

Fading LED Circuit

Objectives



- Accurately reproduce a PCB layout.
- Troubleshoot an electronic circuit if it is not working.
- Solder a printed circuit board to a satisfactory level.
- Identify electronic components.

Introduction

- For this project you are to build a small fading LED circuit that consists of an LED, resistor, coin battery and a switch. Once you have built the circuit board you will use the laser engraver and a 3D printer to make a case that the circuit board will be assembled into.

Marking

Layout and cutting (<i>compared to original</i>)	/5
Drilling layout (<i>compared to original</i>)	/5
Soldering (<i>neatness</i>)	/5
Components Flat	/5
Enclosure (<i>quality, cutting</i>)	/5

Procedure

Step 1

- Obtain the supplies you need to begin making the circuit board
 - Copper clad board
 - A piece of white vinyl
 - Pencil
 - Utility knife
 - Steel Wool
 - Ruler



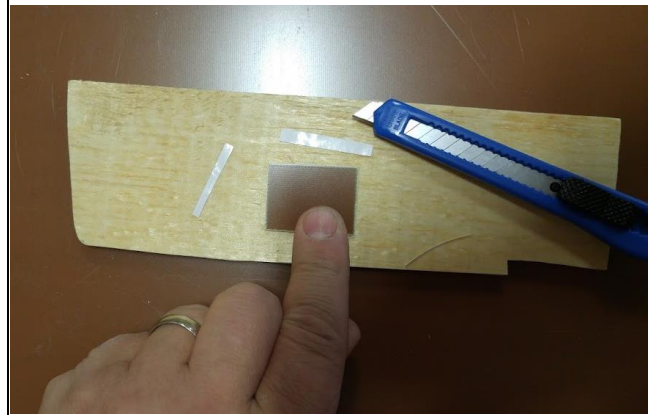
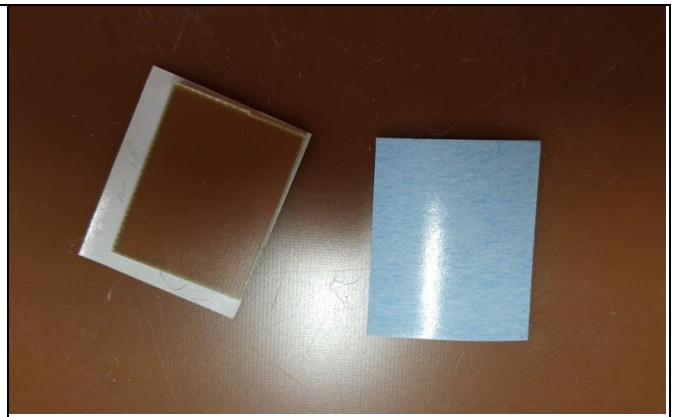
Step 2

- Steel wool the copper clad board to clean off any dirt and grease.



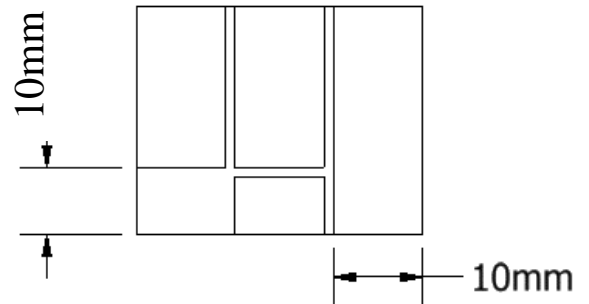
Step 3

- Peel the back off the white vinyl and place it over the **COPPER** side of the board.
- Using a scrap piece of wood, **NOT THE TABLE**, cut off the excess vinyl.



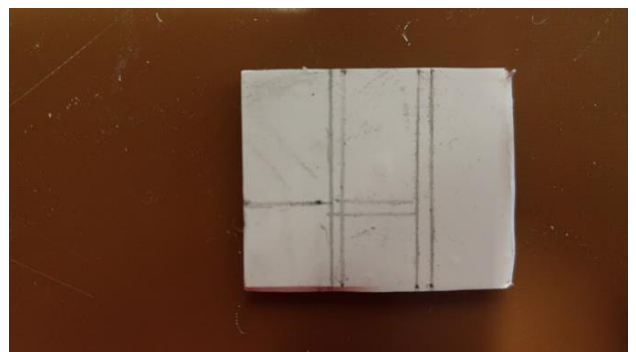
Step 4

- Carefully look at the circuit board layout in the diagram to the right.
- Each "trace" is 10mm wide and the gap between each trace is 1mm



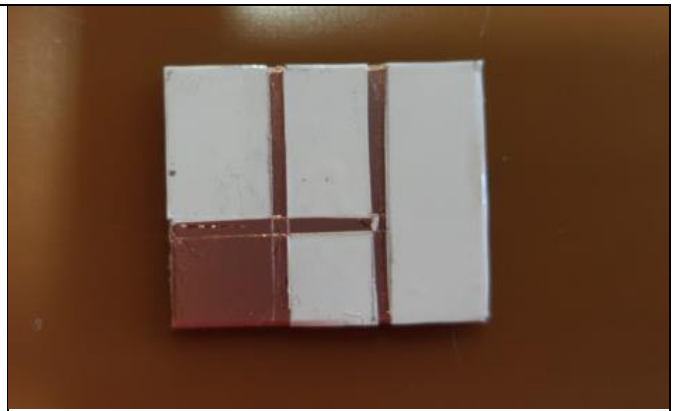
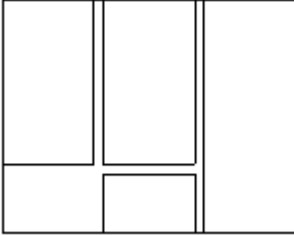
Step 5

- Draw out the circuit board layout on the Vinyl using a **PENCIL and a RULER!**



Step 6

- Using a utility knife, carefully cut the circuit board layout out of the vinyl. Remove the material that is not needed
- When you are finished, it should look exactly like the layout.
- Marks will be given for accuracy. This layout would not get 5 out of 5.



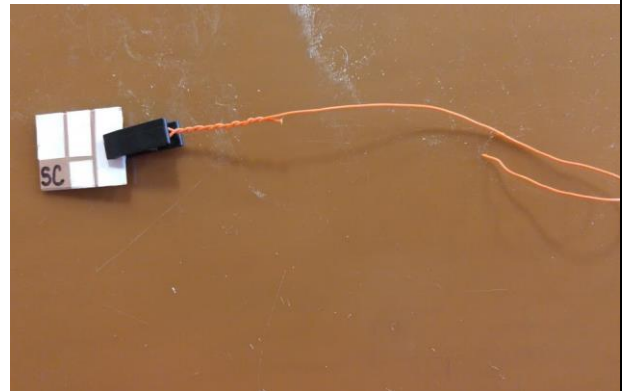
Step 7

- Using the SPECIAL circuit board etch pen, carefully put your initials in the corner.
- Let the ink dry for a couple of minutes



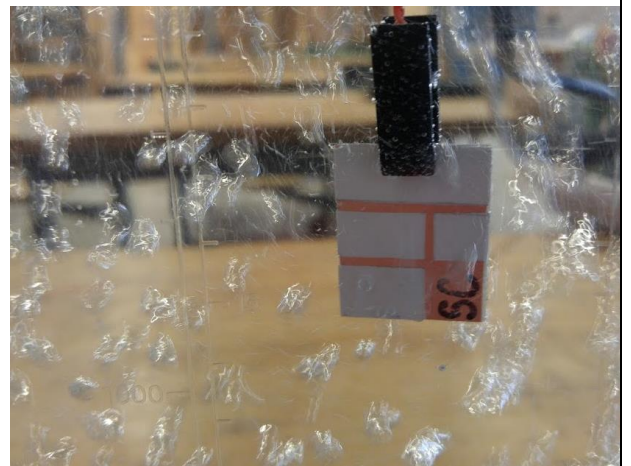
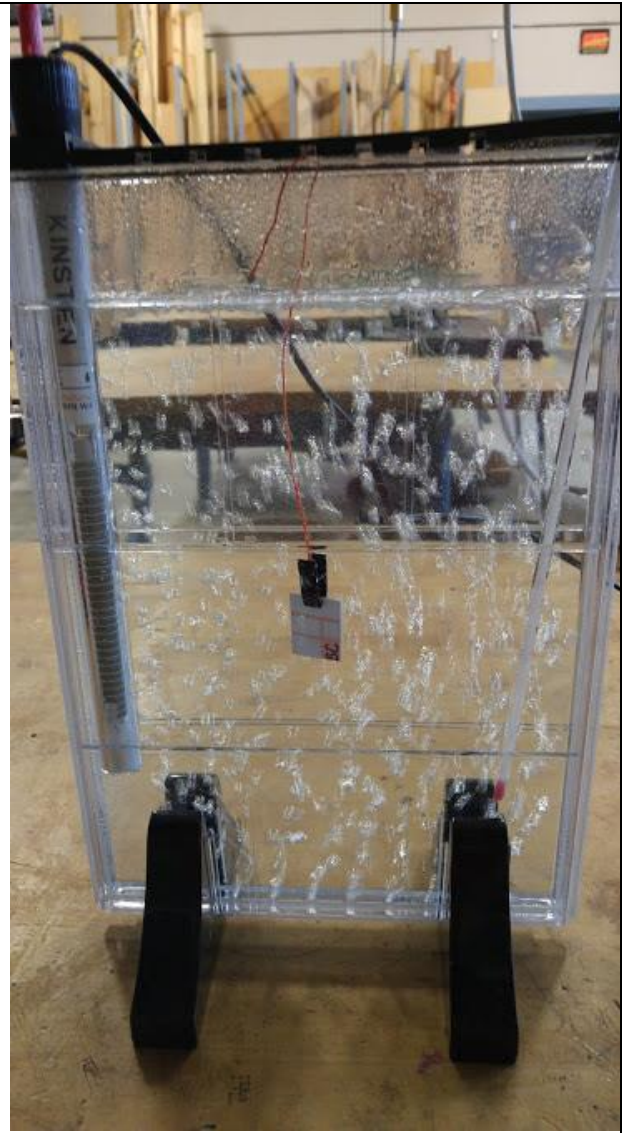
Step 8

- Use a clip from the etching tank to hold your board as shown
- This clip will be used to hold your board in the etching tank



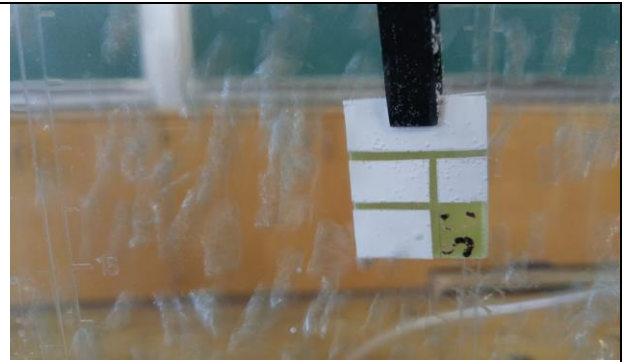
Step 9

- Hang the circuit board into the etching tank.
- The tank should be bubbling and the heater should be on. The warmer the chemical, the faster it will etch
- The lighter colour of the chemical, the faster it will etch.



Step 10

- **Make sure you have rubber gloves and safety glasses on!!**
- When the etching process is complete, you should be able to see through the board and no copper colour should be left.
- Take your circuit board out of the etching tank and put it in a bowl or dish and take it to the sink to wash it off and dry.



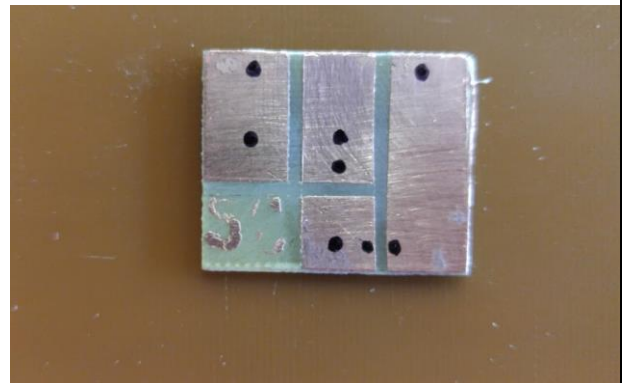
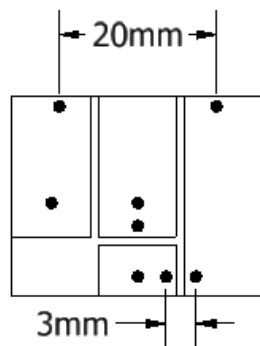
Step 11

- Peel off the white vinyl to expose the copper remaining



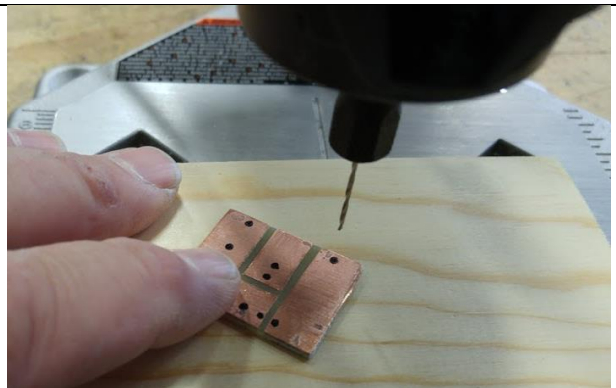
Step 12

- Layout the holes using the following diagram.



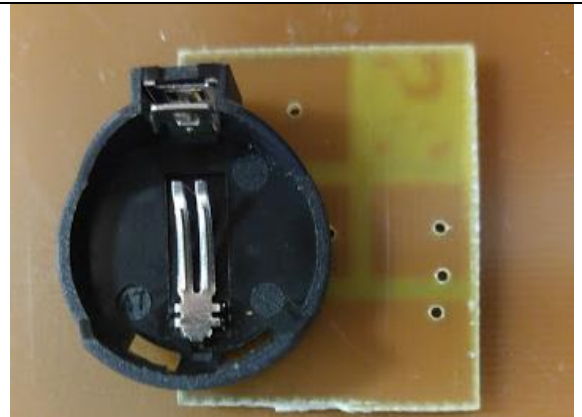
Step 13

- Drill all the holes using a Dremel drill



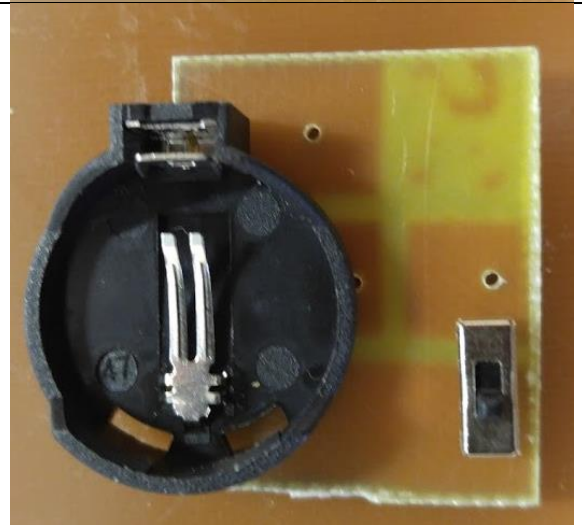
Step 14

- Install the battery holder as shown



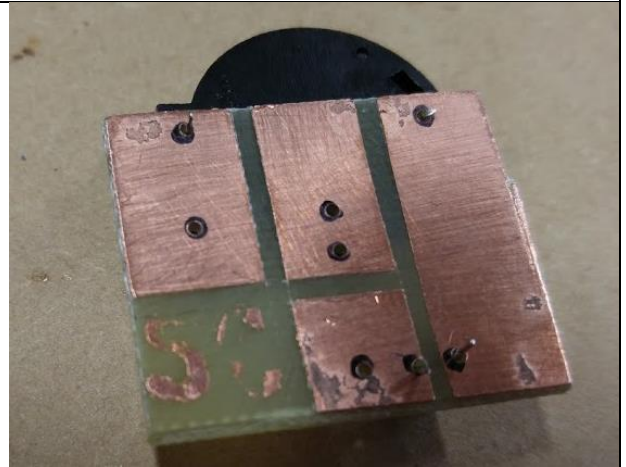
Step 15

- Install the switch in place



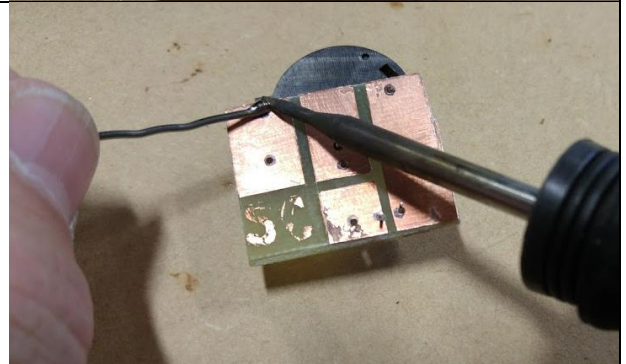
Step 16

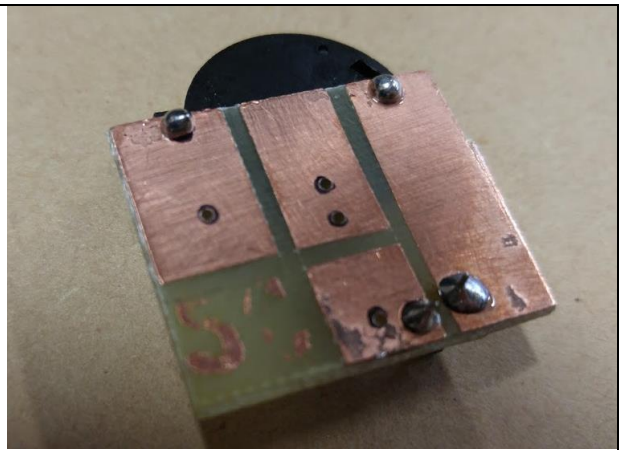
- Flip the board over and ensure the legs of both the battery holder and switch are sticking out of the holes.



Step 17

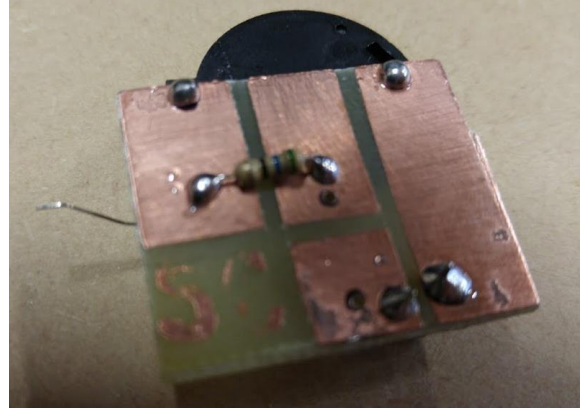
- Solder the battery holder and switch in place





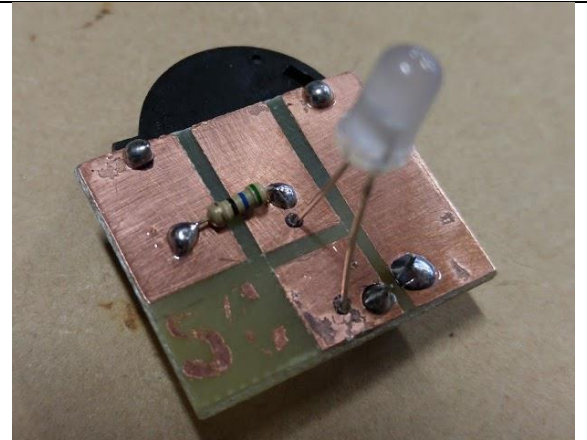
Step 18

- Insert the resistor as shown and solder in place



Step 19

- Insert the LED as shown and solder in place
- The LONG leg of the LED connects towards the resistor!!



Step 20

- Get a coin battery from the teacher
- Install the battery with the positive side up.
- Flip the switch on to see if it works.