Introduction to PCB

by

So what is PCB?

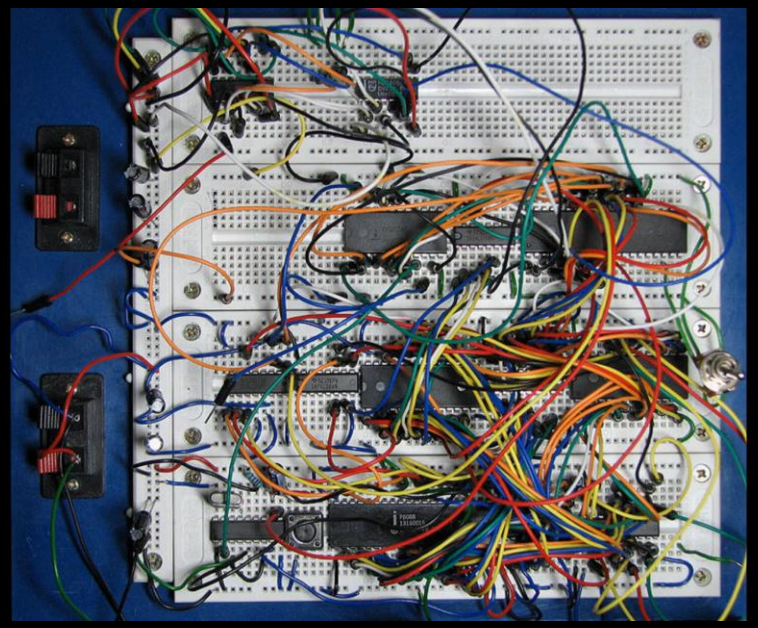
A printed circuit board, or **PCB**, is used to **mechanically support** and **electrically connect electronic components** using conductive pathways, tracks or signal traces etched from copper sheets laminated onto a non-conductive substrate.

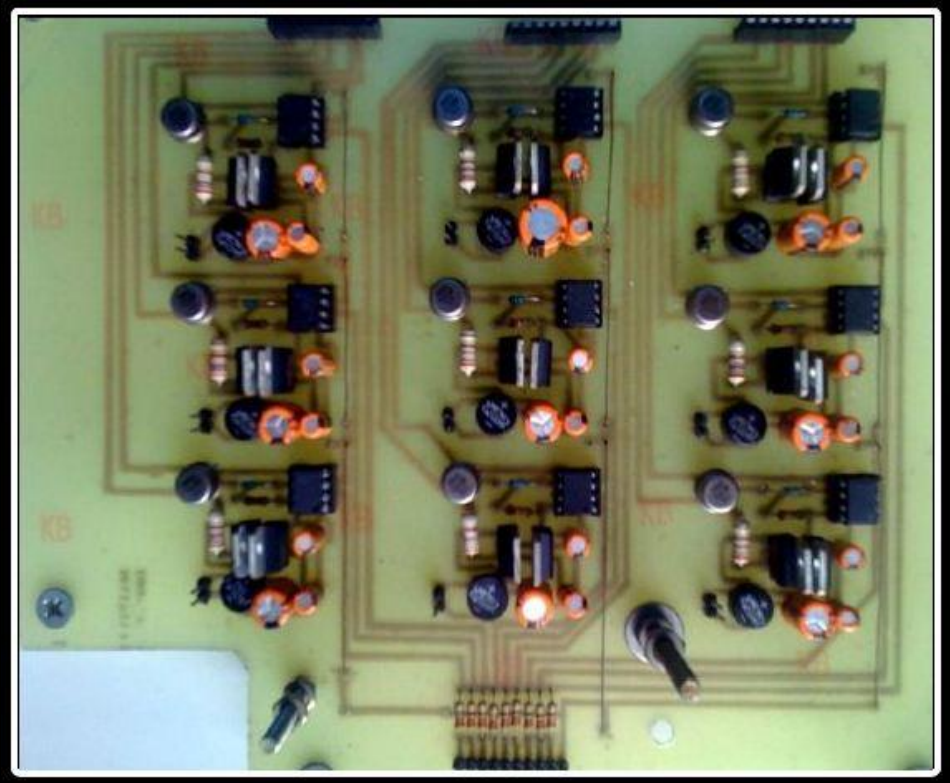
To fabricate a circuit we already have….

Solderless BreadBoard

Then why use PCB?

Comparison between bread board and PCB

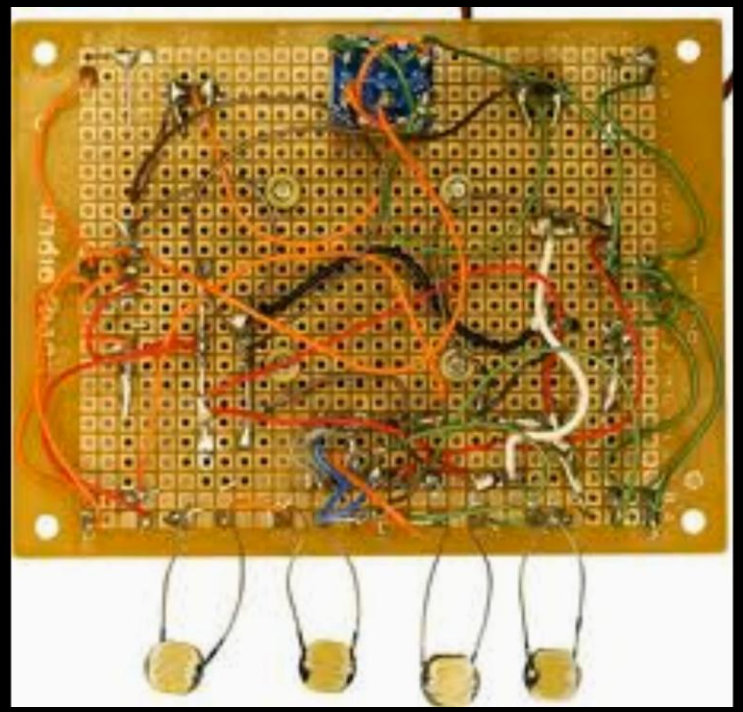




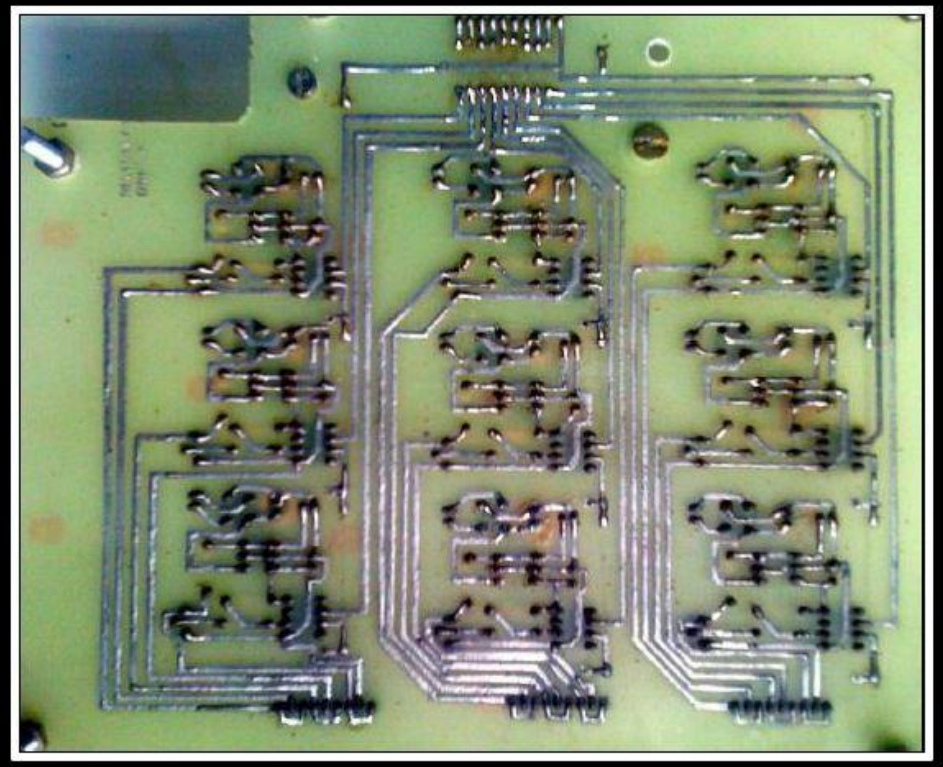
SINGLE LAYERED PCB(BOTTOM)

Comparison between dot board and PCB

Messy dot board



Neat PCB

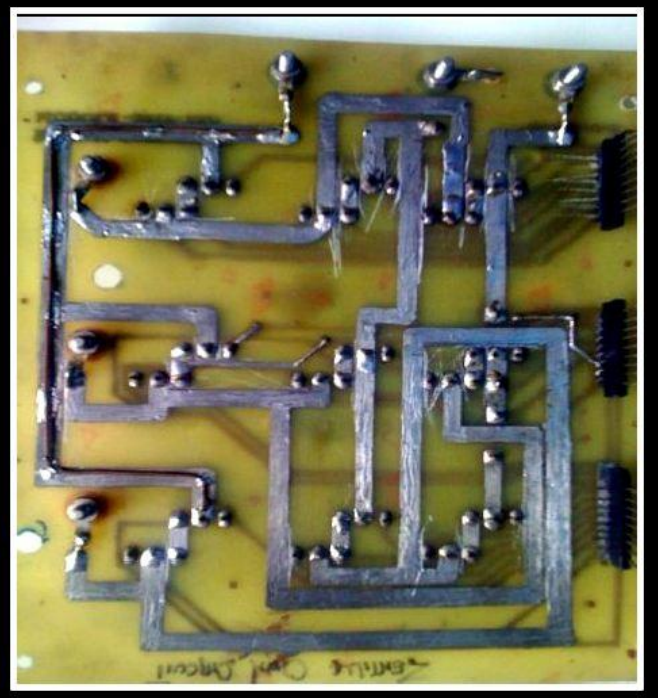


SINGLE LAYER PCB(BOTTOM)

Between Strip board and PCB

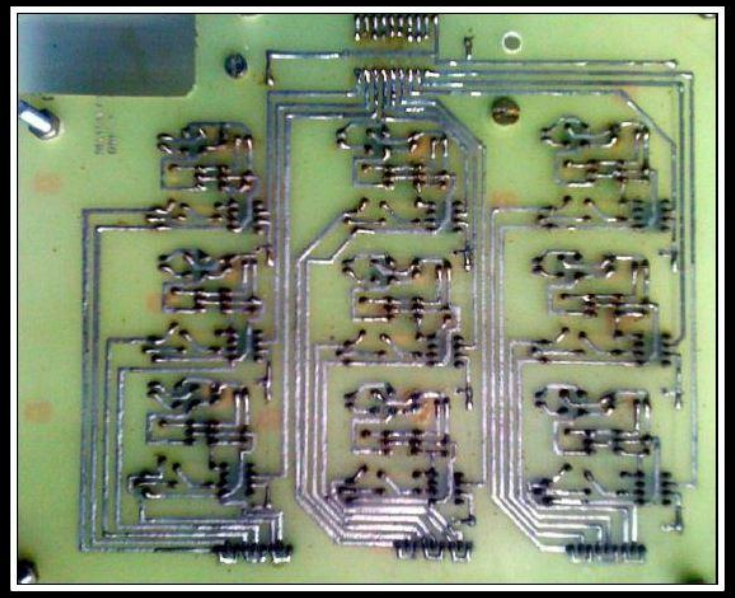
Strip board

PCB



DOUBLE LAYER PCB(BOTTOM)

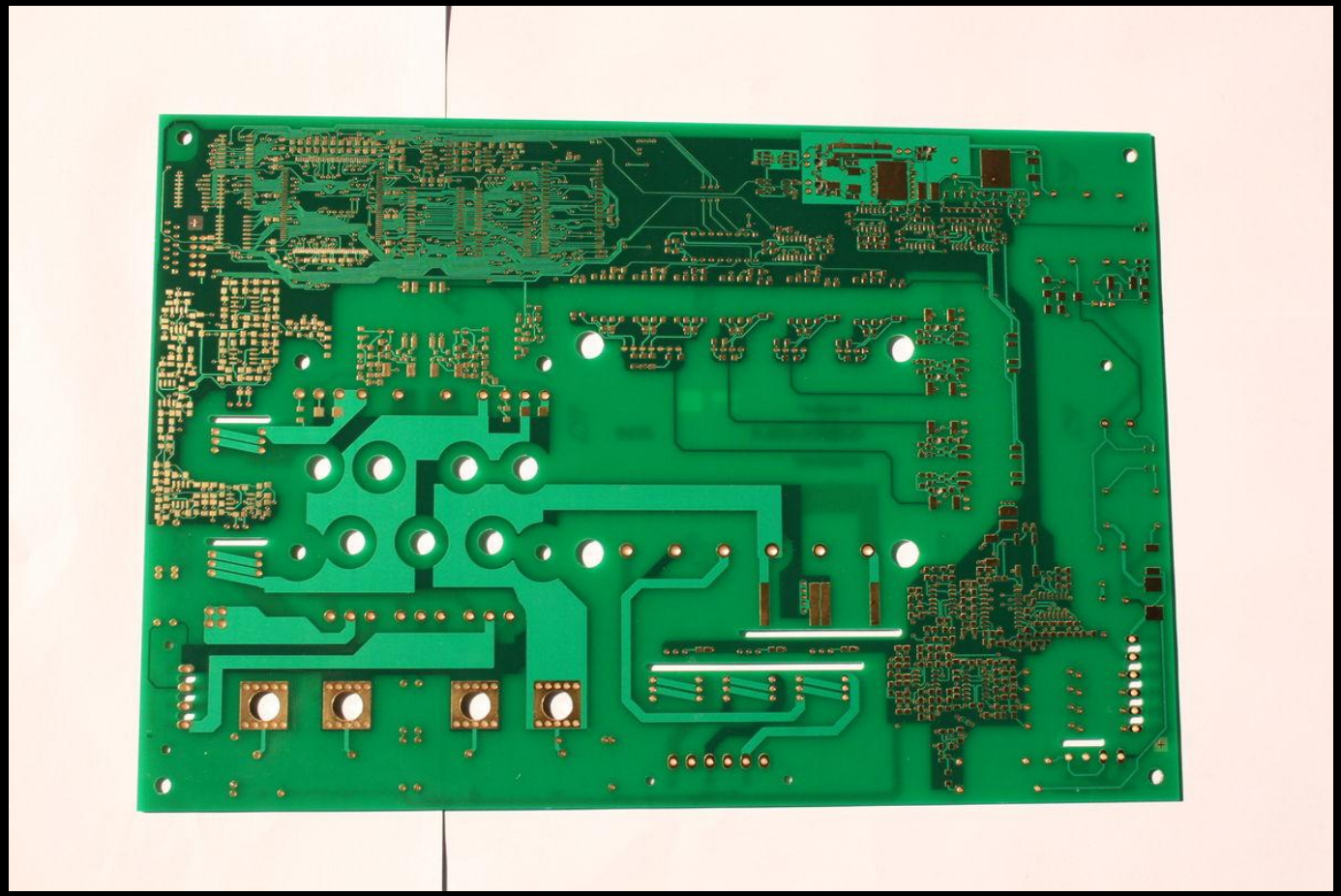
Can we make



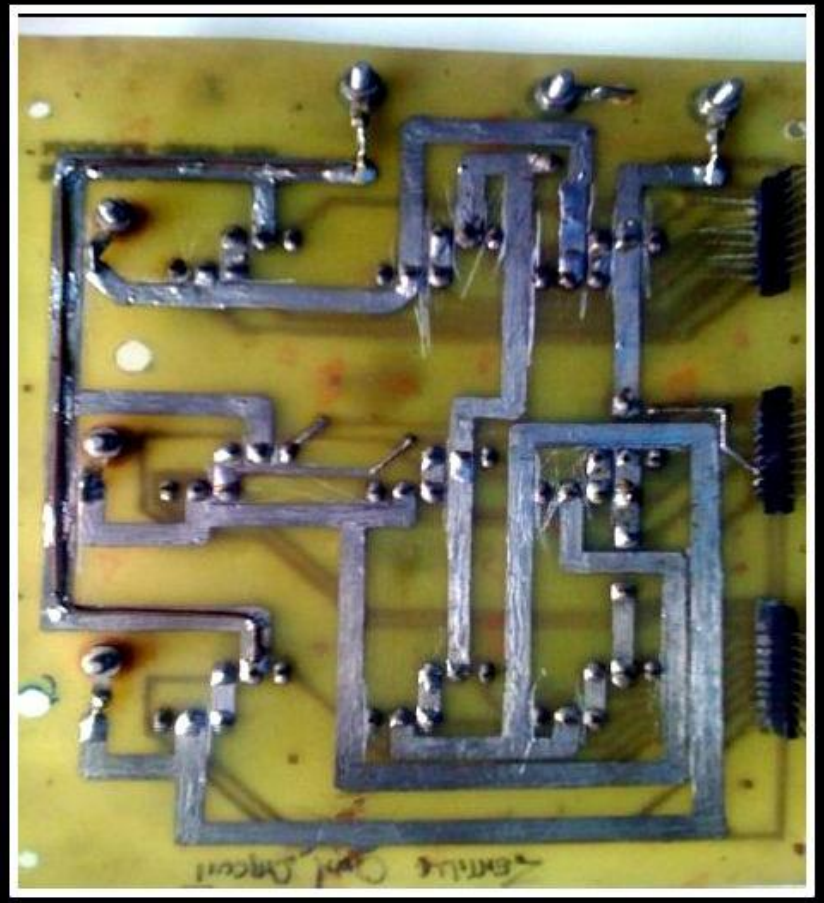
SINGLE LAYER PCB(BOTTOM)

at home?

Of course! But do not expect it to be like



It will be like



You will need the following …

- Copper clad board
- Hacksaw
- Circuit Printout
- Sandpaper
- Iron-box
- Marker and scale
- Water
- Soldering rod and tin

Key Steps in Fabrication

- Circuit Design
- PCB Cutting & Ironing
- Etching
- Drilling & Tinning
- Soldering & Debugging

Circuit Design

Why you need a PCB design software?

- They provide the exact dimensions of the components.
- Auto-routing is available.

We shall be using Easily Applicable Graphical Layout Editor (EAGLE) Software.

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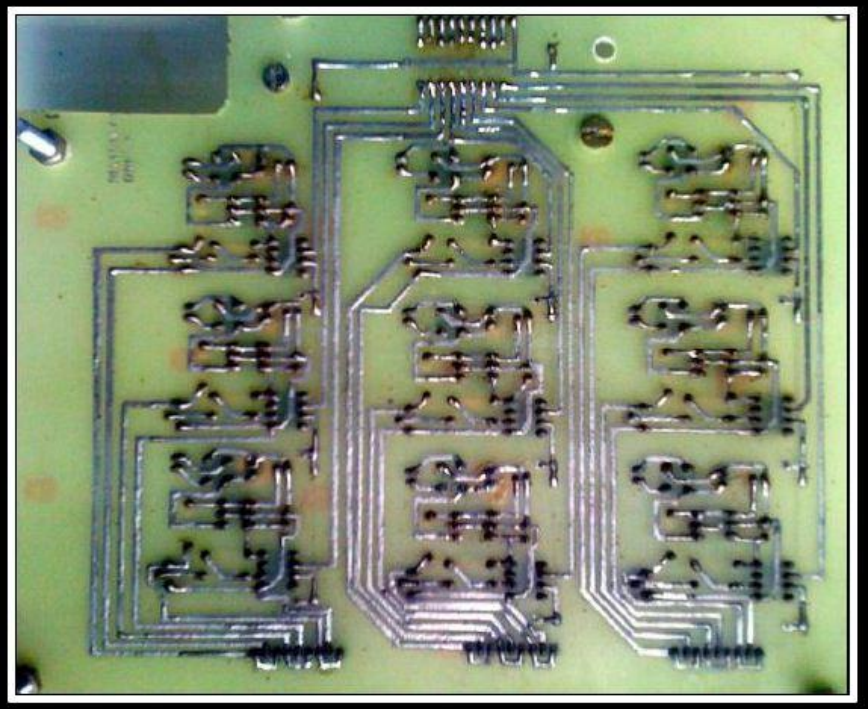

SINGLE LAYER PCB(BOTTOM)

TONER TRANSFER METHOD

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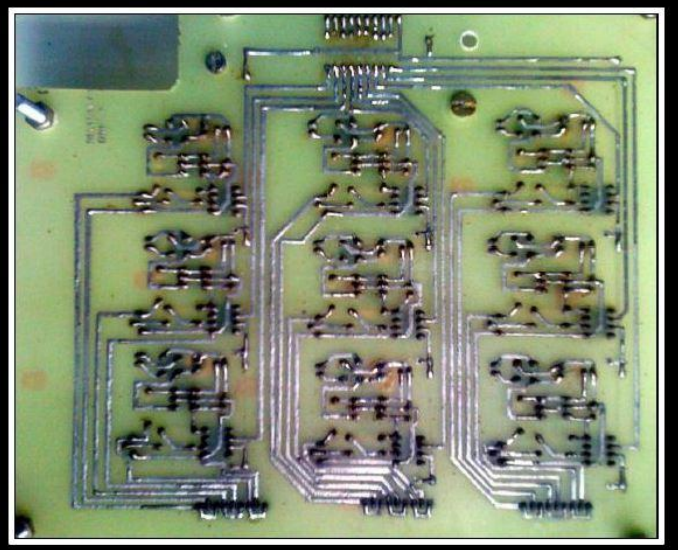
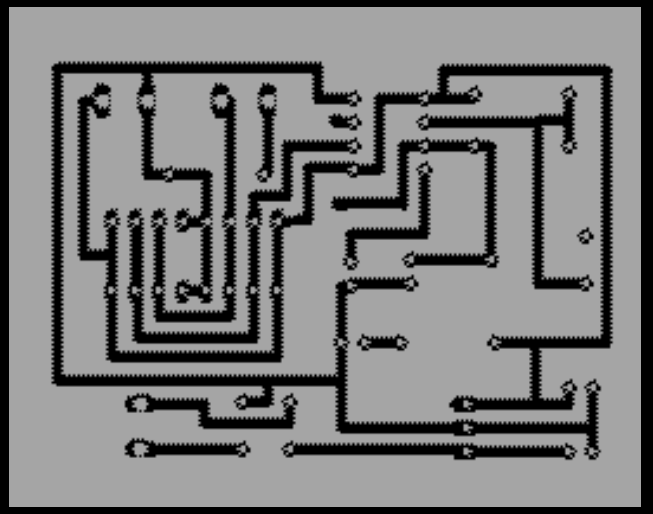


SINGLE LAYER PCB(BOTTOM)



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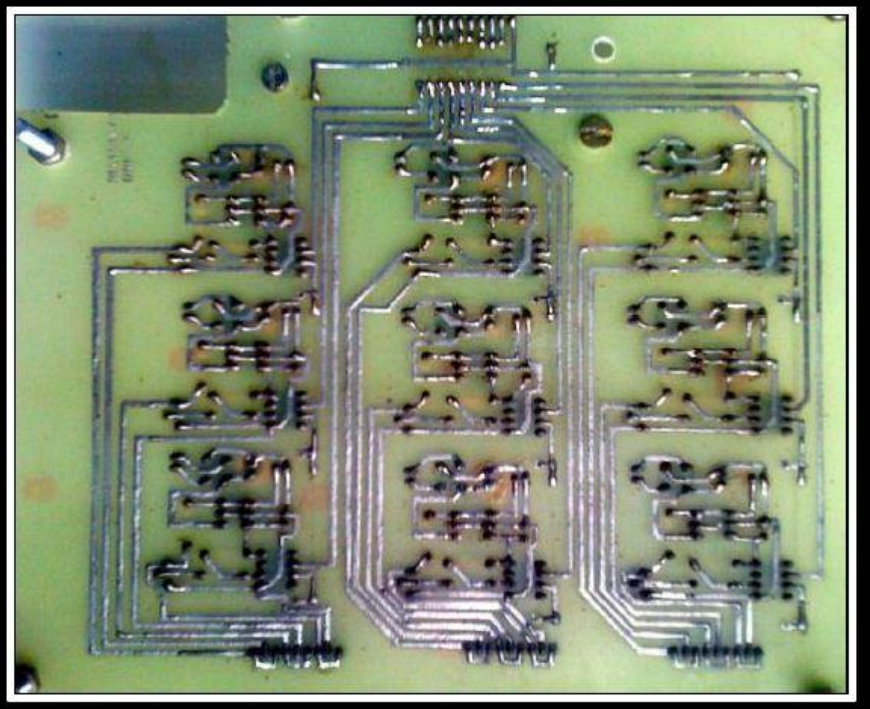

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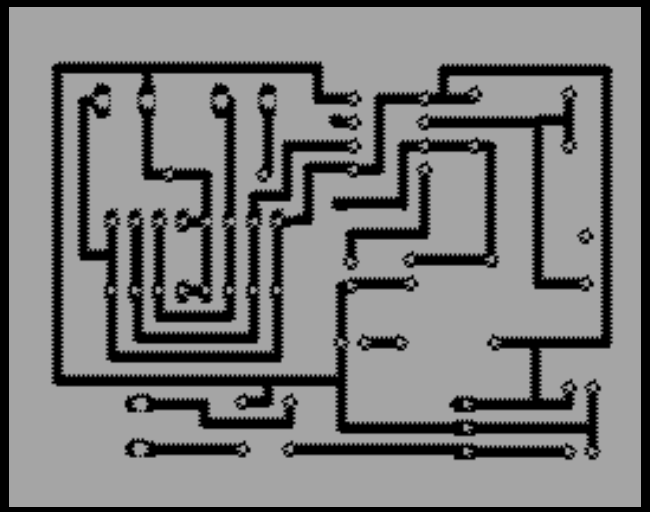

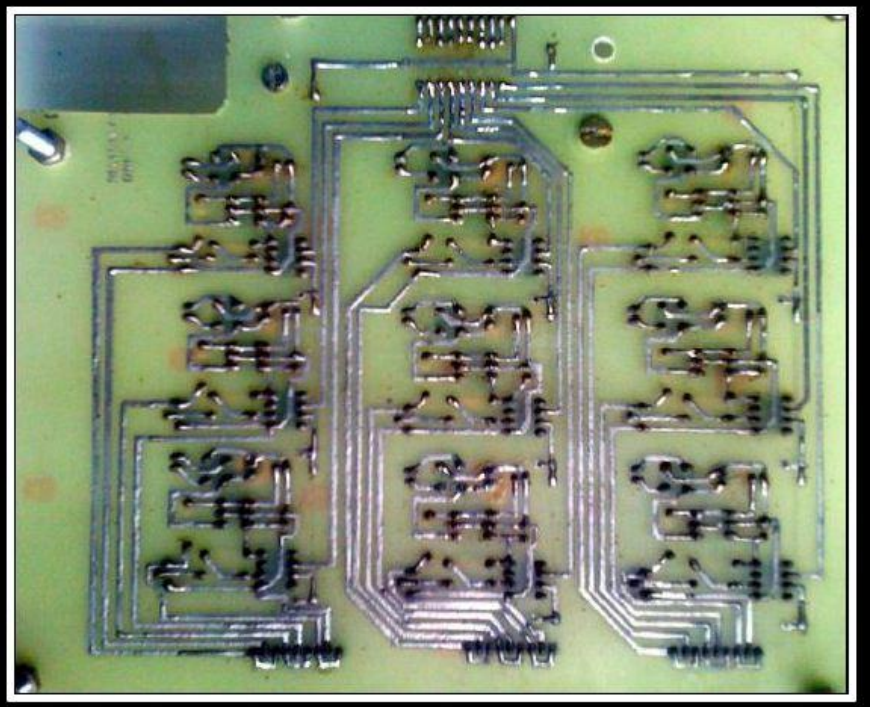

SINGLE LAYER PCB(BOTTOM)

Before ironing

- Clean the surface
- Two methods
  - manual
  - chemical

Ironing

- Duration 3-5 minutes

- Settings

Do Ironing till.....

Let the PCB cool down!

- Air cooling –10 minutes

- Peeling off of the paper slowly(use water for better results)

Use Permanent marker

Etching

The chemistry behind the process is

$$Cu + H_2O_2 + 2HCl \longrightarrow CuCl_2 + 2H_2O$$

Drilling

Drilling tools

- Motorized Drill
- Hand Drill

Drill bits

- 0.8 mm
- 1mm

Tinning

Prevents oxidation and Improves the conductivity

Soldering & Debugging

Solder the components.

Caution: Avoid overheating. It damages the component and the tracks.

Summary

- Circuit Design
- Cutting & Ironing
- Etching
- Tinning
- Soldering & Debugging