



ELECTRONIC WORKSHOP & PCB LAB
MANUAL
(NEC-352)

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ENGINEERING**

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INTRODUCTION

Electronics have an exponentially growing influence on our lives. Most of the things used by an individual in day to day life include the contribution of electronics to some extent. PCB's have definitely contributed in a significant manner as a means of interconnection of various electronic components. The field of PCB designing is a mutual contribution of a wide range of various other fields. For example, the knowledge of mechanics, chemistry and electronics design, production and process management is an essential need for the construction of any particular PCB. The PCB is widely used in the fabrication of electronics as well as electrical circuits since they provide a base for the connections amongst various components used in that particular circuit.

The PCB based circuits are highly reliable as they consist of fewer inter-connection wires. The testing and repairing of components are a lot easier in these (PCB based) circuits.

What is Printed circuit board (PCB)?

Printed circuit boards are dielectric substrates with metallic circuitry photochemically formed upon that substrate. There are three major classifications:

- 1- Single sided boards
- 2- Double sided boards
- 3- Multi layer boards

LIST OF EQUIPMENTS

S.NO	Description
1	Proto-Contact – PCB Artwork Film Maker
2	Protocure –2 / PCB Curing Machine (Oven)
3	Photo Resist Dip Coating Machine
4	Double Sided U.V. Exposure Unit (Proto-UV)
5	Proto-Etch Etching Machine
6	PCB Drilling Machine (Protodrill-3000)
7	PCB Shearing Machine
8	Roller Tinning Machine
9	Proto- Dye / Developer (2 in 1 Unit)
10	Chemicals for the above Machines as per your quotation
11	PCB Design facility PCB Drafting Aids Kit Artwork Table (Illuminated)
12	Winding Machine

DETAILS OF EQUIPMENTS

PROTO-CONTACT-PCB Art Work Film Maker



- A table top unit which serves as a negative making contact printer as well as illuminated art work table for circuit art work, taping and inspection of Film and Negatives.
- User can directly make negative from 1× scale art work.
- Working area : 300mm×250mm (12"×10") with diffused light.
- Push button operated exposure.
- Dimension : 380mm×230mm×330mm.
- 230V/50Hz, 5A Socket required.

PCB DRILLING MACHINE



- A Compact tabletop high speed drilling machine.
- Drill holding by precision chuck with lapped jaws.
- Mains operated DC motor - direct drive (no belt and pulley).
- Motor Speed : up to 20,000 RPM.
- Range : 0.6 to 3.0mm. Metal base.
- Three step speed control and Illumination of work area.
- Working area : 280mm×170mm
- 230V/ 50Hz, 5A Socket required

ROLLER TINNING MACHINE



- Table top unit for tin/solder coating of PCB's. This coating also improves the solderability of the PCB
- A hand operated flywheel allows easy coating of boards
- Maximum PCB width :250mm (10").
- Maximum PCB thickness : 6mm.
- Solder bath capacity : 5Kg.
- Heaters : 2×500Watts.
- Rollers : Silicon coated
- Roller revolution : Gear fly wheel drive.
- Bearing : Teflon
- Electrical power : 230V/50Hz, 5A Socket required.

PHOTO RESIST DIP COATING MACHINE



- The Machine is tabletop and compact.
- A single operation unit designed for coating of laminates with Photoresist.
- The machine ensure uniform controlled thickness of Photoresist on copper clad.
- Maximum Board size : 250mm x 300mm (10" x 12").
- Tank Capacity : 2 liters.
- Dips one PCB at a time.
- Electrical power : 230V/50Hz, 5A Socket required.

PROTO-ETCH ETCHING MACHINE



- Fast single and double sided PCB etching.
- Useful etching area : 250mm×300mm (10"×12").
- All construction material are corrosion free.
- Tank Capacity : 20 Liters includes heater and air flow compressor
- Heater : Titanium-non corrosive with thermostate controls.
- Timer : 0-4.0 Minutes.
- Electric Power : 250V/50Hz, 15 A socket required.

PROTO-CURE BAKING & CURING OVEN



- Table top unit for curing of liquid photo resist.
- Timer controlled heating system allows fast and efficient curing.
- Complete metal construction
- PCB size : 250mm×300mm(10"×12").
- Heating : Finned heaters with thermostate controls.
- Fan : For air circulation.
- Timer : Preset timer.
- Electric Power : 250V/50Hz, 15 A socket required.

PCB SHEARING MACHINE



- Bench top guillotine type shearing machine to cut PCB's and laminates.
- Compact structure.
- Central handle allows ease of cutting.
- Width : 300mm (12").
- Size : 400mm×350mm.

DOUBLE SIDED U. V. EXPOSURE UNIT



- Table top double sided exposing unit for high resolution exposure of PCB's.
- Maximum size : 255mm×300mm (10"×12").
- U.V. tubes : 2×4 (8Watts) actinic tubes with single/double side option.
- Chocks : Electronic type.
- Timer : Provided
- Electrical power : 230V - 50Hz, 5A socket required.

PCB DRAFTING KIT & ILLUMINATED ARTWORK TABLE



The PCB Drafting Kit includes Various tapes, pad and other material for making PCB Artworks.

Area for work : 500 mm x 600 mm (20" x 24")

PROTO-DYE/DEVELOPER



- Table unit which gives convenience of dying and developing PCB laminates both in one machine.
- Diaphragm pump agitates the developing solution chamber.
- Maximum PCB size : 250mm×300mm (10"×12").
- Tank capacity : 2 Liters for developer solution
2 Liters for dye solution.
- Air pump : Diaphragm type compressor pump.
- Mechanical timer : 0-4 min. To operate air pump.

DELIVERABLES

• CHEMICALS FOR THE PCB LAB MACHINES

• Board Preparation & Cleaning:

- Single Sided PCB Laminate Nos 10
- Paper Phenolic 300x 300mm (1 x 1 feet)

• For Dark Room:

- Safe Lamp Unit 1
- Lith Film 250 x 300mm (10 x 12") Nos 10
- Lith Film Developer A&B (5 Ltrs) Pkt 1
- Lith Film Fixer Bottle 1
- Developing Trays Nos 3

• For Photoresist Dip Coating Machine:

- Liquid Photoresist Litres 2
- Photoresist Thinner Litre 1
- Photoresist Developer Litre 5
- Photoresist Dye Litre 5
- Jars Nos 2

• For Etching Machine:

- Etching Crystals Kgs 10

• For PCB Drilling Machine:

- Drill Bits
- 0.80mm Nos 10
- 1.00mm Nos 10

• For Roller Tin Machine

- Solder 63:37 Kgs 5
- Roll Salt Kgs 2
- Flow Coat Litres ½

• PCB Drafting Aids Kit:

- Tapes, pad and other materials for making PCB Artworks for making PCBs.

DIFFERENT TYPES OF PCB LAYOUTS

