

1. Use software to design board (I use CADSoft Eagle)
2. Print on laser printer
 - a. Intensity: Darkest
 - b. Raster graphics
 - c. Print TrueType as graphics
 - d. RET: Off
 - e. Never touch board part of paper with fingers
3. Cut out pattern and leave 1/4" buffer on 1 side for handling
 - a. Lay pattern flat, face up until ready to use
4. Jet Direct Multi Project paper is good for component side
 - a. Slightly difficult to work with because it is very slippery
5. Staples "Picture Paper" is good for copper side
 - a. SKU 471861 – 30 Sheets – Barcode: 7 18103 02238 5 - \$9.99 (recently on sale for \$3)
 - b. SKU 471865 – 100 Sheets – Barcode: 7 18103 02241 5 - \$29.99
6. Scrub copper board with Scotchbrite pad in 2 orthogonal direction pressing hard at first and then softer
 - a. I have recently switched to a random orbit sander with 400 grit paper instead of the Scotchbrite pad (only takes a few seconds of light pressing)
7. Scrub copper board with paper towel soaked in Acetone pressing hard until no more discoloration is seen on paper towel
8. Lay board on a rigid heat resistant surface such as a plywood
9. Blow dust off board and pattern carefully using compressed air
10. Place and align pattern on copper board
11. Heat with iron and apply strong pressure. The longer the better
 - a. Set iron to hottest setting with no steam
 - b. Heat for at least 30 seconds
 - c. Change iron position half way to insure no holes on the iron are not making contact
 - d. A corner of the pattern can be heated for 10 seconds initially to prevent slipping
 - e. Raising rear of iron slightly to get more pressure on tip helps
 - f. Try to press to go over entire pattern with emphasis on tip
 - g. Finish with a flat press
 - h. Entire heating should take about 2 to 3 minutes
12. Place board with paper in hot water
13. Let soak for 10 minutes
14. Try to peel off some paper off after about 2 minutes
15. Let soak another 10 minutes
16. Use toothbrush to remove remnants of paper. Scrubbing hard should be OK
 - a. Paper residue on top of toner is OK
 - b. Wet Crinolin material works better than a toothbrush
 - c. Try to scrub parallel to the patterns to avoid removing the toner
17. Rinse board with soap and water and wipe dry with paper towel
18. Using Sharpie to correct any flakes
19. Etchant Mix
 - a. 1 Part Muriatic Acid (28% Hydrochloric Acid) – Available at most hardware stores
 - b. 2 Parts Hydrogen Peroxide (3%) – Available at most drug stores
20. Place board in etchant in a plastic tub at room temperature
 - a. Wear rubber gloves
 - b. Use plastic knives or forks to move board around in solution to expedite process
 - c. Wear respirator and work outside for good ventilation
 - d. Do not get etchant on anything that is not plastic
21. Remove board from etchant paper towel with Acetone to remove toner from board
 - a. Toothbrush with acetone also speeds up the removal of toner
22. Print component side on Multi Project paper

- a. Set print settings to mirror
- 23. Line up component print with top of circuit board and iron it on
 - a. Use regular paper between iron to prevent coating sticking to iron
 - b. Must be extra careful to avoid any lateral movement because the paper is very slippery and it will smear to transfer
- 24. Drill holes
 - a. Use wire drill bits available at local hardware store