**Image Notes**

1. Red wire goes to pad H. Heat Pad H and insert the red wire into the melted solder.



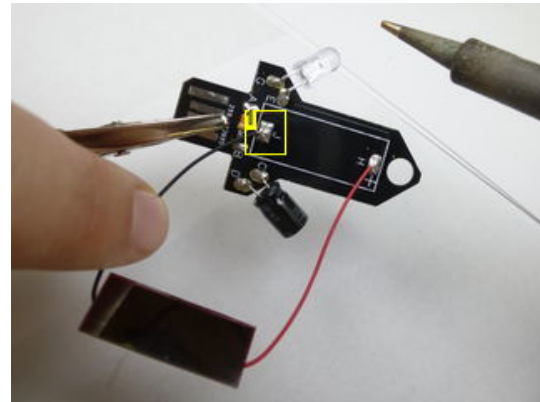
**Image Notes**

1. Remove the soldering iron and hold the red wire in the solder till it solidifies.



**Image Notes**

1. Black wire to pad J. Heat solder and insert end of wire.



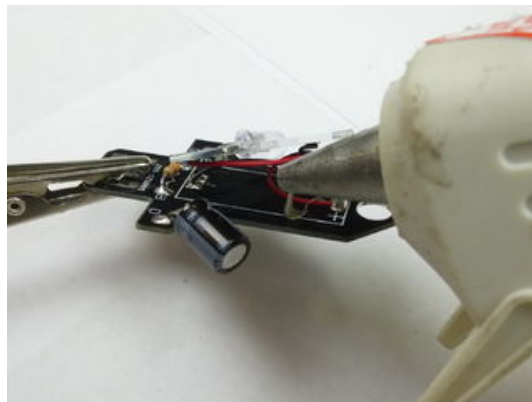
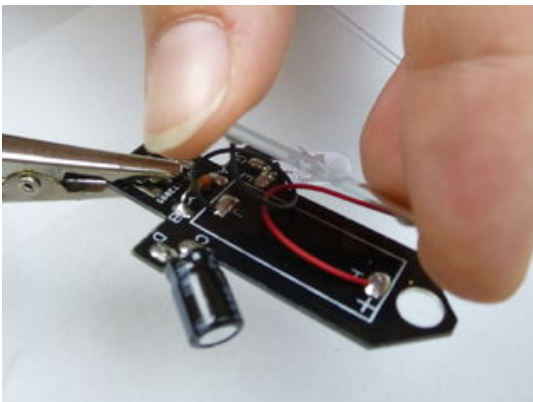
**Image Notes**

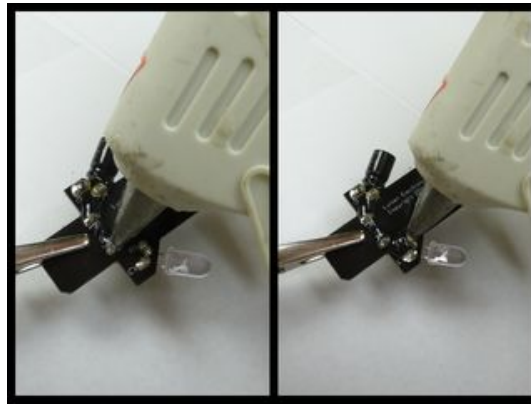
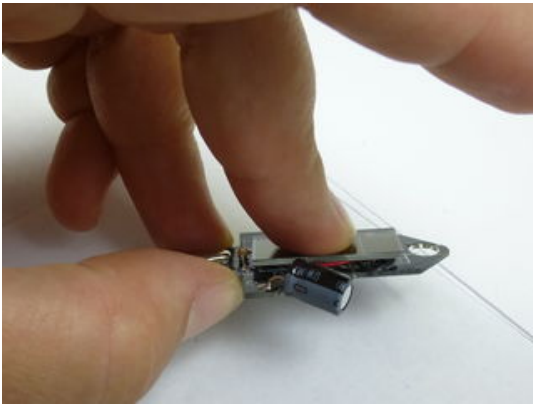
1. Remove iron and allow solder to solidify around black wire.

**Step 8: Hot glue!**

Now for everyone's favorite crafting tool, the hot glue gun!

1. Fold the red and black wires under the solar cell.
2. Place the tip of the hot glue gun on the board below where the solar cell is, inside the white rectangle.
3. Gently pull the trigger, dispensing some hot glue
4. Remove the hot glue gun quickly, don't worry about strings of hot glue.
5. Push the solar cell down into the hot glue and hold it in place till it stays down
6. Turn the board over to the back side and put hot glue on the exposed ends of the wires. This will make it more comfortable to wear. Wait for the hot glue to cool and turn cloudy before touching it. Make sure you do NOT get hot glue on the USB tab below pads A and B. Hot glue on the USB tab will prevent it from inserting properly into USB ports and charging.
7. Once everything is cool, you can cut off any strings of hot glue with a scissors.





### Step 9: FUNction

The first time you charge your Rocket we recommend conditioning the super caps. What does this mean? Charge it for 3-5 minutes, unplug it, then store it in a dark place for a few hours. Conditioning keeps the caps from having a memory and undercharging.

But you are probably impatient to PLAY WITH THE SHINY!! We understand. Rocket operation is super simple.

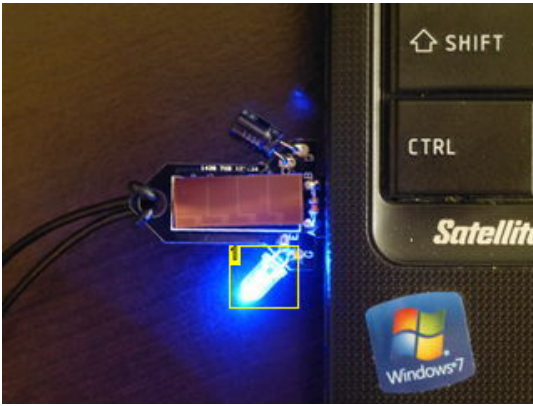
1. Leave it in a sunny window, it will gradually charge up.
2. Leave it under a bright lightbulb, it will also charge up.
3. The solar cell likes certain kinds of light sources better. Bright sunlight is great, however fluorescent lights like the big glass tubes in most buildings are not the best. Old fashioned incandescent or halogen bulbs are also good.
4. And you can always quick charge it with any USB connector. If the capacitor is completely empty of charge this will take 1-2 minutes before the LED begins to light.



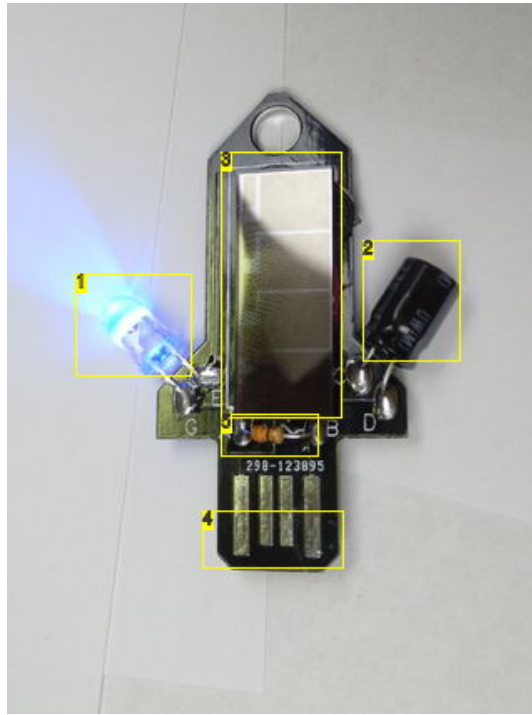
#### Image Notes

1. Insert into USB to quick charge. 1-2 minutes.





**Image Notes**  
1. Charged!



**Image Notes**  
1. Blue LED  
2. Capacitor (power storage)  
3. Solar Panel  
4. USB tab for optional quick charging.  
5. Resistor





## Step 10: Necklace Cord

If you like you can also hang it as a necklace with the cord provided in your kit.

1. Insert the middle of the leather cord into the big hole at the top.
2. Thread the other end of the necklace (with the clasp) through the loop of cord going through the board hole.
3. Pull the knot tight.
4. Done!

