

NorCal Power Meter PC Board Fabrication

You can fabricate a PC board for the power meter by following these simple steps. We will be using the toner transfer method here. You will need the following items:

- A. Clothes iron
- B. Two zip-lock sandwich bags
- C. Kitchen gloves
- D. A permanent marker (Sharpie works well)
- E. 1 gallon plastic container
- F. An abrasive pad
- G. Radio Shack Cat No. 276-1535 PCB etchant.
- H. Several 1/32" drill bits

CAUTION: Ferric Chloride etchant is a hazardous chemical that will cause permanent stains. Use in a well-ventilated area, wear eye protection and old clothing when working with it.

1. Print the layout. If you're using an inkjet printer, you'll have to make a Xerox copy. If you have access to a laser printer, you're all set. Once the layout is printed check that the board dimensions with a ruler. A couple of percent difference is probably OK since nothing on the board is close tolerance.
2. Place the layout face down on the board and iron it onto the board. It may take several minutes to transfer all of the toner. If the paper peels off easily, do a happy dance. If it won't come off the board readily, submerge it in water and soak off the paper.
3. After the paper is removed, check the layout for missing toner. Fill any voids with a Sharpie. You're now ready to etch the board.
4. Fill the plastic gallon container halfway with very warm water, about 105 - 110 F.
5. Nest one zip-lock sandwich bag inside another. Double containment is a good idea since the inner bag may leak. Gently place the board inside the inner bag and carefully pour in a few ounces of the etchant. Seal the inner bag, trapping some air.
6. Put on the gloves and place the bags into the container and gently agitate with up-and-down and side-to-side motions.
7. Periodically remove the bags and inspect the etching process. The etching is complete when all of the copper is removed from the blank areas and no copper whiskers remain. Depending on the water temperature, it should take about 10 minutes.

8. Remove the board from the etchant and rinse under cold running water. Be sure to do this in a utility sink or away from food preparation areas.
9. You can pour the etchant back into the bottle (good idea) or dispose of it in accordance with your local ordinances.
10. The toner must be removed from the board before soldering. Use an abrasive pad, such as Scotchbrite, to clean the board. Rinse the board and dry.
11. The last step is to drill the holes. Use a 1/32" drill bit, preferably chucked in a drill press. You can also use a hand drill, but be prepared to break some bits.
12. Use the assembly drawing to install the components. The schematic references the proper values.

73 & Good Luck,
Bob – W3CD