

# Christmas Tree

version 1.1

*Build Instructions*

F O U R  
B I T  
I N D U S T R I E S . C O M

Thank you for purchasing our Christmas tree kit. The instructions below will show you the proper placement of all parts into the PCB. Be sure to follow the directions closely as many parts are polarized and will not work if inserted backwards.

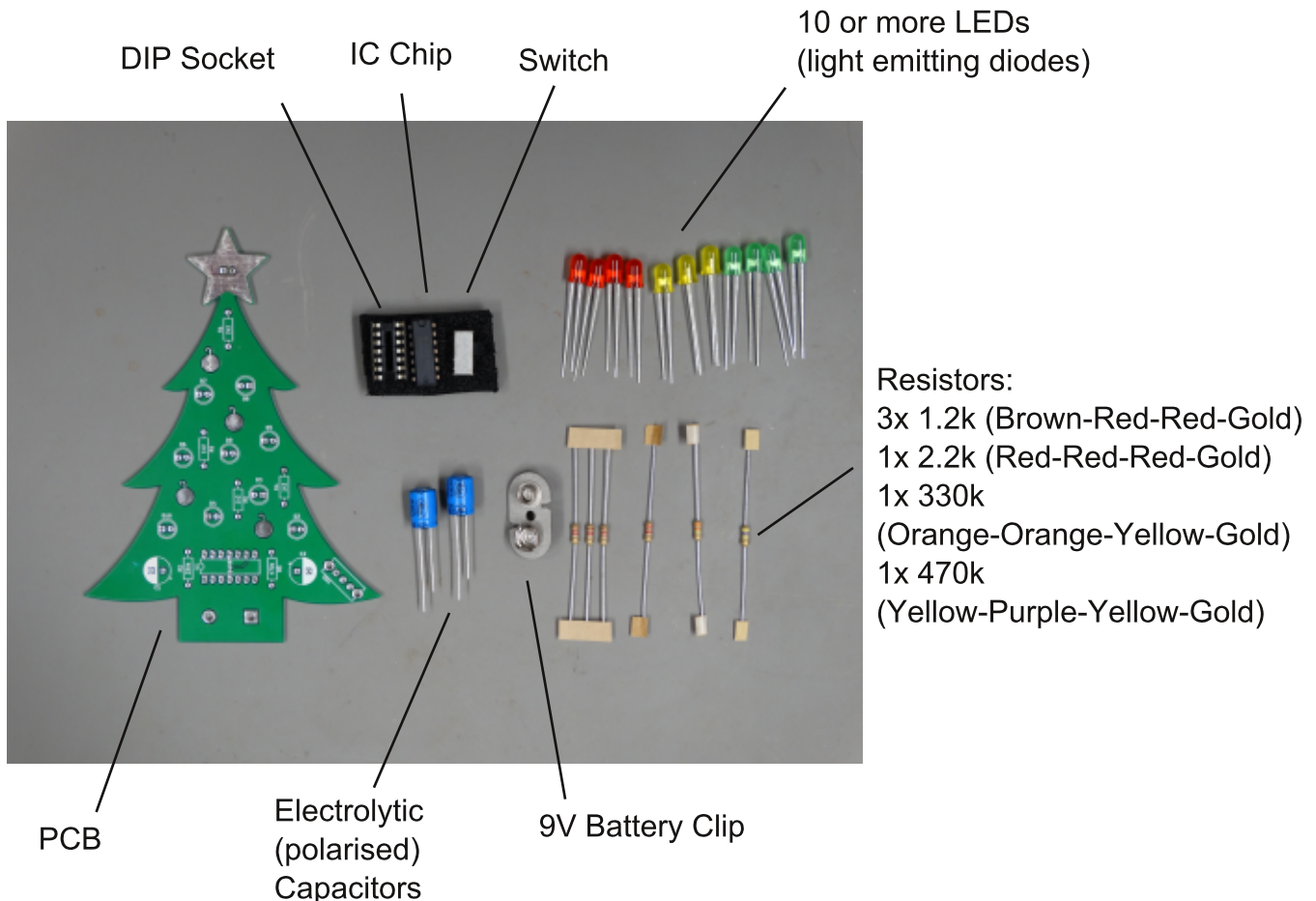
If you've never soldered before, consider taking a class at your local hackerspace! We have found a good introductory video from [curiousinventor.com](https://youtu.be/lpkkfK937mU) on youtube at <https://youtu.be/lpkkfK937mU> or by following the QR code at right.



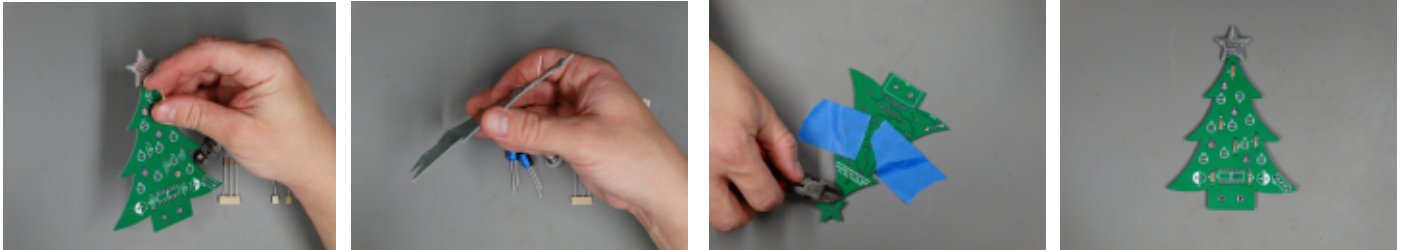
## WARNINGS

Always follow best safety practices for soldering, including the wearing of eye protection and adequate fume extraction. This kit is not for children.

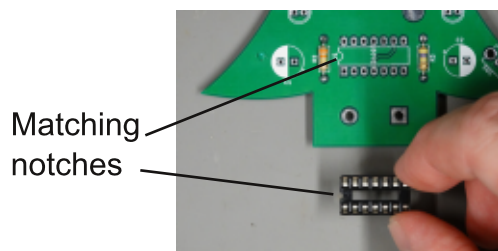
1. Verify the parts in your kit.



2. Begin by putting in place the 2.2k (red-red-red-gold) resistor. This goes into the spot marked R1 at the top of the board near the star. Bend the leads of the resistor so that you can pull the leads through the two holes. Resistors are non-polarized components so it does not matter which lead goes through which hole. Once it is inserted, bend the leads outward to hold the part in place while you solder. Once it is soldered to the PCB, trim the leads. You can then move on to the other resistors: R2 is 330k (orange-orange-yellow-gold); R3 is 470k (yellow-purple-yellow-gold); R4, R5, R6 are 1.2k (brown-red-red-gold). The correct value is written in each location.

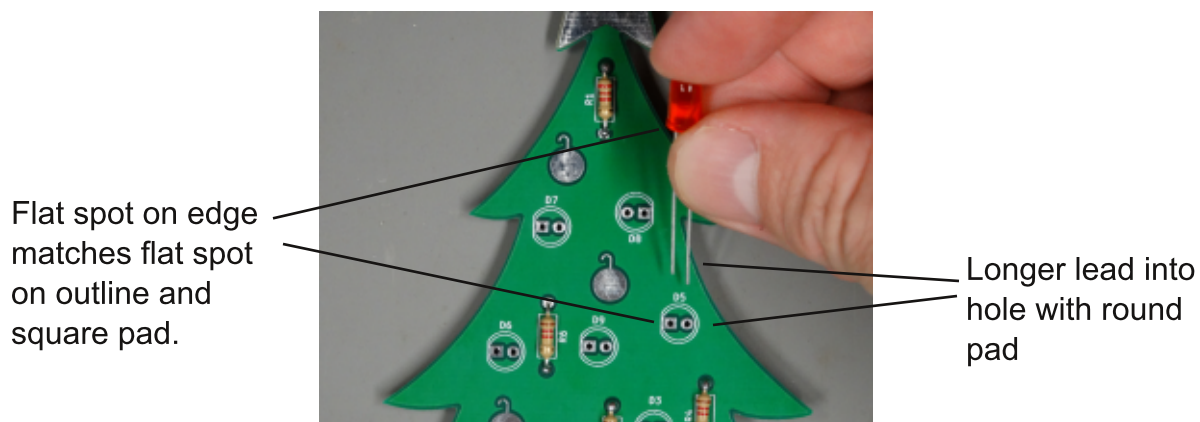


3. Next we will solder into place the DIP socket. This component has a correct orientation. On the PCB you will see a notch drawn on the outline that matches the notch on the socket. Once we have soldered all the other components, we will insert the DIP chip into this socket. The chip has a notch that matches the socket and the outline.

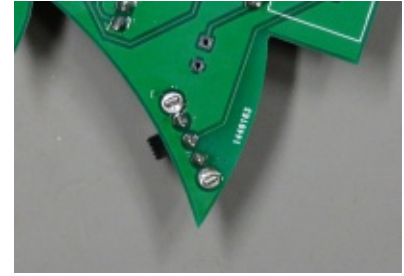


Use some tape to hold the socket in place before you turn over the board to solder the leads. Solder just one lead and then check the socket again to make sure it is flat against the board. If it is not, you can reheat the joint and push the socket flat before proceeding to the other leads.

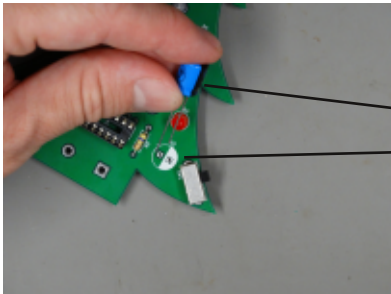
4. There are ten LEDs to solder into place. LEDs are polarized and must be inserted correctly. There is a long lead and short lead on an LED. The long lead is called the anode and should go be soldered to the round solder pad. The short lead should go be soldered to the square solder pad. Be careful, as not all of the LEDs on the PCB are face the same way.



5. Insert the slide switch into the space marked SW1. This switch can be inserted either way but it is easier to operate when it is facing out. Hold the switch down with tape for soldering. You can solder the three small leads and the two large legs for stability.

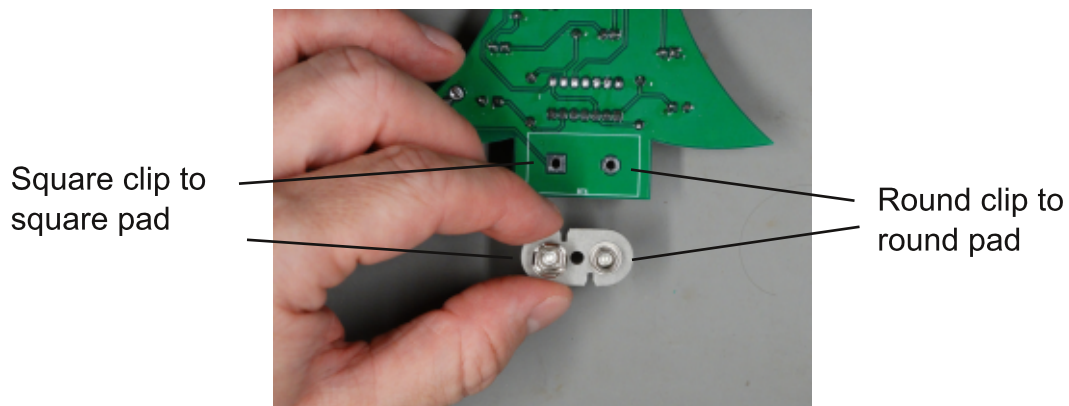


6. The two capacitors are polarized and must be inserted in the correct orientation. Find the stripe down each capacitor that is marked with negative signs. This side of the capacitor must be put into the side that is shaded white, away from the + sign. Note that the two capacitors will point in different directions with their stripes pointing out from the center of the tree.



Stripe marking the negative side of the capacitor corresponds with the hole shaded white by the outline.

7. The last part to solder is the 9V battery connector. We recommend soldering this component to the back of the PCB so that the battery attaches from the rear. Insert the battery connector so that the square-shaped clip corresponds with the square pad and the round shaped clip corresponds with the round pad. Tape the component in place and the solder from the front of the PCB.



8. Last we will install the DIP chip. You can straighten the leads of the chip by rolling it gently against a flat surface to bend all the leads on one side so they point straight down. Then do the same to other side of the chip. Insert the chip so that the notch at the end of the chip matches the notch in the socket and the notch on the outline.

9. To operate, attach a 9V battery and turn the switch on. The LED on the star should light immediately. After a few seconds, the other LEDs should begin blinking. The LEDs are wired in groups of three that should turn off and on together. If any LED or chain of LEDs do not light, it is likely that one or more of them are installed backwards. If no LEDs light then the chip or battery connector may be installed backwards.