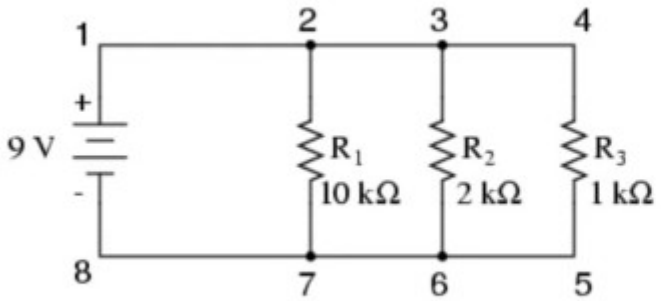
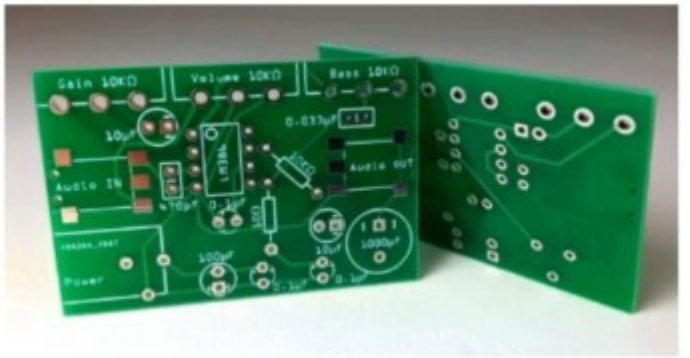
# PCB

# WHAT IS PCB

- **P**rinted **C**ircuit **B**oard



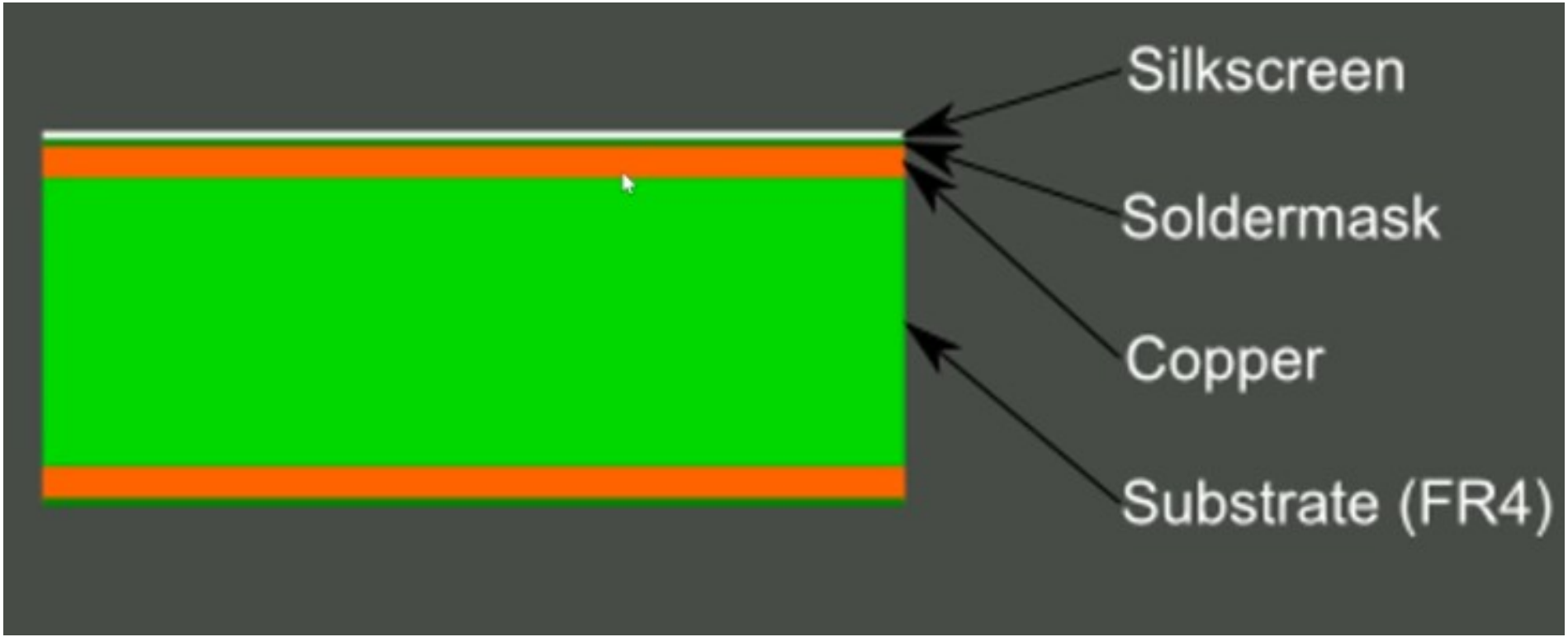



- Best way to materialize and manufacture a circuit

# PCB Design Process

- Schematic capture
- Preparing the schematic for layout
  - Attaching package symbols (footprints)
  - Creating a netlist
- Layout / Routing
- Prepare for manufacure
  - Generating artwork (Gerber files) and drill files
  - Submitting PCB files for fabrication check

# Basic Board Structure



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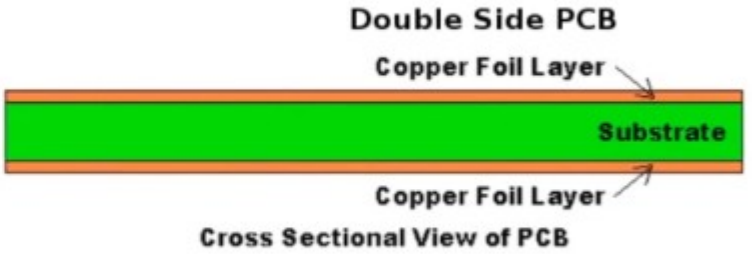
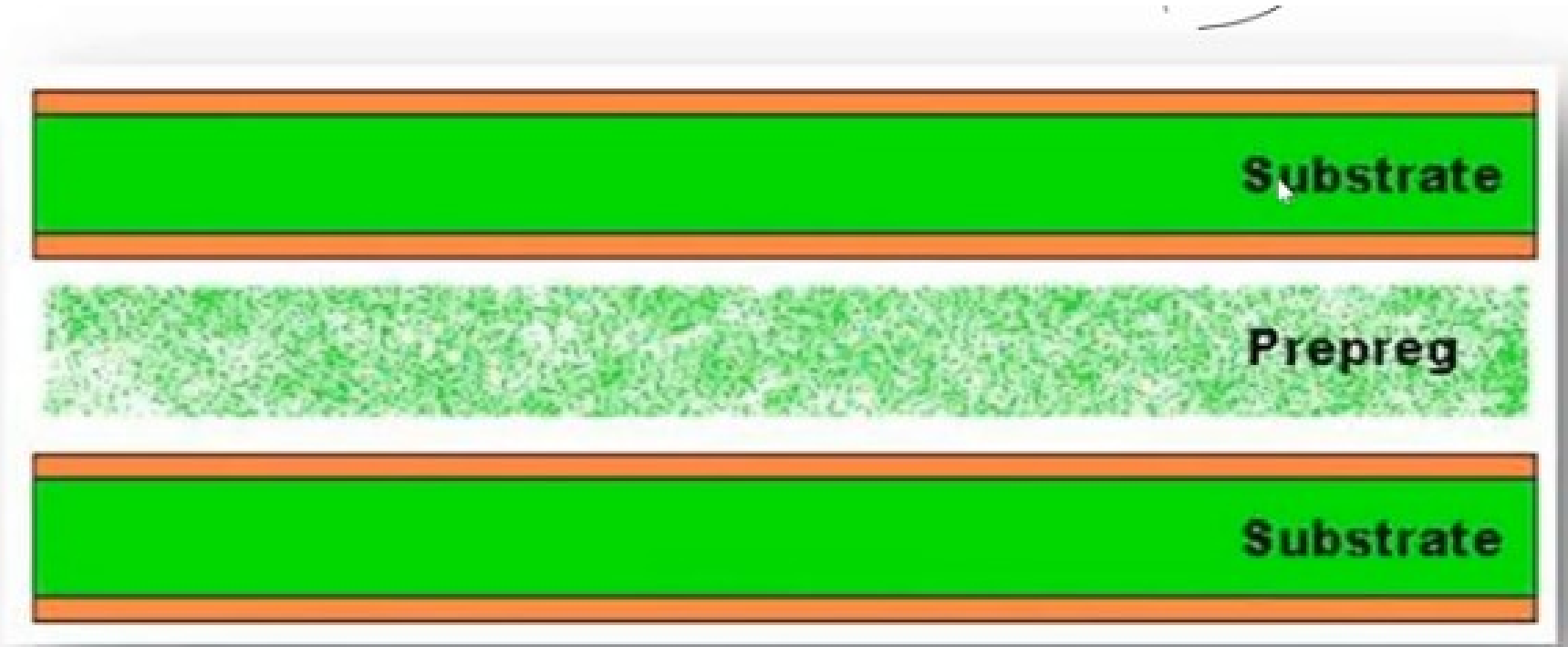


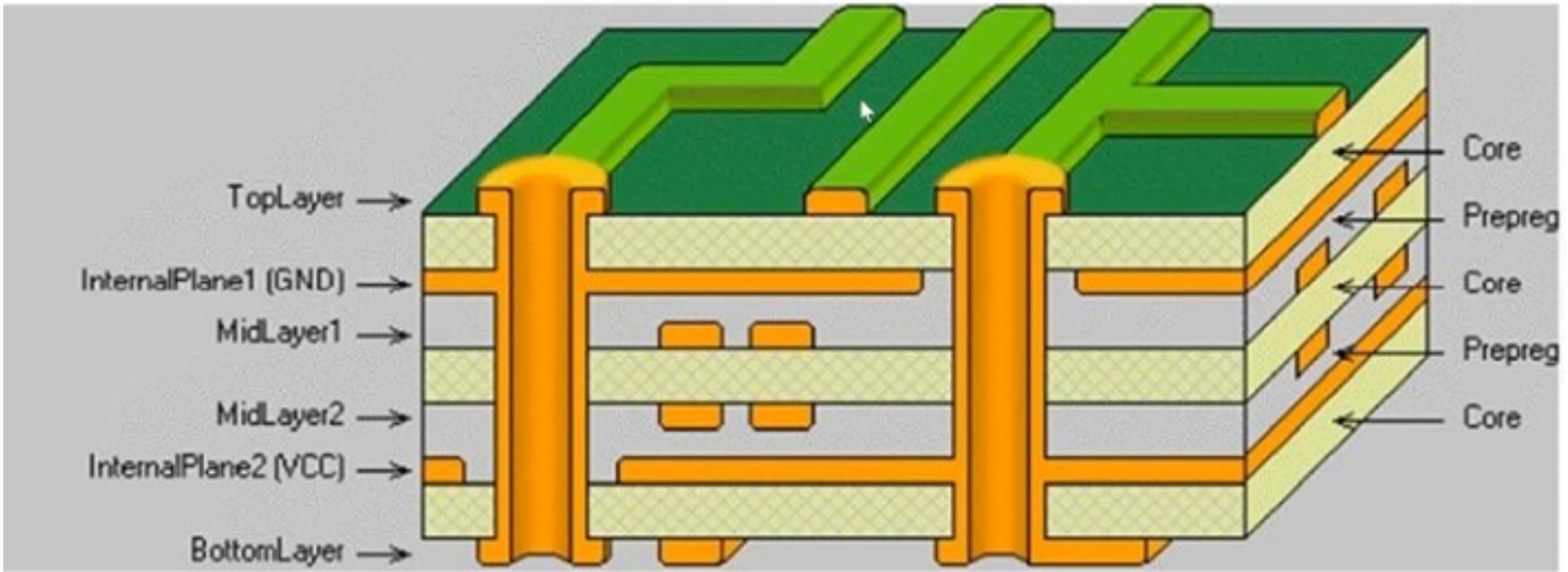

- Copper layers can be of different thickness
- Most common and popular thickness of copper layer is 35 micron

Bare PCB

# Multilayer Board



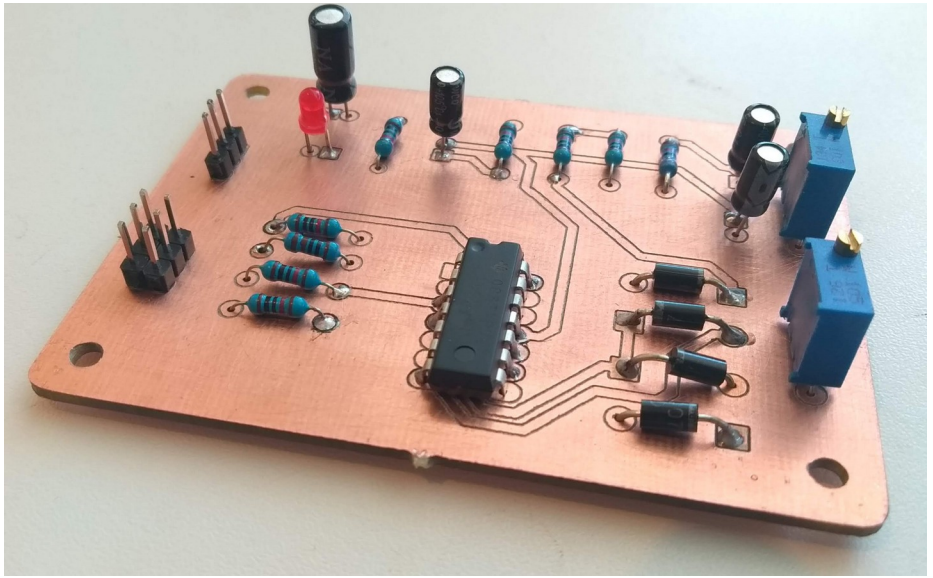
# Multilayer Board



# Substrate

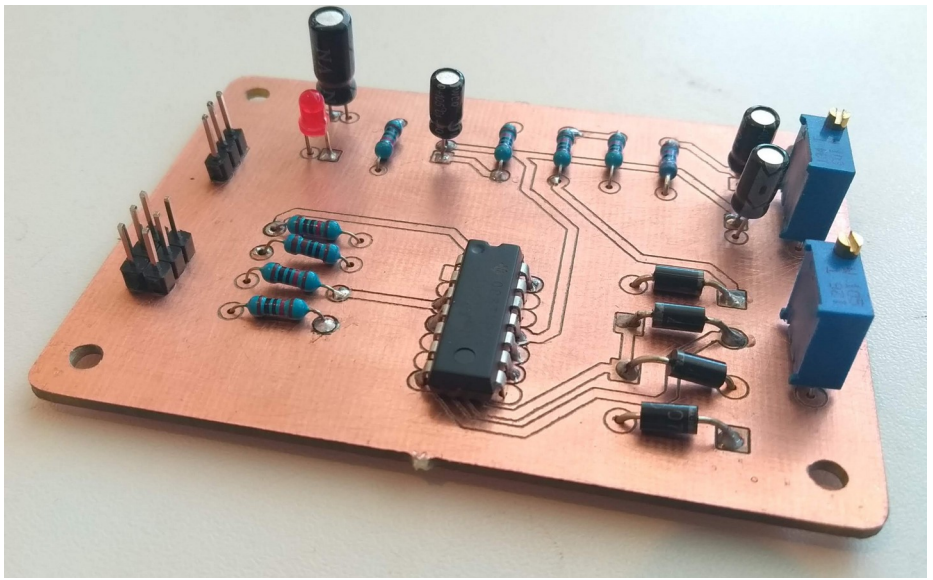
- The base material, or substrate, is usually fiberglass.
- Its called “**FR4**”.
- This solid core gives the PCB its rigidity and thickness.
- There are also flexible PCBs built on flexible high-temperature plastic.
- Board Thickness
- 0.8mm 2.6mm thickness, most common is 1.6mm.

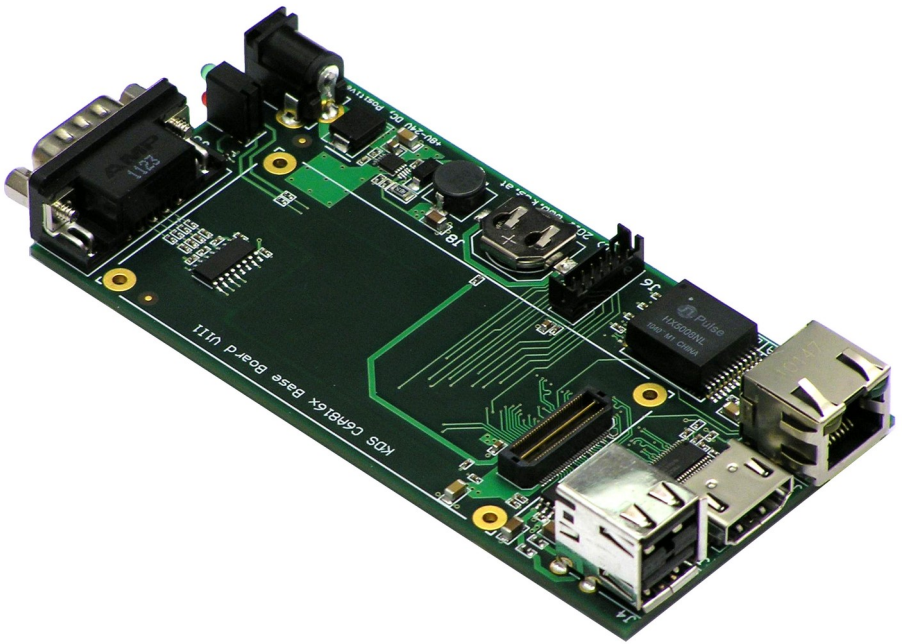
# PCB



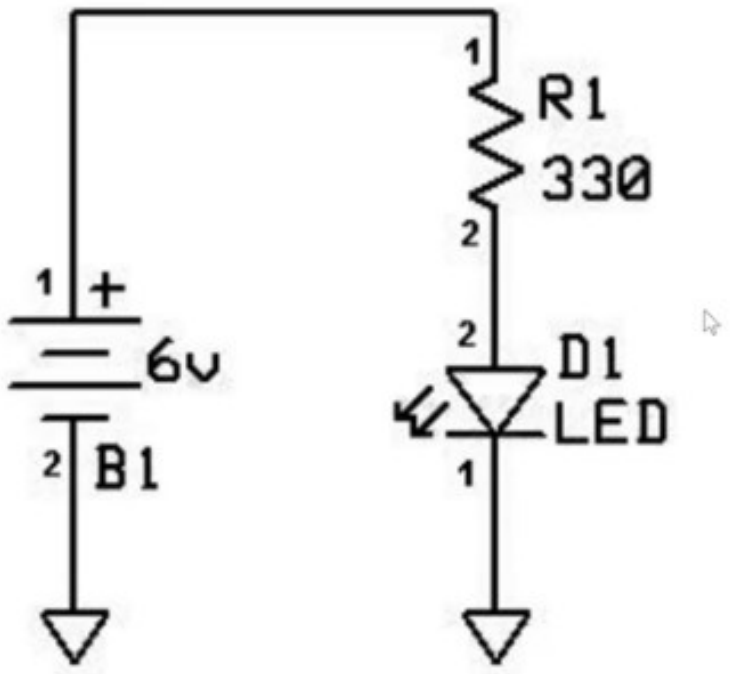
- Draw a circuit on PCB
- PCB Etching
- Drill it
- Solder components
- Finish the System
- DYI PCB Looks like this

# DIY vs Manufactured





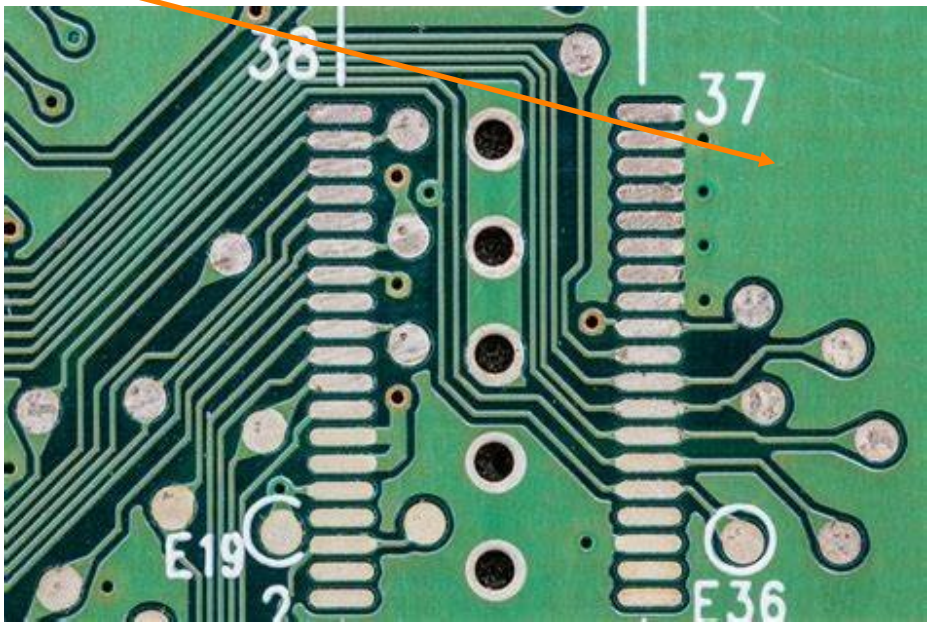
# Netlist




- It describe how individual components in the circuit are connected.

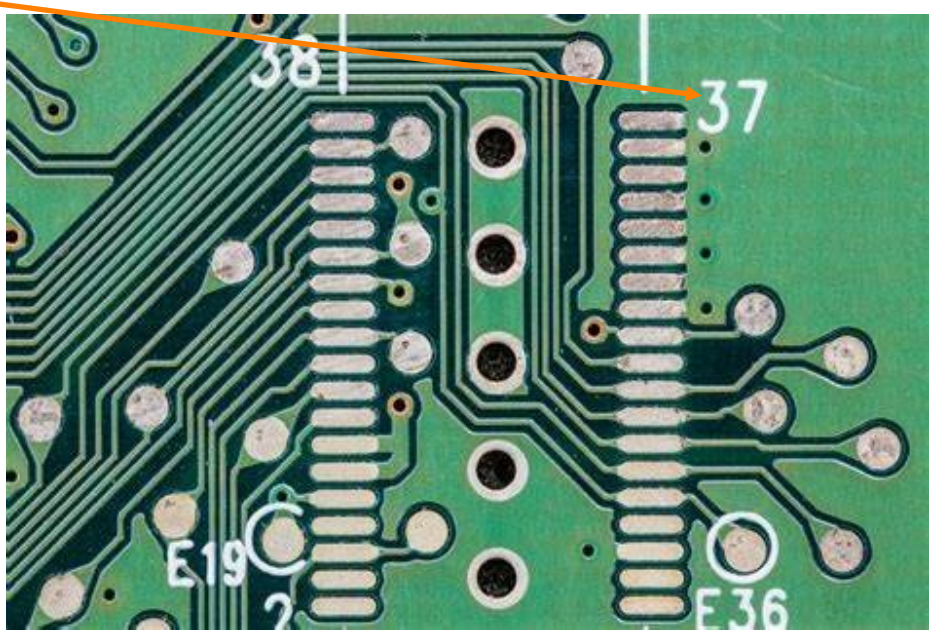
# Solder mask

- It’s the layer on the copper
- It gives the PCB its color
- RED/GREEN/BLUE/BLACK
- Protects Copper part of PCB
- Everywhere except pads and holes for soldering



# SilkScreen

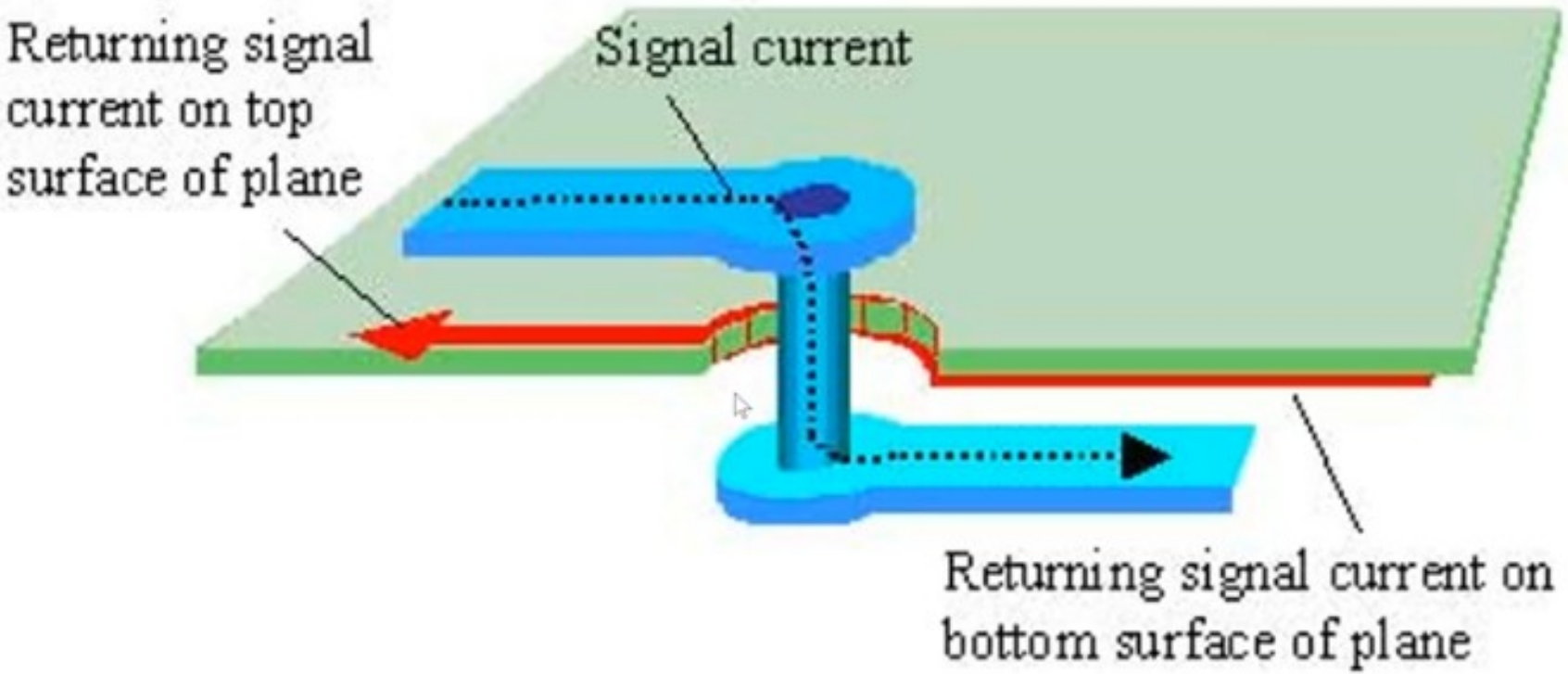
- White ink over solder mask
- Identification of component names
- Symbols
- Manufacturer data
- Pin no / names



# Common Terms

- **DRC:** Design rule check
- **Hole:** Hole to insert and solder component
- **Pad:** pad to solder surface mount component
- **Via:** Hole to connect 2 layers of PCB
- **Track:** Copper line connecting 2 parts / wire of circuit
- **Jumper:** Wire to place where track can’t be drawn
- **Plane:** Excess copper area
- **Footprint:** Component print on PCB

# Vias


Returning signal current on top surface of plane
Signal current
Returning signal current on bottom surface of plane