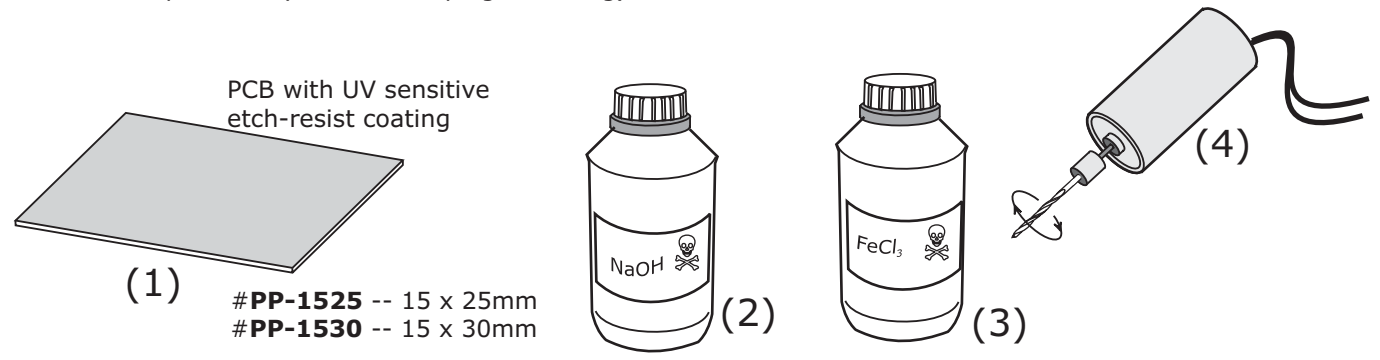


How to make professional quality PCB using UV sensitive etch-resist board

Materials you need

- (1) P.C.board with UV sensitive etch-resist coating
 - (2) Developer (*NaOH or caustic soda solution*)
 - (3) Etchant (*Ferric Chloride solution*)
 - (4) Mini hand drill
- Miscellaneous items : *materials for preparation of pcb artwork (transparency, pads & lettering transfers), acrylic board cutter (OLFA-450) ,2 pieces of thick glasses, plastic trays for developing & etching)*



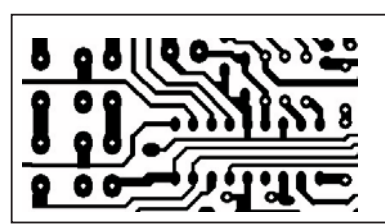
PCB artwork

Prepare your pcb artwork using your preferred pcb software (*Protel, etc..*) & print it out on transparency using a laser printer. *Be sure to use the correct type of transparency suitable for laser printer.*

The artwork can also be done manually by placing tracks & pads on the transparency using transfer papers.



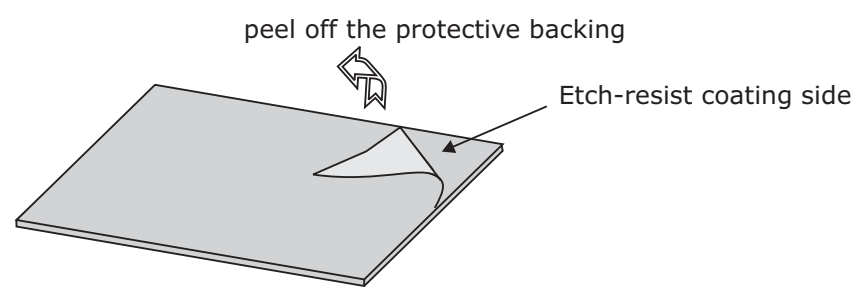
IMPORTANT : Use only "positive" artwork such as the sample shown below (dark areas for tracks & pads)



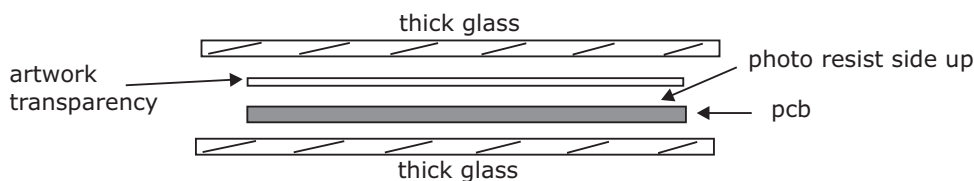
Getting started

Remove the board from the envelope. Cut the board to the required size using **OLFA-450** board cutter. (unused portion should be kept in the original opaque envelope for future use)

Peel off the protective pvc backing from the coating side of the pcb as shown in the picture below.



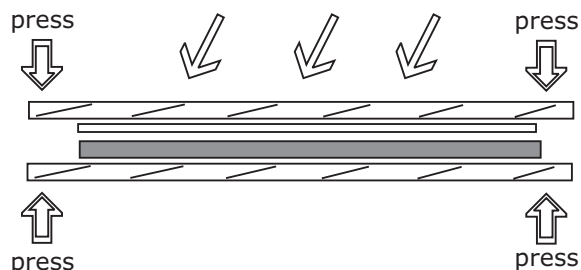
Sandwich the artwork & pc board between two pieces of thick glasses as shown



When placing artwork on the pcb, make sure that it is in the "copper side" view. (i.e. the foil pattern as seen from the solder/copper side)

Exposure

Light source (strong sun light or UV lamp *)



Exposure time

Strong sun light -- 1.5 ~ 2 min

UV lamp (18W) -- 4.5 ~ 5 min.

Common fluorescent lamp (20W) -- 8 ~ 10 min.
(lamp should be around 5 cm above the board)

* When using UV lamp, be sure to use the correct type of lamp specially made for photo-resist exposure

After exposure, remove the transparency & you will see a faint shade of the artwork (in very light purple colour) on the coating

Developing



(Use plastic trays only) (The concentration of NaOH solution is **very critical**. Use the solution as is. **DO NOT** mix with water)

After exposure, leave the board in a plastic tray with the UV coating side facing up. Pour in the NaOH solution (**do not mix with water**) until the liquid level is just a few mm over the board. Agitate the liquid by rocking the tray slightly. The movement of the liquid will speed up the process. A few seconds later, the image of the pads & tracks will begin to appear. This should continue until the tracks & pads are clearly visible. You may add a bit more of the NaOH solution along the way if the developing slows down. After developing is completed, rinse the board in running water.

NOTES : (1) Use the right size of **plastic tray**. **Oversized tray** will cause wastage of NaOH solution.
(2) Discard the NaOH solution after use. Always use **fresh solution** for every new developing job.

Etching



(FeCl₃ is a highly corrosive chemical. Use only plastic trays and do not share the same tray with developer)

Get ready a plastic tray & pour into it adequate amount of FeCl₃ solution. You may add 20~30% of hot water to raise the liquid temperature so that etching finishes sooner. (etching is faster in higher temp.). Immerse the board in the liquid with the copper side facing up. Rock the tray continuously. Etching takes much longer time than developing so you would expect the process to take about 15 min. or longer. After that, remove the board from the chloride, rinse it & hold it against fluorescent light to see if there is any residue copper remains. If so, return the board into the tray & continue with the etching until it is done.

NOTES : FeCl₃ solution is reusable for 2~3 times after which it should be discarded.

Removing the etch resist coating

After etching is completed, rinse the board with soap & water. Next, remove the etch-resist coating by rubbing it with a piece of cloth with paint remover (the so-call "thinner" which is available at hardware shops). After that, rinse the board again with soap & water. After drying, you may (if you wish) spray a layer of clear varnish on the copper side to prevent the copper from oxidation. Spray can varnish can be purchased from almost any hardware shop at about RM 6.00 each.

Drilling

The most common drill bits sizes : 0.8 mm ---- for ICs, small transistors
1 mm ---- for resistors, power transistors, capacitors, jumpers,...
1.3 mm ---- for relays, trimmer pots (presets),...

You may use battery operated mini hand-drill or other convenient tools available.