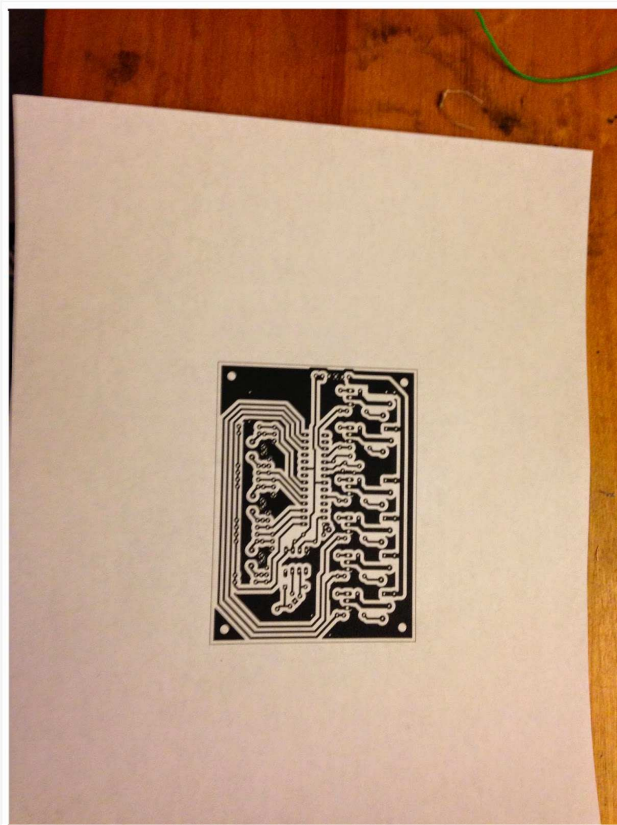


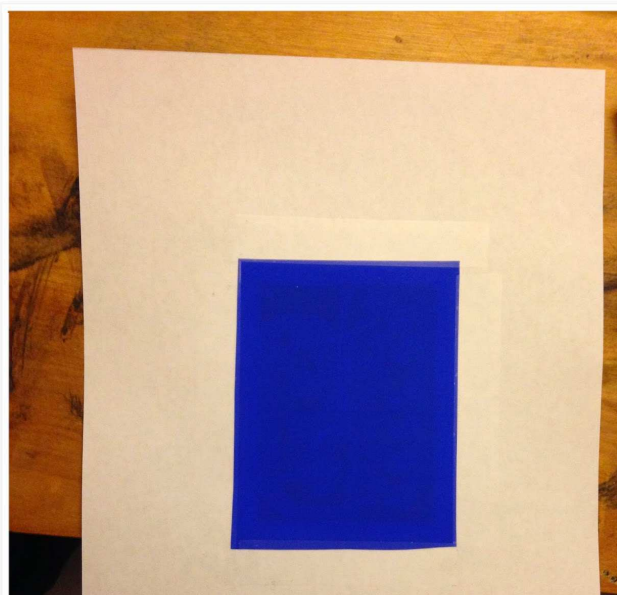
What I know about etching single sided PCB's

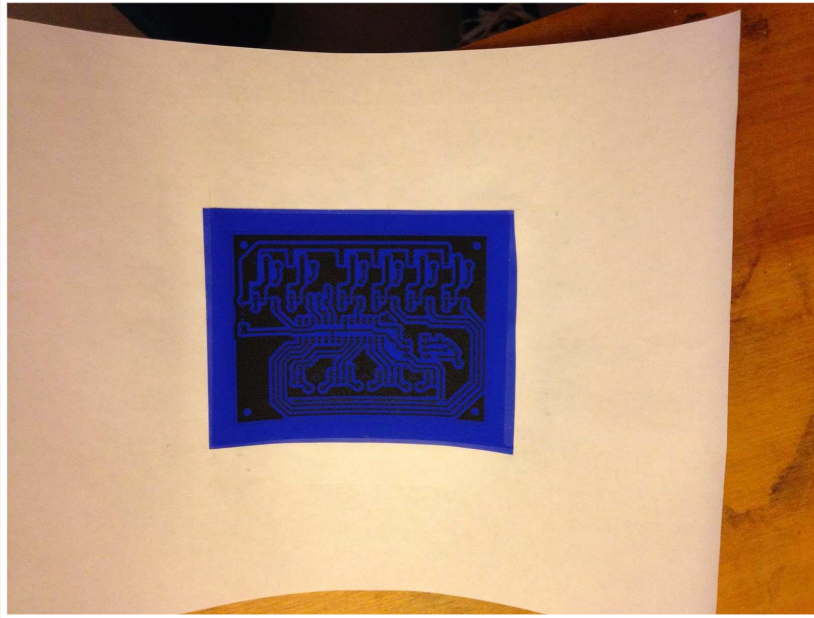
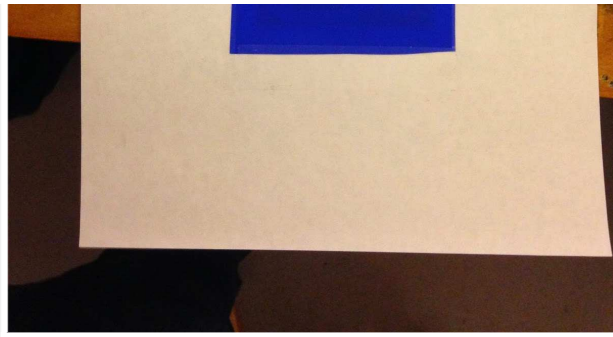
Because I get so many questions about my PCB etching technique, I decided to dedicate a post to what works best for me. I've divided my advice into a few different sections.

Designing the trace: There's a few things to consider while designing your PCB that will make the whole etching/transfer process more successful. Keep your traces nice and fat. I use Eagle Cad and I try to stick to .032" and above. You can certainly go smaller, but smaller traces are harder to repair if the transfer process results in an imperfect transfer (and it almost always does). Along the same lines, use large pads whenever possible. In Eagle, you can change global pad sizes with the "restring" parameter. Give yourself plenty of space between traces and if you use a "ground pour", make sure the isolation is around the width of a trace(.032").



Transfer medium: I use Press-n-Peel blue transfer sheets (search "press peel blue" on ebay). They are prices but I have yet to find anything which can transfer as well as they do. You will need a laser printer in order to print on them. Laser printers use a plastic toner which, when heated, can stick to the copper clad PCB board. Wash your hands with dish soap before working with the transfer. To save as much of the transfer paper as possible, print your design without the transfer paper, cut out a piece of the transfer paper slightly larger than the design, use scotch tape to adhere the transfer paper over your design, reload in printer and print again. cut out the Transfer as close to the design as possible, this is make it easier to place it on the copper. Touch the transfer as little as possible.





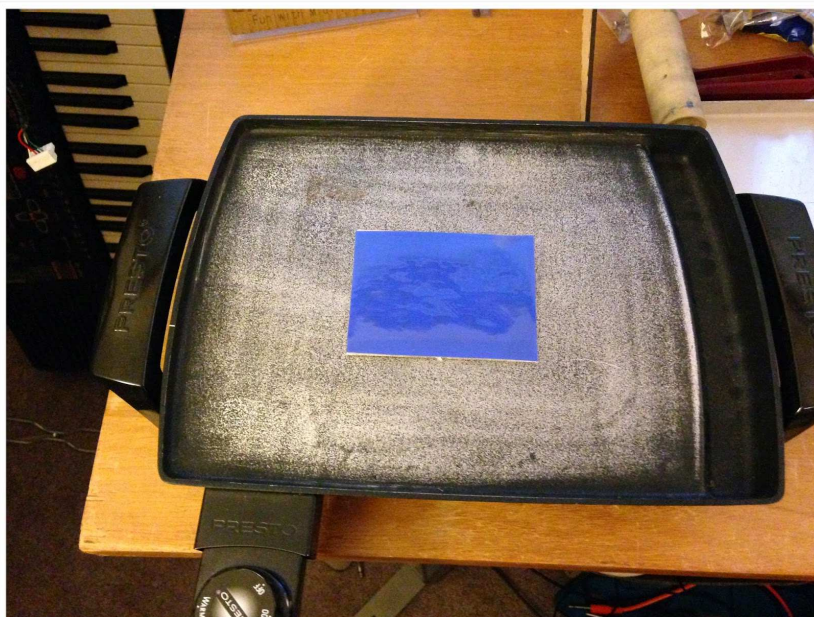
PCB material: I buy this stuff off ebay too. Look for single sided using keywords like "copper clad" or "PCB". If you want a flexible or more transparent PCB, try to find something around .030" or thinner. I always prepare the board with a green scowling pad, even if it already appears to be prepared. if you cut the PCB down to a smaller size, you're gonna want to make sure it doesn't have any raised edges, use a file to get rid of them. When my board is prepared, I wash it with dish soap to make sure the surface is grease free.





Heat Transfer Process: I use a griddle to do my transfers but you can use a Iron or whatever. The temperature is very important. I tend to set my griddle to around 270 degrees F. Unfortunately, the griddle is not a precision machine, so you may find that you need more or less heat. Too much heat will cause the transfer image to smear. So will to much pressure. I like to start with the griddle cool.

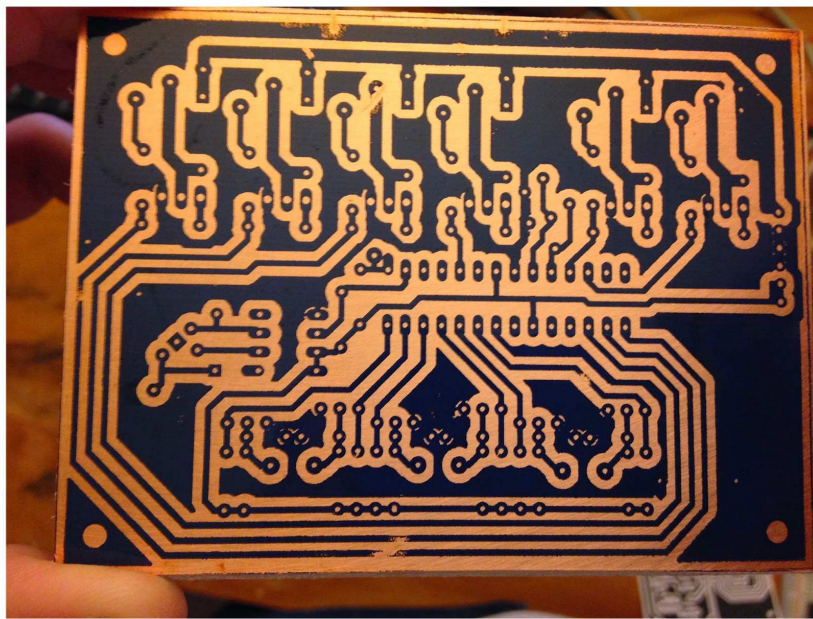
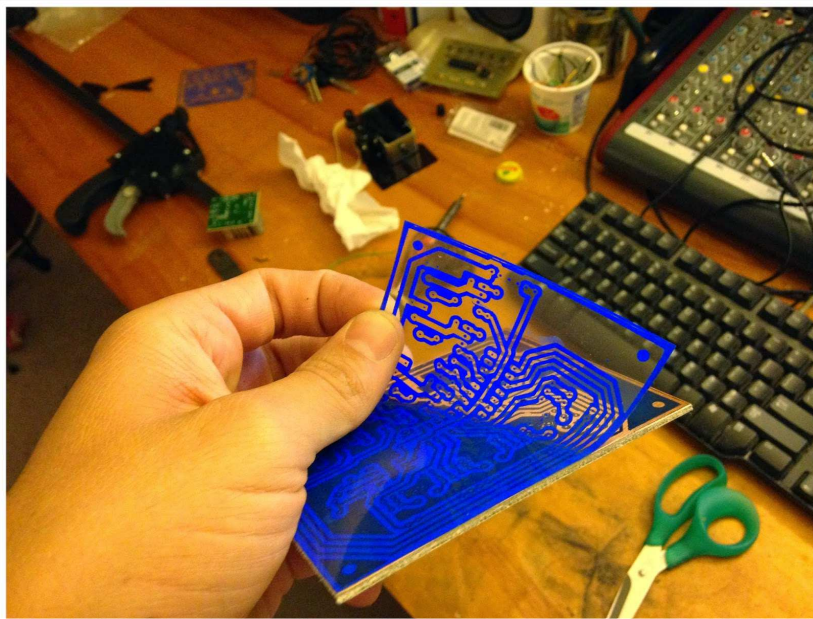
The transfer is plastic and can collect static, it's good to blow it off before you place it on the copper to clear away any dust that may have stuck to it. For my setup, I place the copper clad material face up on the griddle with the transfer paper face down on the board. Then I place a piece of aluminum over the board to apply pressure. Then I place a book (or a box) on top of that, something of appropriate weight for the amount of surface area the transfer has (I know that is vague but I guess some of this is from practice/intuition). Then I plug in the griddle and wait for the little warm up light to turn off. if you're using something with a heating element similar to a griddle, do your best to keep your material/transfer from being directly over the heating coil.



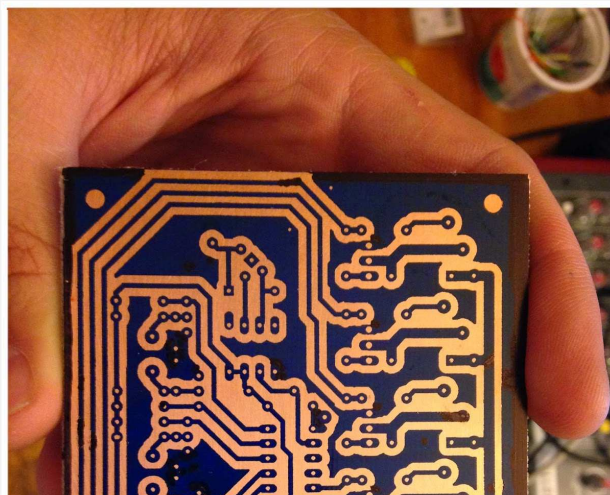


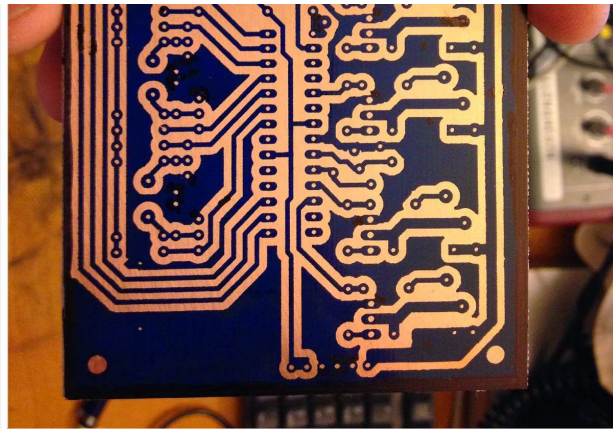
Moment of truth: After you are sure that the material has reached the right temperature, remove the aluminum/weight arrangement and check out your board. I have this nice little speedball print roller I can use to make sure the transfer has made full contact with the copper clad board. **DON'T PRESS TO HARD!** After you've done a few boards, you'll get a feel for how the transfer paper looks when it has made a full transfer. Turn off the griddle and use an oven mitt or something to remove the board. I like to cool my board by holding it to the window. When the board is cool, use your finger nail or something to start peeling back the transfer, anyplace where toner was, should be almost completely clear. If, as you are removing the transfer, you notice it has not fully transferred, you can stop and place it back on the heating element and try again.

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Making repairs: I've only had a few transfer go well enough to not need any touch ups. Use a very sharp(new) sharpie to touch up any places in which the image didn't completely transfer. This is where having nice large traces can come in handy. There were a few of bigger errors in this transfer because I wasn't careful about blowing the dust off the transfer when I placed it on the copper. If you get any smearing action, or just want to clear up a trace, you can use the tip of a screw driver (I use a dentist tool) to scratch away any excess toner.





Ferric Chloride Etching: You can buy ferric chloride at Radio Shack. You'll need a tub of some kind to do your etching. I use a piece of tupperware. Before placing the board in the tub with the ferric chloride, run it under some water and lightly rub/tap your thumb across the surface. This will break any surface tension on the board and allow the etchant to get into all the tiny holes and lines. Now place the board in the tub, pour enough Ferric Chloride to submerge the board. For the next 30 minutes, agitate the Ferric Chloride by gently rocking it back and forth, I use a pencil and make a "see saw." You can tell when the etching has finished when the board is completely transparent in all places not covered by the toner/transfer. Keep in mind that the edges etch before the center.



Cleaning: When your board has finished etching, pour the ferric chloride back into its container. You want as little ferric



Cleaning: When your board has finished etching, pour the ferric chloride back into its container. You want as little ferric chloride as possible to end up in the drain. I usually rub clean the board with a paper towel, then rinse it off with water. Now you need to remove the toner from the copper. I like to use acetone to do this.



There you have it! Ferric chloride seems to last for a really really long time. I've done more than 40 etches with mine and it still does the job (even though it's super dirty).