



Making A Customized Circuit Board (Made Easy)

by [angelo10](#) on September 1, 2011

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I got interested in electronics and mechanics when i was 4 year old.
And started soldering circuits (kits) at 7 years old.
And improved soldering at 9 years old without any kit only following circuit diagrams.
And started making original circuits and schematics at 12 years old.

Intro: Making A Customized Circuit Board (Made Easy)

Today I'm going to show you how to make your very own customized PCB (printed circuit board). All you need are some materials and tools like a: PCB board, A bottle of *Ferric Chloride*, A mini drill, A small container, A bottle of thinner and Some plastic tweezers. Making your own circuit board only takes a snap, what you need is 30-45 minutes of time. I thought of posting this Instructable since there are only few articles out here in the site about making a customized circuit board

P.C.B. (Printed Circuit Board)

What are PCBs ?

PCB (Printed Circuit Board) is used to mechanically support and electrically connect electronic components using conductive pathways, tracks or signal traces etched from copper sheets laminated onto a non-conductive board. Components are connected through the conductive material below a non conductive board, the common conductive material used in packaged PCBs are usually copper, since copper is cheap and common.

Why Use Customized PCBs Instead of Ready Made Project Board?

First, because the board will be more compact because your design as well is made to be compact. Second, it's more convenient to use, since you can decide where to put space on your board. And last, the board will be stronger unlike those ready made project boards are full of holes everywhere, making ready made boards weaker.

How Do We Make Them ?

Usually you print your circuit design indirectly to your board, you print it on a glossy paper, photo paper or magazine paper. Let me remind you that before you print you should use a *laser printer* or a *photocopying machine*, using of inkjet printer will not work. After you had printed your circuit board design you will iron the printed design over the copper side of the PCB, ironing it above the copper side of the board will transfer the ink, from the glossy paper to the PCB board. The ink serves as the protective layer to cover the copper part that shouldn't be etched. Then after transferring the ink to the PCB board you will have to dip the PCB board to a etching solution like *Ferric Chloride* for 15 minutes. After etching it you might have to rinse the PCB board with water to remove the etching solution. After rinsing it you should remove the remaining ink with thinner, to uncover the uneched copper part. After removing the ink you will need to drill holes for your components to be soldered on the board. And last but not least just solder your components of your customized board and your done!!!

How does the procedure work?

Since the etching solution only works with metal and not with ink, you transfer ink to the copper side of the PCB be so that a certain pattern on your PCB board gets etched and the inked part doesn't

Notice:

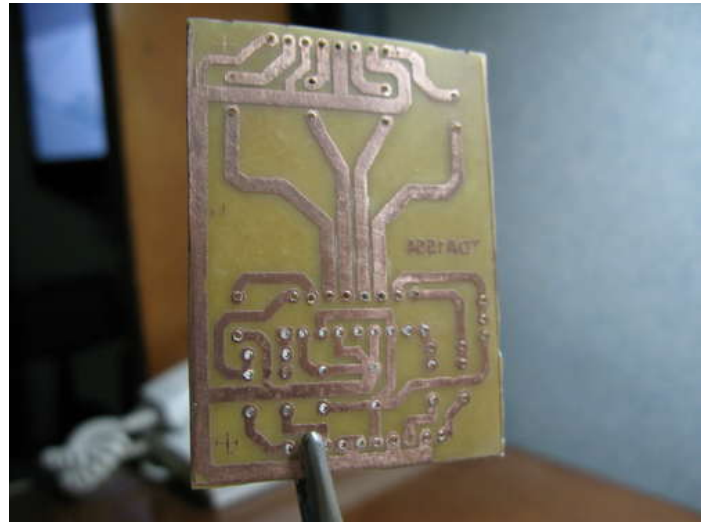
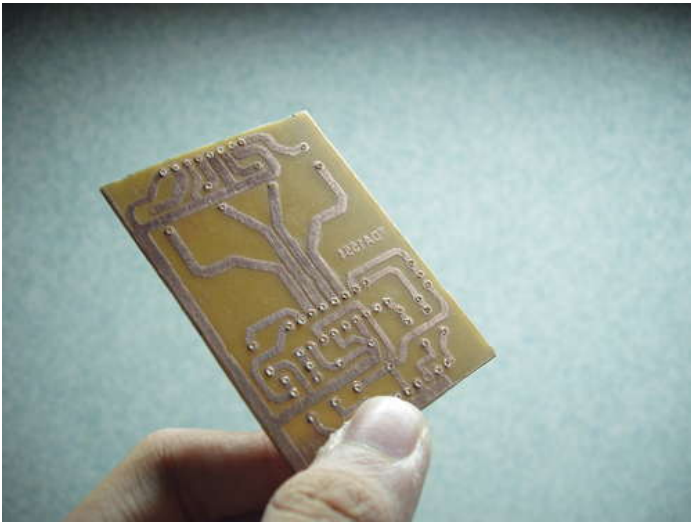
The video below is not mine!!

Its the courtesy of [javapda](#).

The Peel n Press paper mention can be substituted with a magazine paper or photo paper.



CLICK TO PLAY VIDEO 



Step 1: Tools & Materials

Here are the tools and material that you are going to need.

Tools:

- Mini Drill (Dremel)
- Flat Iron
- Laser Printer / Photocopying Machine
- Latex Gloves
- Eye Protection

Materials:

- Etching Solution (Ferric Chloride)
- PCB Board
- Fine Tipped Marker
- Ruler (optional)
- Magazine Paper / Glossy Paper
- Plastic Tweezers / Plastic Straws
- Small Piece of Cloth
- Sanding Paper

Where To Buy: (click on the material to see where to buy)

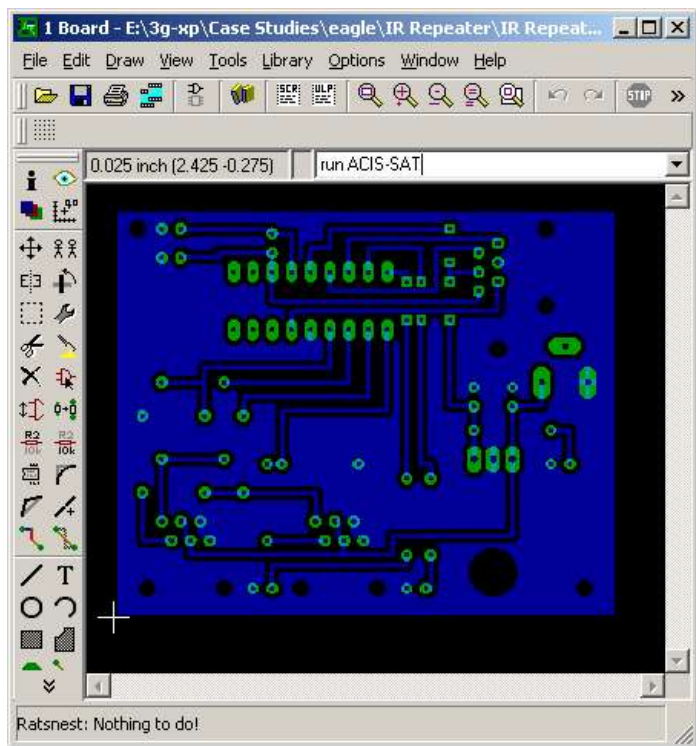
- PCB Board
- Ferric Chloride
- Sanding Paper
- Dremel
- Plastic Tweezers
- Latex Gloves
- Eye Protection
- Laser Printer



Step 2: Making Your Circuit Board Design

If you already have a PCB layout then there's no problem you can just skip this step and go to the other one, you might as well write your design directly on the board, if you don't have plans doing the printing method. Before you make your own customized PCB board you should first design your own PCB layout. You can make your own PCB layout by using a decent PCB designing software. For me the best PCB board design software is Eagle Layout Editor, but for people who are looking for a less complicated software can use Microsoft Powerpoint.

Here's the link for *Eagle Layout Editor* download: <http://www.cadsoftusa.com/downloads/freeware/>



Step 3: Printing Your PCB Layout

When you print your layout be sure to use a *Laser Printer* or a *Photocopying Machine*, Inkjet Printers wouldn't work since its ink is soluble with water so it won't transfer its ink on the PCB board. Use any kind of glossy paper, magazine papers would do.

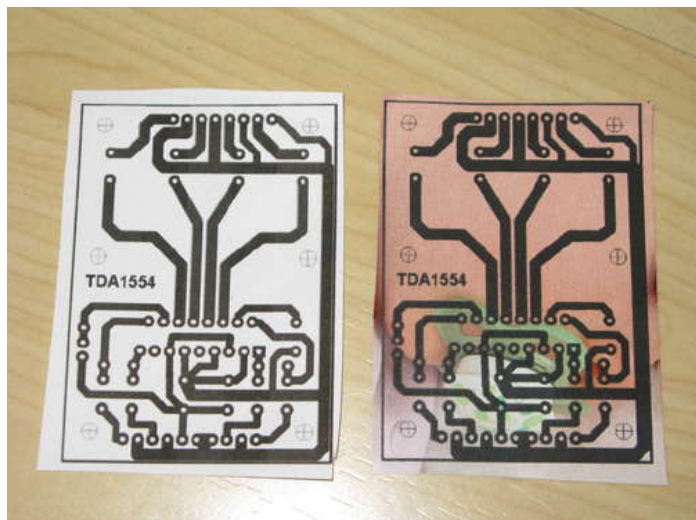
Summary:

What Paper Should I Use:

- Photo Paper
- Magazine Paper
- Glossy Paper

What Printer Should I Use?

- Laser Printer
- Photocopying Machine



Step 4: Ironing The Printed PCB Layout

Use a laundry iron to iron your printed PCB layout to your board. Ironing the printed layout transfers the ink from the paper going to the PCB board. You need to set your iron's temperature to the highest setting if your paper is thick but if not, set it to the medium setting.



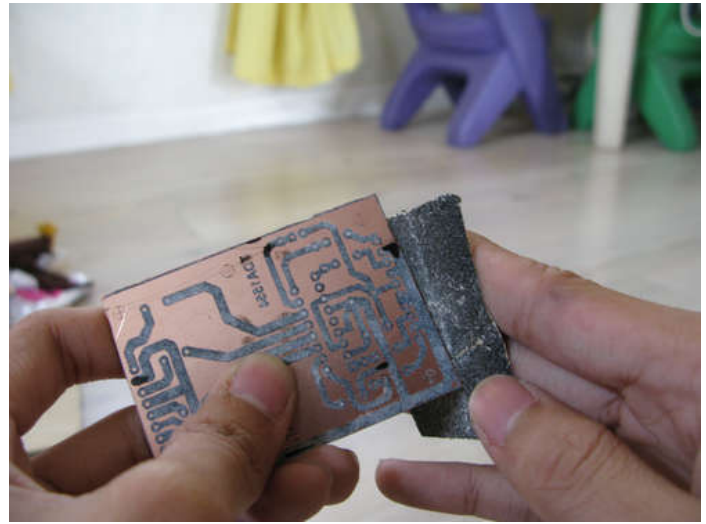
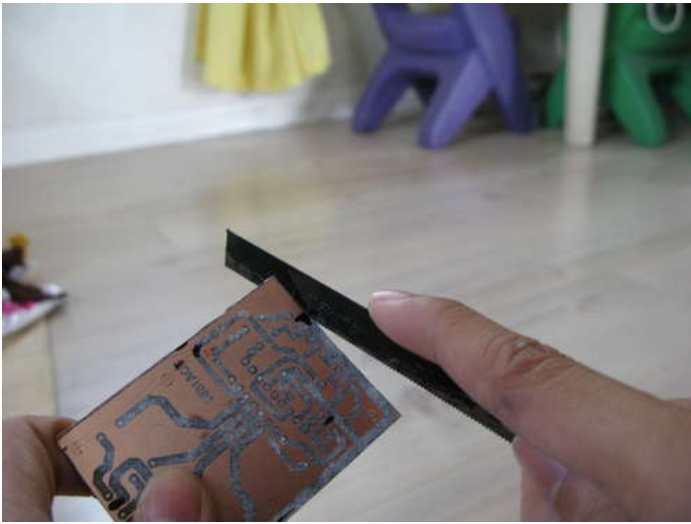
Step 5: Rubbing The Paper Off the Board

You need to soak the board in a container of tap water for about 2-5 mins, or you can rub it while you expose it to running water from the sink. Be sure to wait until the paper on the board becomes soggy, then rub it gently so the ink won't get removed when you rub the paper off the board.



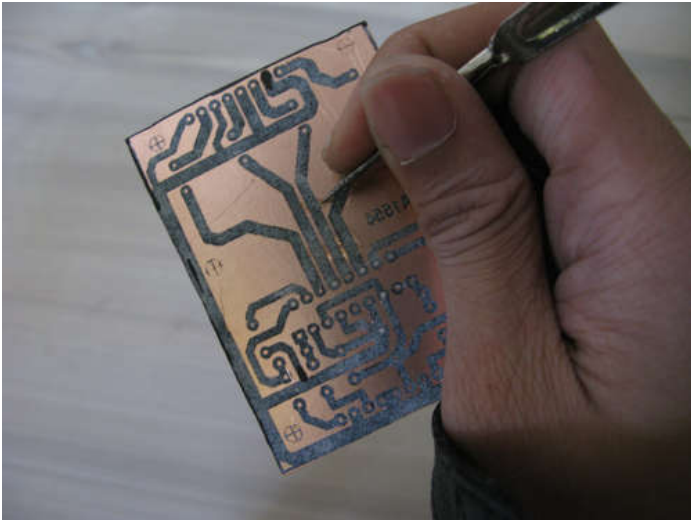
Step 6: Sawing The Excess Board & Sanding It

Saw the excess board with a metal saw. Next you need to sand the edges to smoothen the board with sanding paper, kindly use the finer so you will have a finer finish.



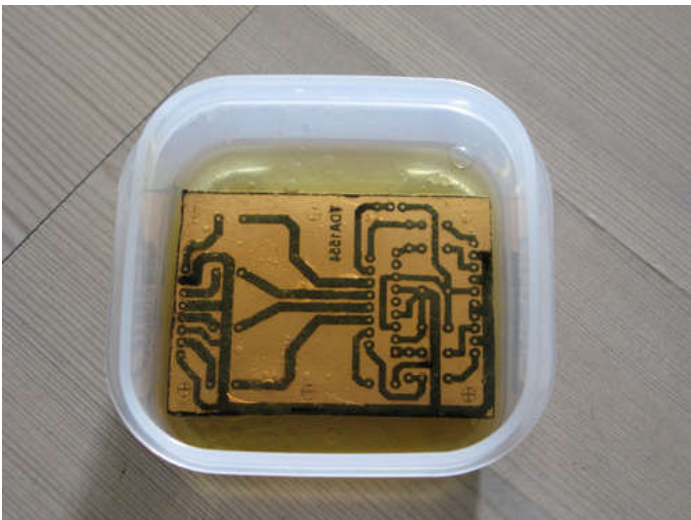
Step 7: Cleaning The Board & Restoring It

Even though you have rubbed the paper off the board there will still be excess paper left on the board, remove it using a very sharp object like the tip of the cutter, the point of a sharp compass or a tooth pick. When you had rub it off or you had sawed the excess board, some of the inked areas had been remove unintentionally, you should restore it with a marker and a ruler.



Step 8: Etching The PCB Board

There are different variety of etching solution but the most common is Ferric Chloride. Get a plastic container, never use any kind of metal container. Pour th etching solution on your plastic container. Leave the PCB board for about 30-45 minutes in the container. After for about 30-45 minutes remove it from the container, leaving it for a long time will etch the ink protected area so please remove it when it's done.



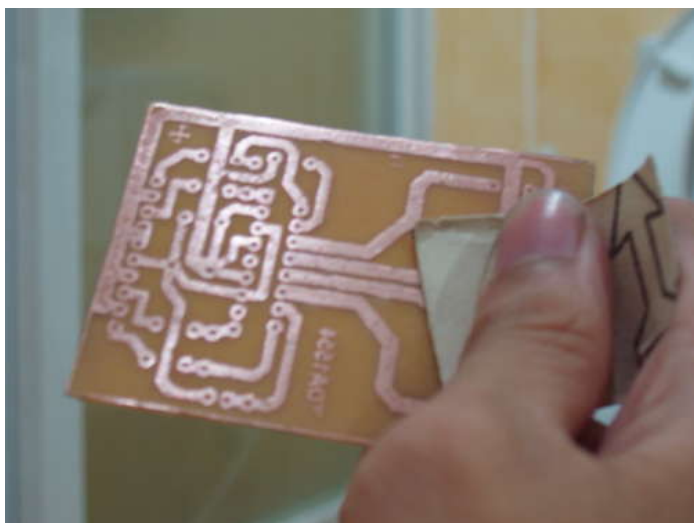
Step 9: Rinsing The Board

Rinse the PCB board with tap water, after etching it in the solution. Be sure to wear gloves when cleaning it. It is advised to use plastic tweezers, please do not use metallic materials like pliers or your tool will end up like mine's, its rusty.



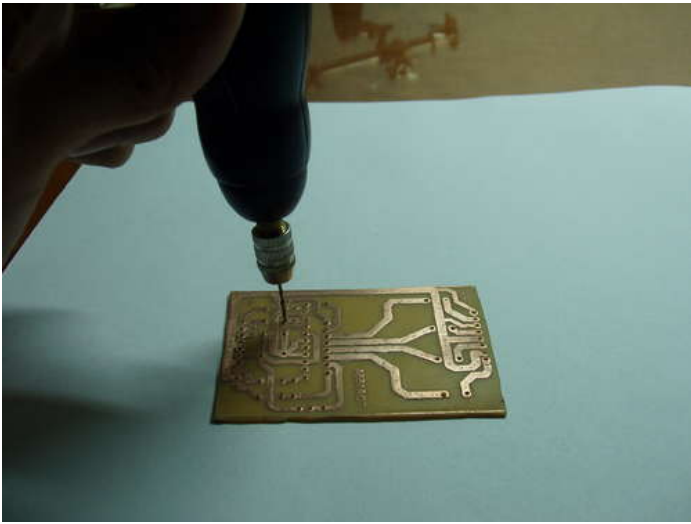
Step 10: Removing The Left Ink

First you should brush the remaining ink with laundry soap after etching the board to expose the copper part of the board, or you could clean it with a small piece of sanding paper (fine) while give it its shiny finish.



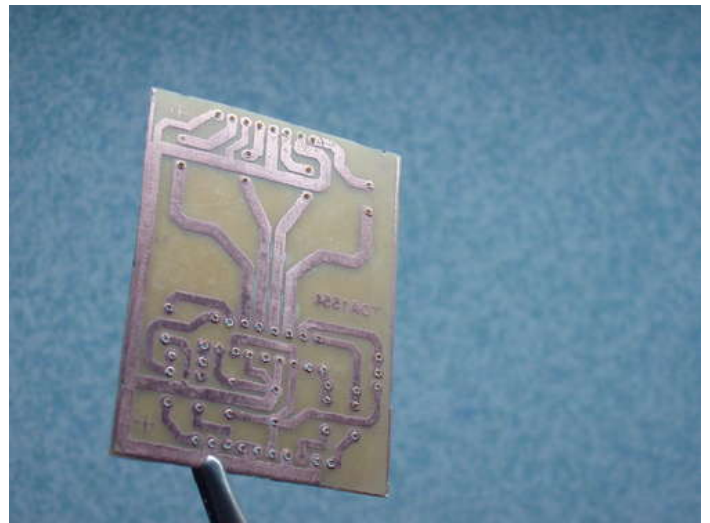
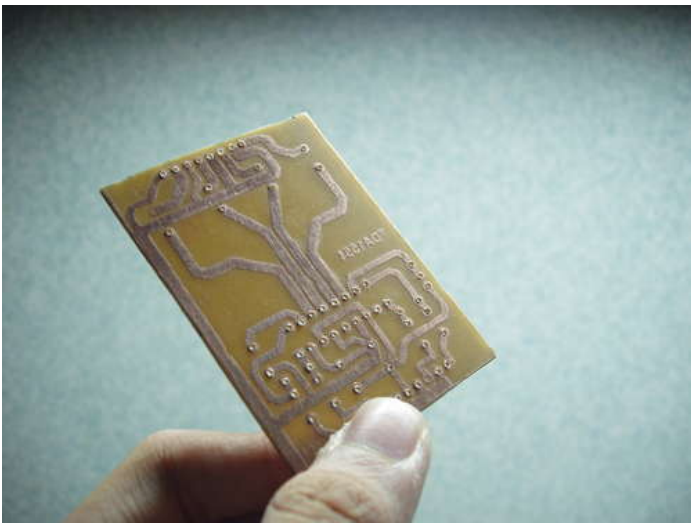
Step 11: Drilling The Holes

Drill the board with a mini drill a dremel tool will do. After drilling it rinse it again with water. Be sure to drill it on the copper side, since the copper layout will be your guide where to drill.



**Step 12: Your Done !!!
Your Done !!! ^_^ !!!!**

Be sure to clean it before you solder the components.



Related Instructables



Making Printed circuit Boards at or Near Home: A Comprehensive Overview, Almost a Guide
by russ_hensel



HOW TO MAKE YOUR OWN PCB (PRINTED CIRCUIT BOARD) (video)
by mshayan27



How To Make A PCB
by PARKOUR123



Adding Custom Graphics to EAGLE PCB Layouts
by iobridge



How to make a PCB Method 2
by PARKOUR123



Circuit Board Layout Tips & Tricks (video)
by nmclana