

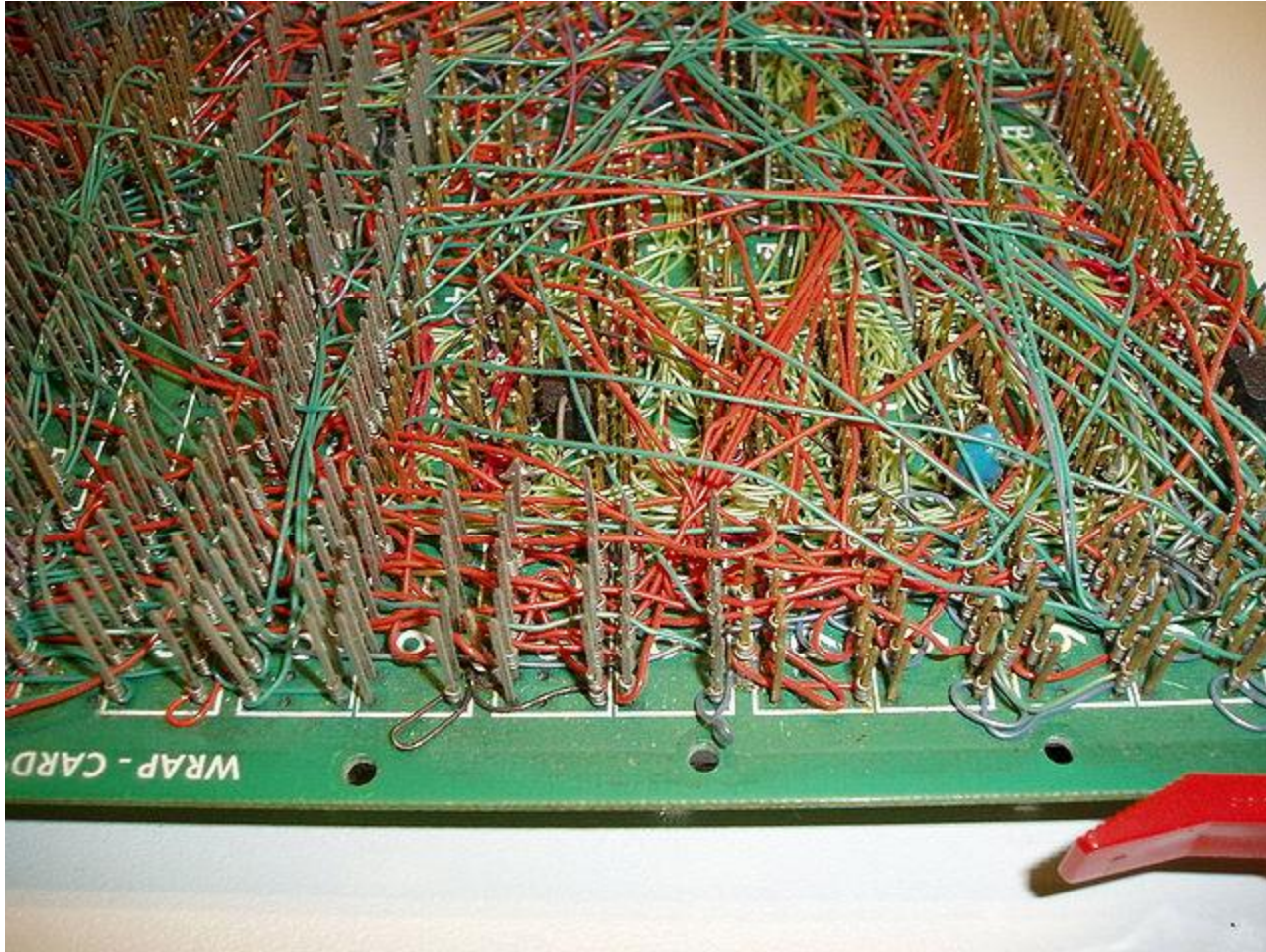
Printed Circuit Board (PCB) Basics



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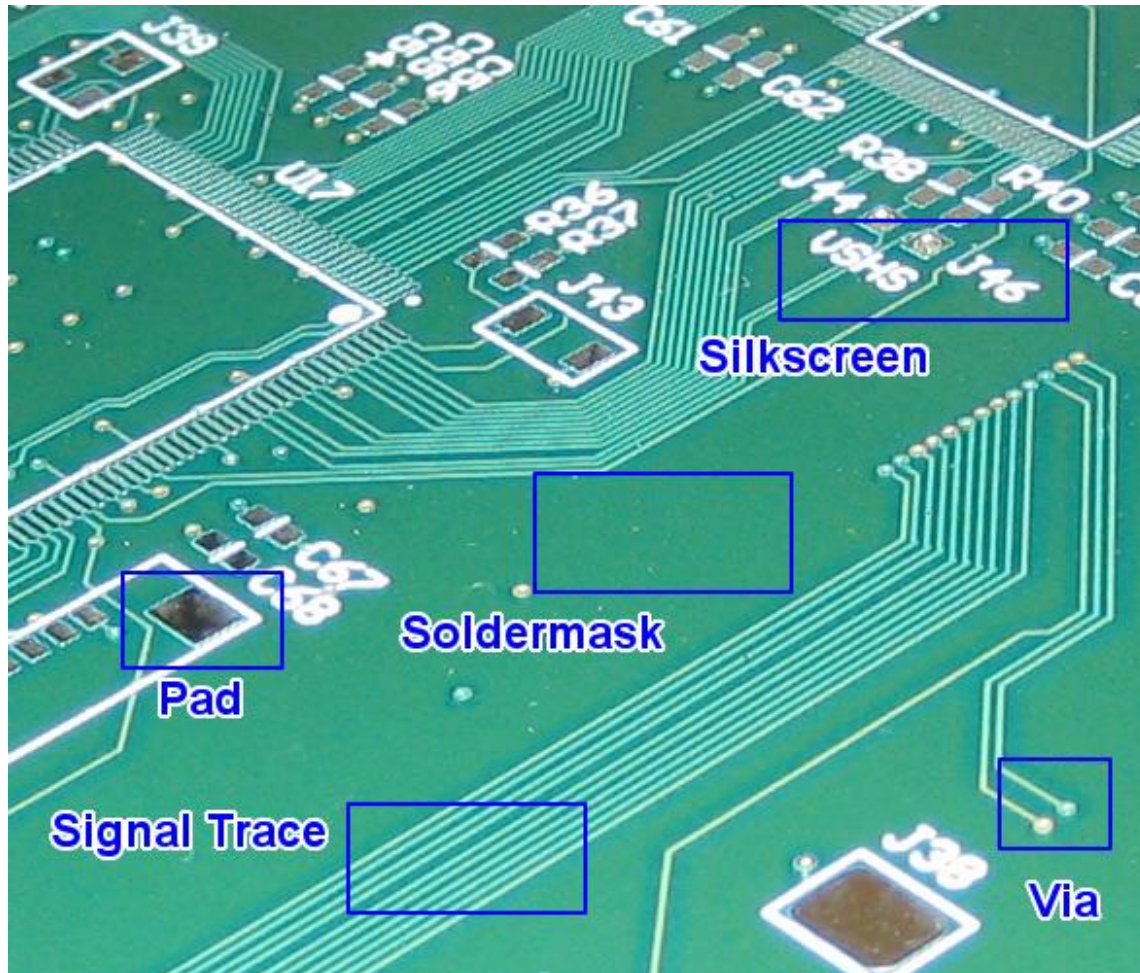
PCB OVERVIEW: Question

- How does one solve this problem?



PCB OVERVIEW: Answer

- Print traces and mount components on a PCB

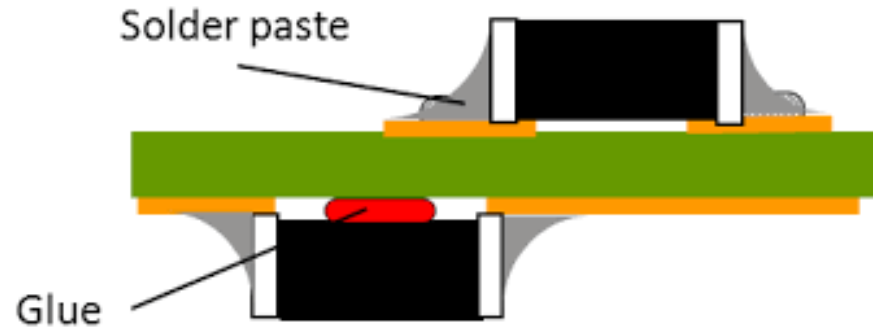
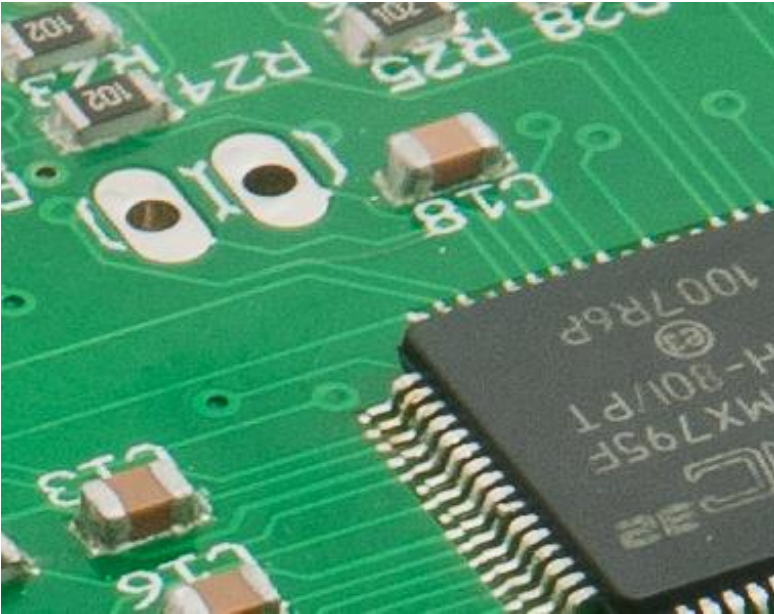


PCB OVERVIEW

- PCB is like a layer cake of alternating layers laminated together with heat and adhesive
- Typical PCB includes one or more insulating (fiberglass layers) with metal (copper) layers in between and on either side.
- Number of layers of a board (e.g., 2-layer board, 4-layer board,...) refers to the number of copper layers.
- Copper layers are patterned to form traces, pads, etc.
- Surface mount (SMD) components soldered directly to pads

PCB OVERVIEW

- Surface mount components on a PCB

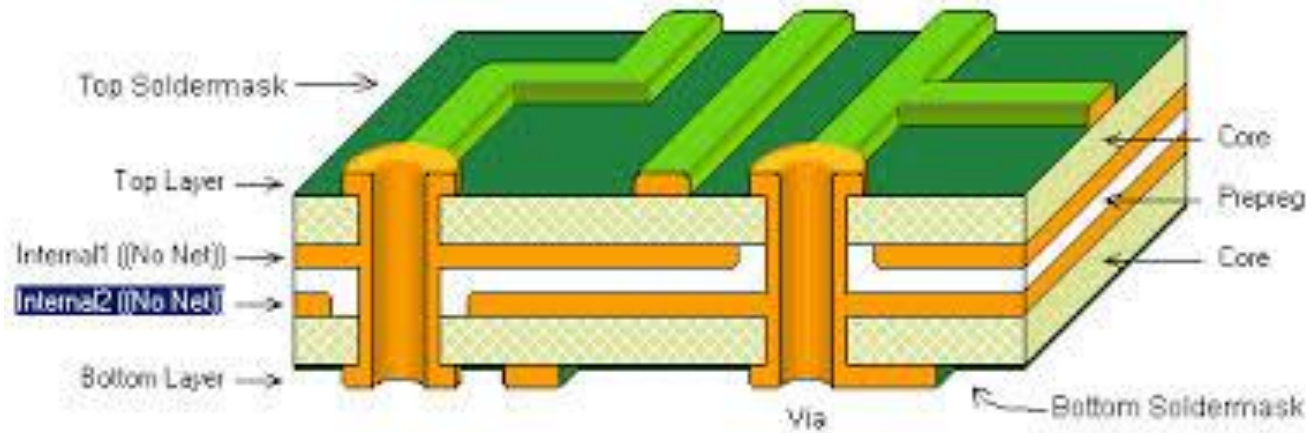


PCB OVERVIEW

- Soldermask (green layer) covers outer copper layers to prevent shorting of copper traces to other metal, solder, or conductive bits
- Silkscreen: Adds letters, numbers, and symbols to aid in assembly and identification of parts/regions
- Via holes allow for connections between layers or connect components to buried layers

PCB OVERVIEW

- Cross-sectional diagram along a via hole



4-Layer PCB Boards

- 4-layer board technology
 - Top and bottom layers for signal routing
 - Middle (inner) layers for power and ground planes (inner planes typically are mostly solid copper)
- In cases where components are all mounted on top (one side), the top side is referred to as the “component side” and the bottom side is referred to as the “solder side”

Multi-Layer PCB Construction

- 6-layer board (at cross-section of through hole)
 - Made from 2 cores and 3 layers of prepreg (fiberglass cloth)
 - After stacking, panel is pressed and fused together
 - Any traces or copper features are embedded into the prepreg, making one final smooth, flat assembly

