Make your own PCB at Home

Printed circuit board or PCB is one of the important things to assemble an electronic circuit. The pins/leads are then soldered to connect with the PCB tracks. Here it explains the easiest method to make a PCB at home for prototyping.

To make the PCB, following materials are required

1. **Copper clad board**

   The copper clad is available in standard sizes. Cut it to the required size using a Hacksaw blade. The copper clad board has a copper coated side which forms the soldering side. The other side is the component side on which the components are placed.

2. **Ferric chloride solution**

   This is the Etching solution of Ferric chloride. It removes the unwanted copper layers from the copper clad board.

3. PCB drill and bits

PCB drill is used to drill holes in the PCB. A hand drill with suitable bits is sufficient for the purpose. Use drill bits of the following size to make holes for different components

4. Tonner remover

Usually paint thinner is used for removing the tonner.

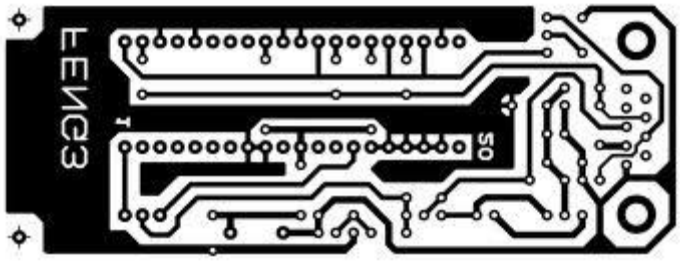
5. Cleaning solution

The copper clad may be deposited with oil and other impurities, we can use dish wash liquids like prill to clean the board

PCB Making

PCB making involves the following stages

1. Select the layout that we have to print on the board. Print it on a 130 GSM photo paper using laser printer with the maximum darkness possible.



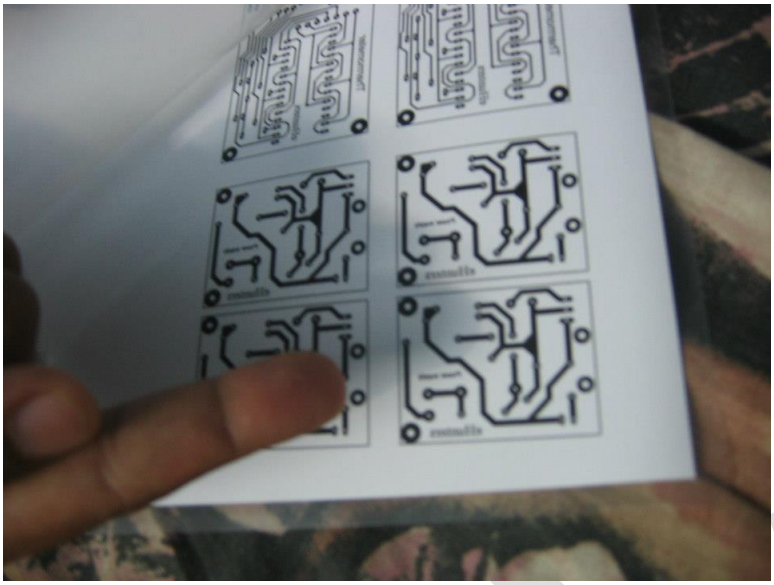


Fig 1: Print out for the toner transfer method

2. Cut the copper clad to required size and clean the board using dish wash liquids like Pril and scrub using scrubber like scrotchbyte to remove the impurity and oil.

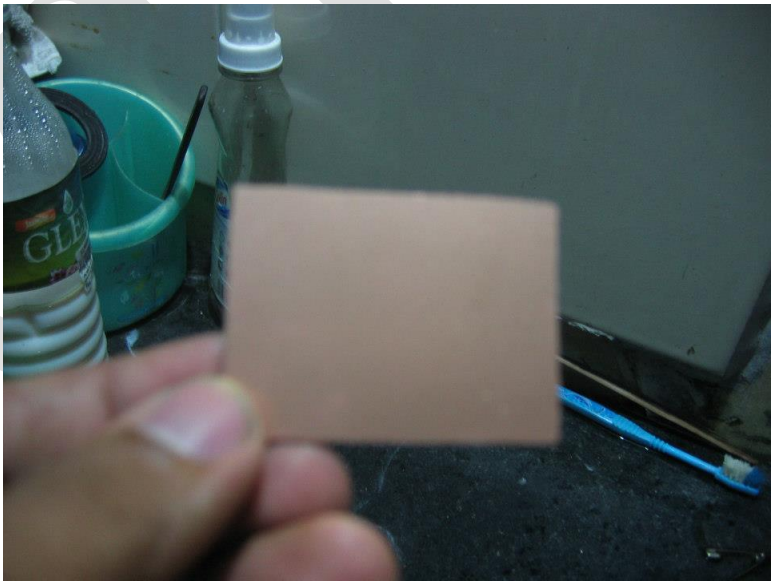


Fig 2: The required board size is selected

Fig 3: Cleaning the board using the cleaning liquid

Fig 4: Cleaning the board using the scrubber

3. Place the print out on top of the board. Be care full with the alignment, as the print out paper will stick to the board soon.

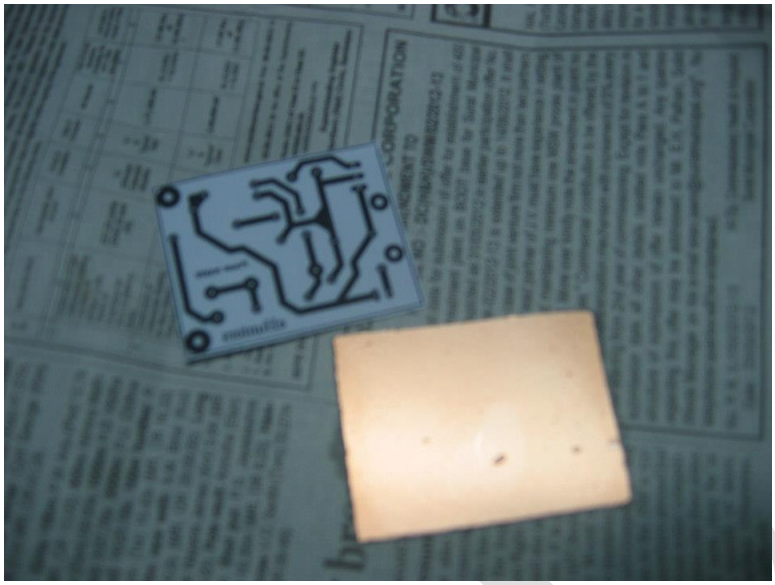


Fig 5: Print and cut and cleaned board

4. Pre heat the board using a hot iron box and Iron the print out for 5-6 minutes.

Fig 6: Pre Heating the board using the iron box before toner transfer

5. Once, when the print gets stick to the board, immerse the whole board in warm water. The paper will start to soak, then peel the paper using your thump finger. Remove the paper to the finest level.

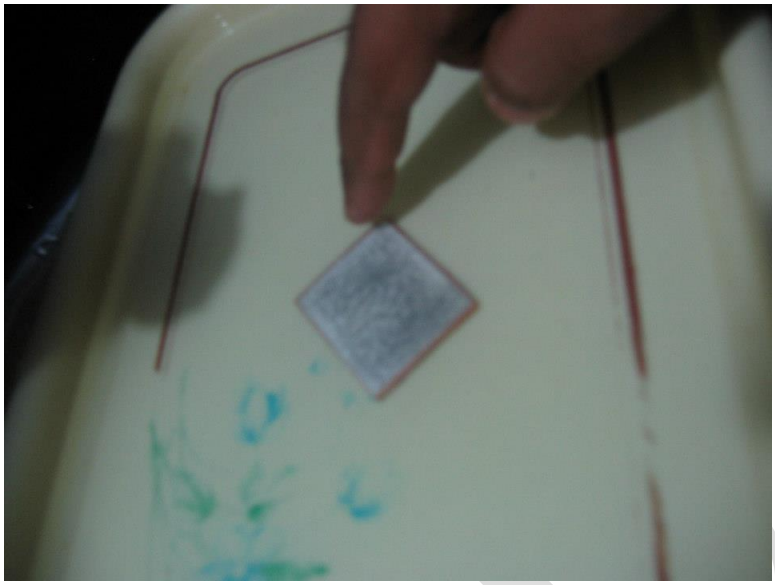


Fig 7: Removing the paper after the transfer

6. Once the whole paper is removed, the board is ready for etching.

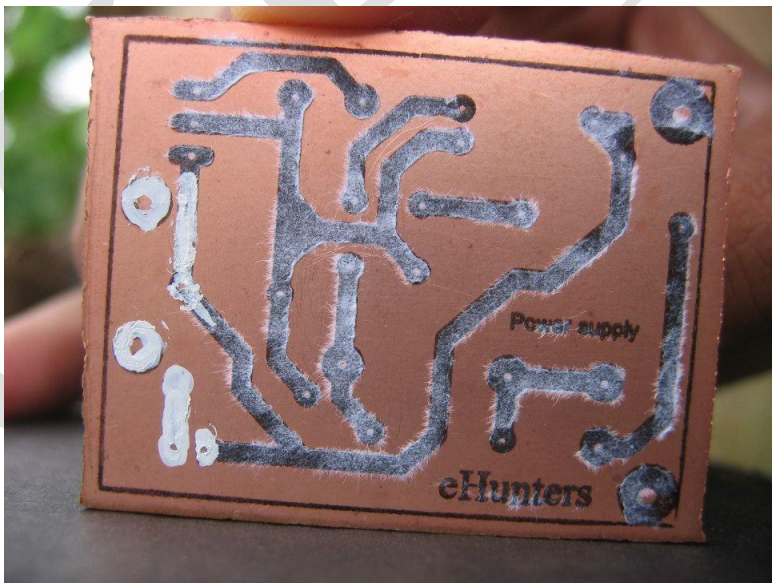


Fig 8: After tonner transfer PCB ready for etching

7. Take a Plastic or Porcelain tray and place the copper clad board with the track side facing upwards. Carefully pour the Ferric chloride solution over the copper clad till

the copper clad is immersed in the ferric chloride. Shake the container for faster etching. Heating the solution before the process will give you a better result.

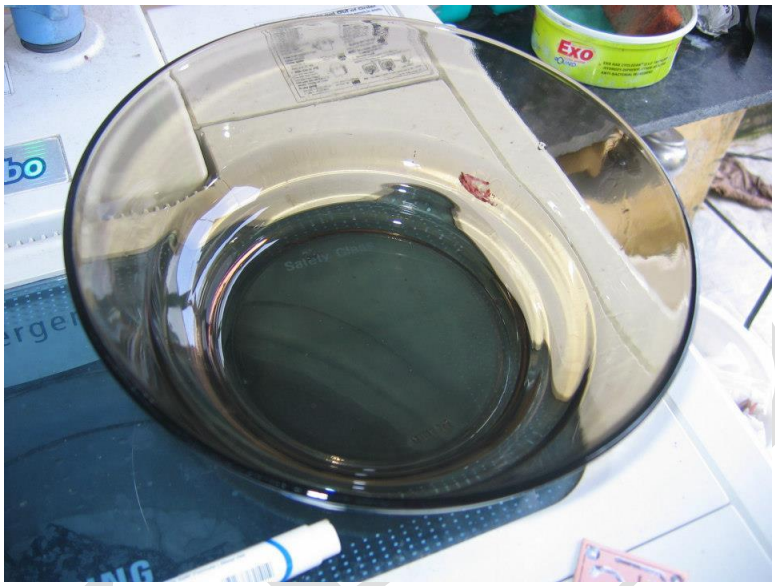


Fig 9: Preparing the Etching Solution

Fig 10: Board in solution for etching

8. After etching, clean the copper clad using tap water. This will remove the dissolved copper from the copper laminate except the copper beneath Tonner.

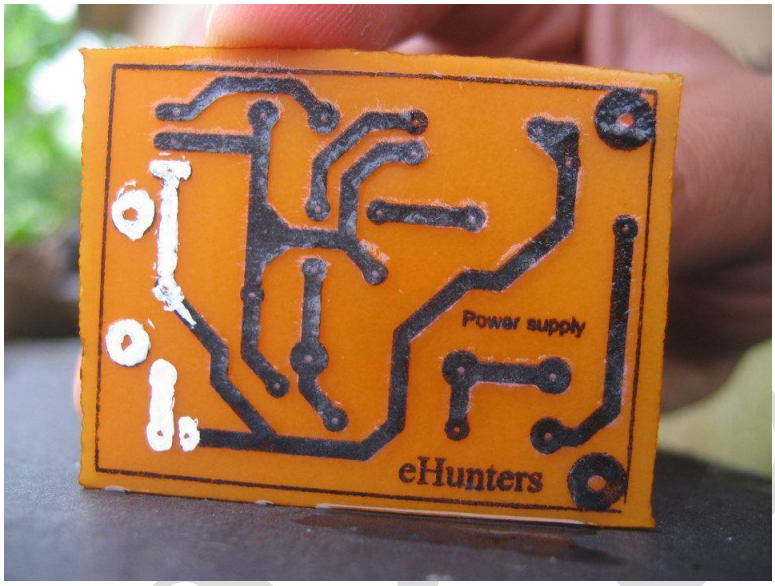


Fig 11: After drilling holes and removing the toner

9. Drill holes using appropriate drill bits.

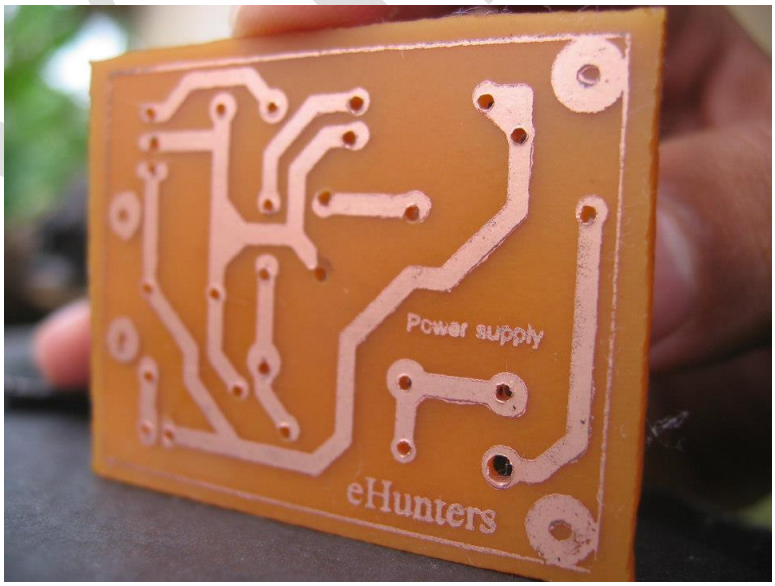


Fig 12: After drilling holes and removing the toner

10. Remove the Tonner using paint thinner and cotton waste so that the tracks will appear as copper lines.

11. If required, tin the tracks carefully using solder lead. Dip in varnish to prevent copper oxidation in tracks.

Caution: Ferric chloride solution is toxic. It can cause skin burning or irritation. Use hand gloves during etching. Do not spill the ferric chloride on the skin. If this happens accidently, wash with water. Do not keep ferric chloride in places access to children.