

ELNC236 -MG Method for Printed Circuit Board Processing

Note: Safety Glasses (goggles) and Disposable Nitrile Gloves & Lab Coat must be worn at all times when working with chemicals. The board will be destroyed if it is subjected to prolonged exposure of the light from a fluorescent fixture, or a white incandescent light, prior to using the positive artwork with the Kepro Exposure Frame.

Objective: To create a printed circuit board using the M.G. Chemical positive photofabrication process

Materials:

- 1 - M.G. Chemicals Cat #630 8" x 10" presensitized copper clad board
- 1 - 1000 ml beaker
- 1 - 100 ml beaker
- 1 - glass tray
- 1 - foam paint brush
- 1 - Kepro Ultra -Violet Exposure Frame
- 1 - M.G. Developer, mixed 10:1 (750-ml water to 75-ml M.G. Developer)
- 1 - sink/tap water rinse
- 1 - printed circuit board artwork positive
- 1 - Kepro circuit board shear
- 1 - Kepro Etcher (Sodium Persulfate)

Procedure:

Start-Up

Acquire the artwork positive from your instructor. Place paper towel on the bench where you will work. This will protect the surrounding work area from possible developer and water splash. Set the glass tray on the paper. Wearing a **lab coat, hand and eye protection** mix the - M.G. Developer, 10:1 (750-ml water to 75-ml M.G. Developer) in the glass tray (developer first then water). Carefully place the tray with the M.G. Developer on the hot plate to warm (if necessary) the chemical in order to speed up the developing time. Turn on the Kepro Etcher to allow the sodium persulfate to warm up.

Exposure

Remove your board from the protective package. Just prior to exposure, starting at the uncut corner of the board, carefully remove the white protective sheeting from the presensitized copper clad board. Avoid contact with the presensitized coating (photoresist) on the board.

Open the Kepro Ultra -Violet Exposure Frame (clean glass if required) and place the printed circuit board artwork positive centered on the Kepro Exposure Frame. The lettering on the mask should appear backwards when the mask is positioned on the exposure frame. The controls on the exposure frame should be set to five lamps, timer mode.

Place the presensitized copper clad board, photo resist (green) side down on the artwork positive using the alignment guides that appear on the artwork positive. Close and secure the exposure frame. Turn the timer dial on the exposure frame past the one-minute mark and back to the one-minute mark and release the timer control. This will expose the circuit board through the artwork positive for approximately one minute. The timer will zero and a bell will ring telling you that the exposure is complete. Open the exposure frame and carefully remove the exposed circuit board and the artwork positive.

Development

Develop the exposed board by immersing it copper (green) side up in the M.G. Developer. Lightly brush the photo resist on the exposed board with a foam brush and you will see the circuit image appear. Continue lightly brushing the board until the photoresist is removed and the printed circuit layout is clear and well defined. If you scrub the board too hard you will remove the printed circuit board pattern. The development process removes the photoresist, which was exposed through the artwork positive to the ultraviolet light from the Kepro Exposure Frame. If you over develop the board all of the circuit pattern will be removed from the copper surface. Immediately neutralize the development action by rinsing the board with water. Inspect the printed circuit pattern for flaws. Allow the board to dry and touch up with a photo resist pen, if required.

Safety Glasses (goggles) and Disposable Nitrile Gloves & Lab Coat must be worn at all times when working with chemicals.

Etching

Turn off the etcher, open the glass lid and remove the circuit board support. Place the developed circuit board(s) in the circuit board support and return the support with the board attached, into the etcher. Close the lid on the etcher and turn it on. Set the timer on the etcher for one complete cycle (fully clockwise). Turn off the etcher approximately every two minutes to check to see how much copper has been removed from the circuit board. Remove the printed circuit board from the etcher when you can see the printed circuit layout is clean and well defined.

Note: If you leave the circuit board in the etcher too long it will remove all of the copper from the board. Etching time will vary with the concentration and temperature of the etchant.

Rinse the circuit board in warm water to remove all traces of the sodium persulfate. Allow the printed circuit board to thoroughly dry so that it may be machined (sheared, filed, & drilled). Do not remove the remaining resist protecting your circuit or image, it protects the copper (printed circuit pattern) from oxidation. Removal of the resist is not necessary when soldering components to your board. When soldering, the heat disintegrates the resist underneath the solder resulting in an excellent bond. Clean up your work station and put all chemicals and equipment away.