

PCB Design Basics

By

Vicky B

What is PCB?

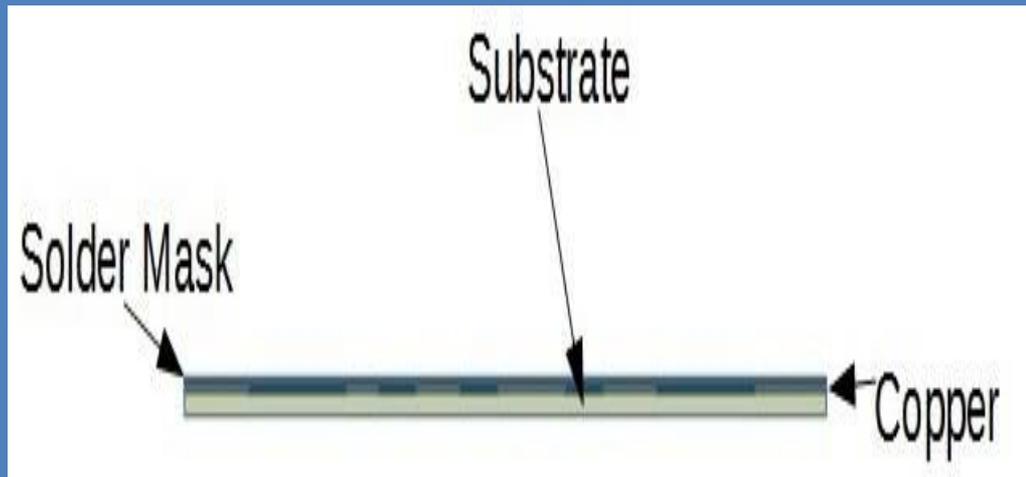
A printed circuit board (PCB) mechanically supports and electrically connects electronic components using conductive tracks, pads and other features etched from copper sheets laminated onto a non-conductive substrate (FR-4).

Types of PCB

- Single sided PCBs
- Double sided PCBs
- Multi-layered PCBs

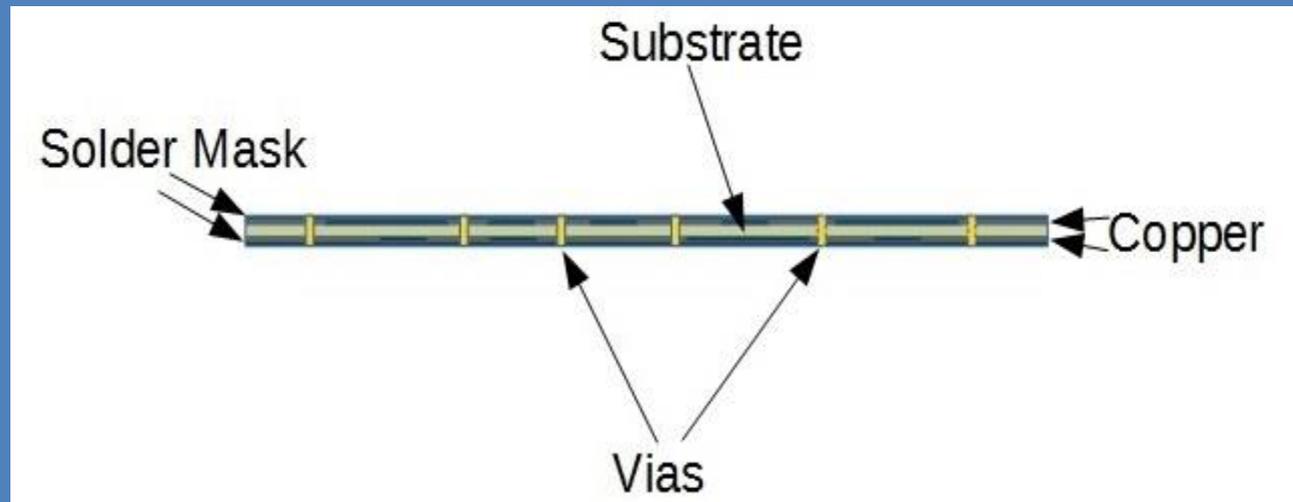
Single-sided PCBs

Single sided PCBs are the most basic type of PCB. They contain only one conductive layer and as such constrict their use to simple low density designs



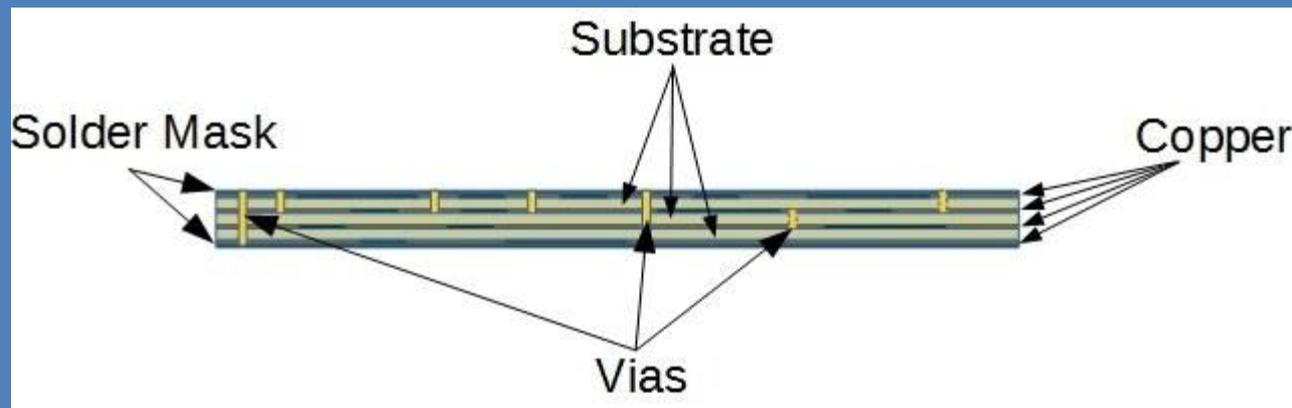
Double-sided PCB

Double sided PCBs probably are the most common type PCB. They allow for the routing of traces around each other by jumping between a top and bottom layer by way of vias



Multilayer PCBs

Multilayer PCBs further increases the complexity and density of PCB designs by adding additional layers beyond the top and bottom layers seen in a double sided configuration.

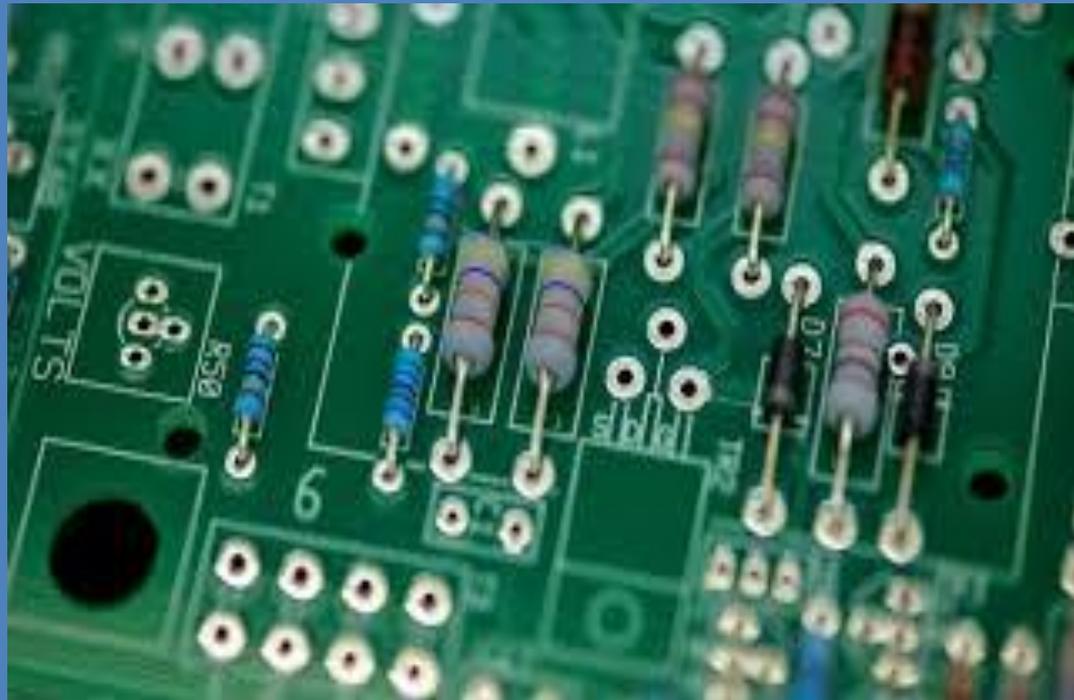


Mounting Techniques

- Through-Hole Mounting (THM)
- Surface Mount Technology (SMT)

Through-Hole Mounting (THM)

Through-hole mounting is the process by which component leads are placed into drilled holes on a bare PCB.



THM vs SMT

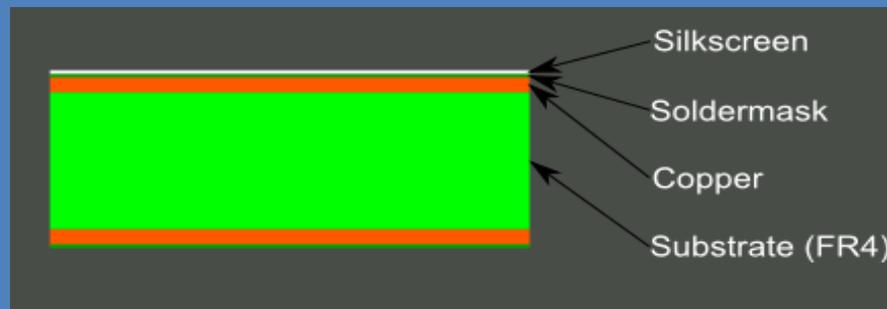
- SMT does not require holes to be drilled through a PCB.
- SMT components are much smaller.
- SMT components can be mounted on both sides of the board.

Elements involved in PCB Design

Pad: The portion of the conductive pattern on printed circuit board designated for the mounting or attachment of component pins or legs.

Pitch: The center to center spacing between 2 adjacent pins.

Thermal spoke: It is used to connect pins to a positive copper area, to dissipate heat.



Anti Pad: It is used to create some clearance from the surrounding area.

Silk-screen: A legend printing of epoxy ink used for component identification.

Solder mask: A coating applied over selected areas of the circuit board thereby permitting soldering only of the exposed areas, usually only the pads.

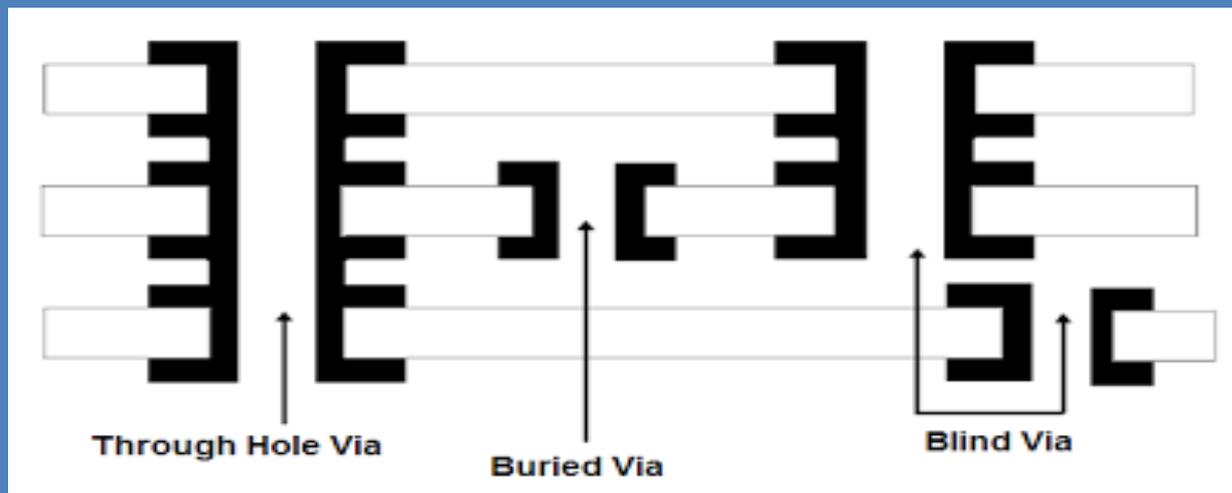
Paste mask: A coating over the pins of SMD components for assembly purpose. Through hole components does not require paste mask.

Via and its Types

Through hole via has a path to both external layers.

Buried via grants connection within inner layers, it has no path to the external layers.

Blind via does not cross through the entire board, and has a path to only one external layer.



Measurements

1 mils = 0.001 inch

1 inch = 1000 mils

1 mils = 0.0254 mm

1 mm = 39.37 mils

1 inch = 2.54 cm

1 cm = 10 mm

Thank You

By

Vicky B