PCB Fabrication Procedure with Dry Laminate Photoresist

This is a procedure to fabricate a printed circuit board using the etching laboratory in BA7162. Proper precautions must be followed at all times as the lab contains some dangerous chemicals. A lab coat, gloves, and eye protection should be worn at all times. You should be familiar with all the Material Safety Data Sheet (MSDS) information for the chemicals you are using. Reserve time on equipment website.

Preparation

1. Prepare spray etcher:
    a. Attach water line to tap
    b. Turn tap on
    c. Plug in etcher
    d. Turn both switches on (heater takes about 30 minutes to heat up)

2. Prepare UV exposer:
    a. Check to make sure the glass is clean
    b. Check to make sure the photodetector at the back is properly situated (not fallen down)

3. Prepare laminator:
    a. Turn off main lights and turn on red lights
    b. Remove cover from laminator
    c. Turn on heating element, and let it heat up to around 200º F (about 10 minutes)

4. Prepare board:
    a. Cut board to desired size
    b. Put down some paper towels on the wet bench
    c. Lightly scrub the board with Ajax and water
    d. Rinse board and dry with Kim-Wipes and air gun

Lamination

5. Laminate board: (maximum board thickness is 3mm)
    a. Set speed dial of laminator to the 12 o'clock position (mid-point)
    b. Turn the laminator motor on and let run for a few seconds (5 to 10 seconds)
    c. Place board on tray and lightly push it forward to make sure it is accepted
    d. If the board stops moving, gently push it forward or pull laminate from the output
    e. Once the board has moved through, turn off laminate motor
    f. Cut the board free, using either the built in serrated edge or the scissors
    g. If you are finished with the laminator turn off the heater and let it cool down
    h. Once the heater has cooled (5 to 10 minutes) replace laminator cover

Exposing

6. Mask the board:
    a. Cut off excess laminate from the board, but make sure to leave a ½ inch border
    b. Place mask over board (it is best to put the ink side down)

c. Tape mask in place if necessary

7. Expose the board:
    a. Place masked board under glass
    b. Turn on main power and then the vacuum
    c. After vacuum has stabilized, set proper exposure (usually between 21 and 24)
    d. Close curtains
    e. Press the black start button to expose the board
    f. Do not look at light (metal halide lamp)
    g. Repeat for other side for double-sided etching

Developing

8. Develop exposed photoresist:
    a. Prepare a solution of Sodium Carbonate (17g per 1 litre of water)
    b. Remove protective film from the laminate on the side(s) that you want developed
    c. Place board in developing solution
    d. Periodically, gently rub the surface of the board to remove developed photoresist
    e. Developing time is generally between 5 to 10 minutes
    f. Once board is developed, the main lights can be turned on

Etching

9. Rinse board
    a. Gently rinse board with water to remove excess photoresist and developer

10. Etch board
    a. Place board on etcher holder and secure it with the cross bar
    b. Place holder in etching tank and close the lid **avoid breathing fumes when lid is open)**
    c. Set the etching time (between 30 sec. to a minute usually) and press the start button
    d. Once etching is finished, lift lid and dip the holder into rinse tank **careful, don't splash on floor or clothes, use big plastic tray on floor**
    e. Examine board and etch more if needed
    f. Turn of etcher when done. Disconnect waterline at sinc.

11. Remove photoresist
    a. Remove board from holder and rinse with water
    b. Remove any remaining protective film from the photoresist
    c. Place board in developing solution and let soak until all photoresist is removed
    d. Rinse with water and dry with air gun

Clean Up

12. Clean up entire lab
    a. Wipe down the etcher and surrounding floor to clean up any spilled ferric chloride
    b. Thoroughly wash and dry any dishes that were used and put them back in their place
    c. Wash down the wet bench and dry with paper towels
    d. Clean up the other areas of the lab, i.e., throw out any cut laminate, wipe up any spilled

sodium carbonate, etc.

e. Generally tidy up lab by putting things back into there proper place
f. Hang up lab coats
g. Check power off on spray etcher, UV-expose

13. Privileges to use the etching lab may be lost if a proper clean up is not done!