

PCB Design TRAINTER

14-02-2023

Overview of PCB Design:

What is PCB?

- * The PCB is a Printed Circuit Board.
- * PCB is an integral part of any Electrical and Electronic Device.
- * PCB is made up of Copper, Dielectric material, Solder mask and ~~silk~~ silk screen.

Pad refers to conductive area on the board surface where electronic components are soldered.

Pad for surface mount SMD and through pad.

Solder mask: is a process of covering the PCB to protect against corrosion, rust, prevent solder bridges from forming between closely spaced solder pads.

Silkscreen: is used as a reference indicator for placing component on a PCB board, marks, logos, symbols, and so on.

Types of PCB:

- * Single Sided
- * Double Sided
- * Multi-layer
- * Rigid
- * Flexible
- * Rigid-Flex

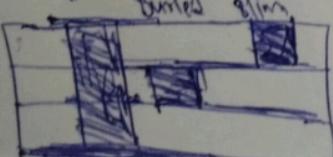
Via Allows a conductive connection between different layers.

→ Types of Via

Through hole → TH Via this connects top layer to bottom all layers.

→ Blind via + It is connected top to bottom this connects internal layers.

→ Buried via. It is connected top to bottom this connects internal layers.



PCB Performance Classes

→ Class 1:

General Electronic products.

→ Class 2:

Consumer Electronics, Toys, etc.

Dedicated Service products

Professional Systems, Computers, Communication Systems.

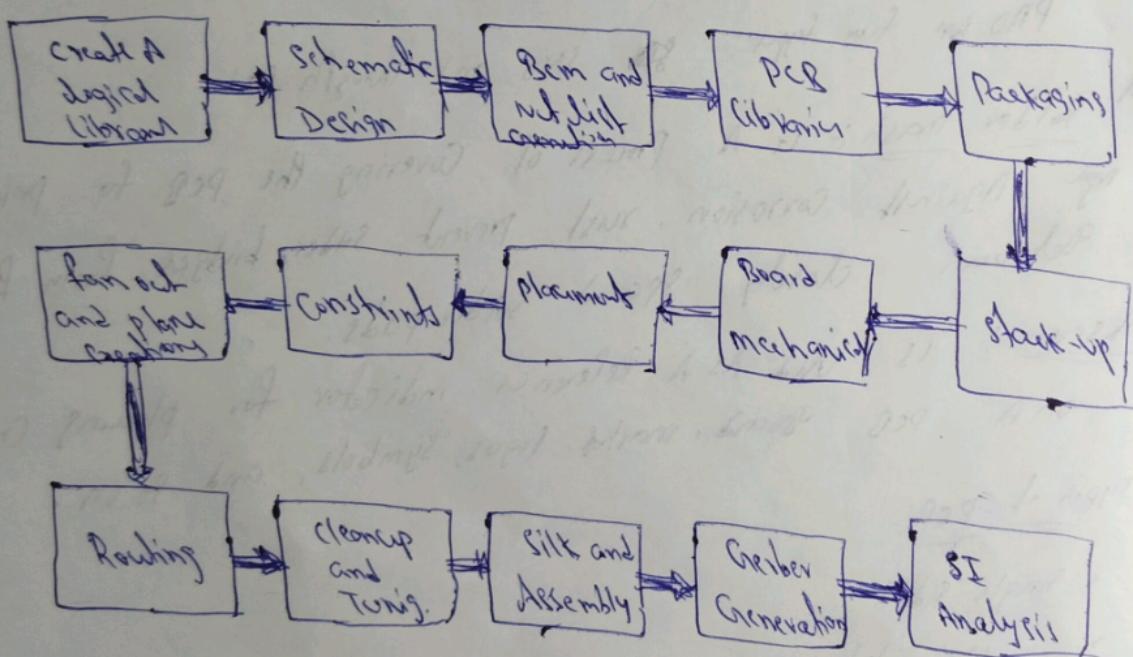
→ Class 3:

High Reliability Products.

Radar, Weapon systems, Aerospace.

Aerospace, Satellite Communication Equipment.

PCB Design flow Basic



Schematic Library and Schematic Creation

15-2-2022

For Today's session:

- Logical symbol creation.
- Schematic creation.
- Bill and net list generation.

Building the Symbol:

- * Grid - 100 Mils
- * Symbol name
 - * max 30 characters.

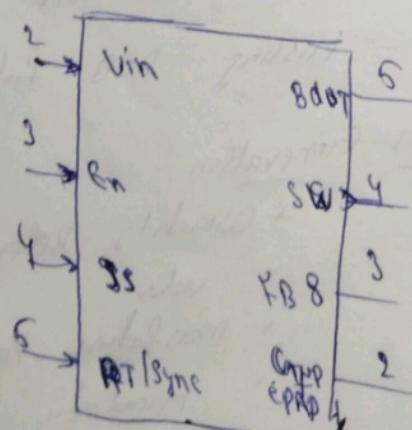
Symbol

Parameters:

- * Reference Designator.
- Value
- PCB footprint
- Manufacturer part number
- Manufacturer Name
- Description
- Power/ wattage/voltage / Tolerance.

Design (23.5.1) Circuit Design Using ~~Circuit Management~~ Altium

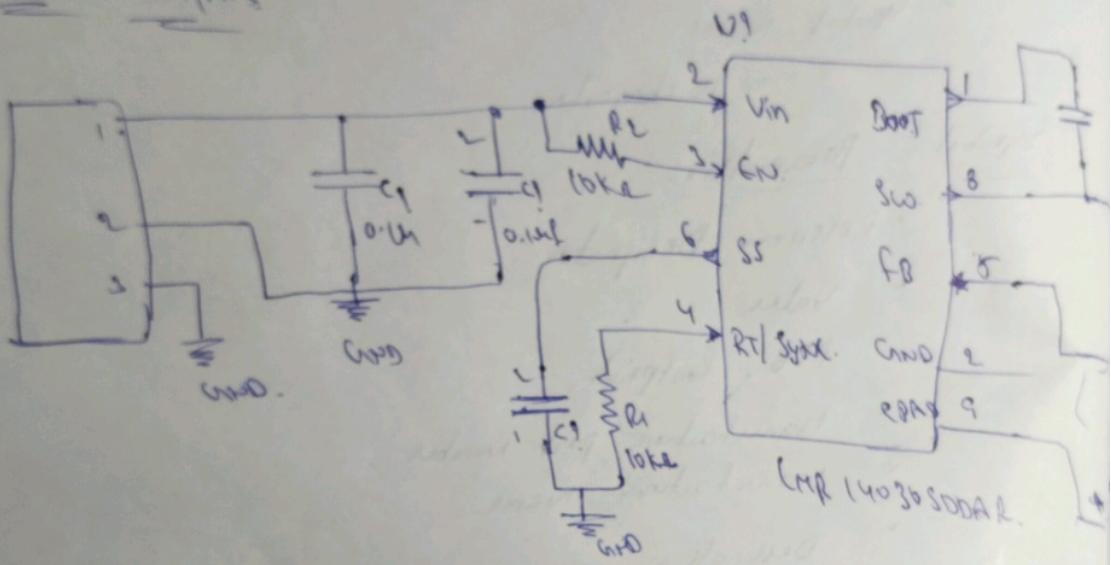
- File → New → PCB → Schematic library.
 - Create Symbols, Resistors, Capacitors, Inductors.
- (MF140305DOPAR)



Schematic Page Order

- * Design Name
 - Contents
 - Block Diagram
 - ...
 - ...
 - ...
 - ...
 - Revision History..

Schematic Diagrams



Netlist Errors

- * Net naming convention.
- * Missing off page connections.
- * Special characters in Attributes
- * Single pin nets.
- * Missing PCB footprint names.

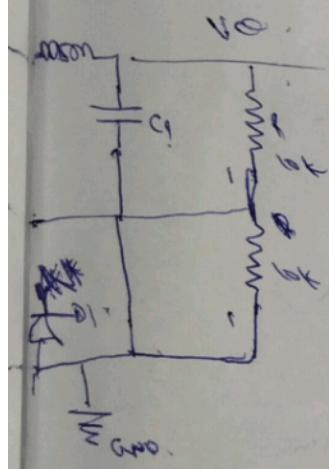
BOM Generation

- * Quantity, Reference Designator.
- * Value
- * Manufacturer Part Number.
- * Manufacturer Name
- * Description
- * PCB Footprint Name.

PCB LIBRARY

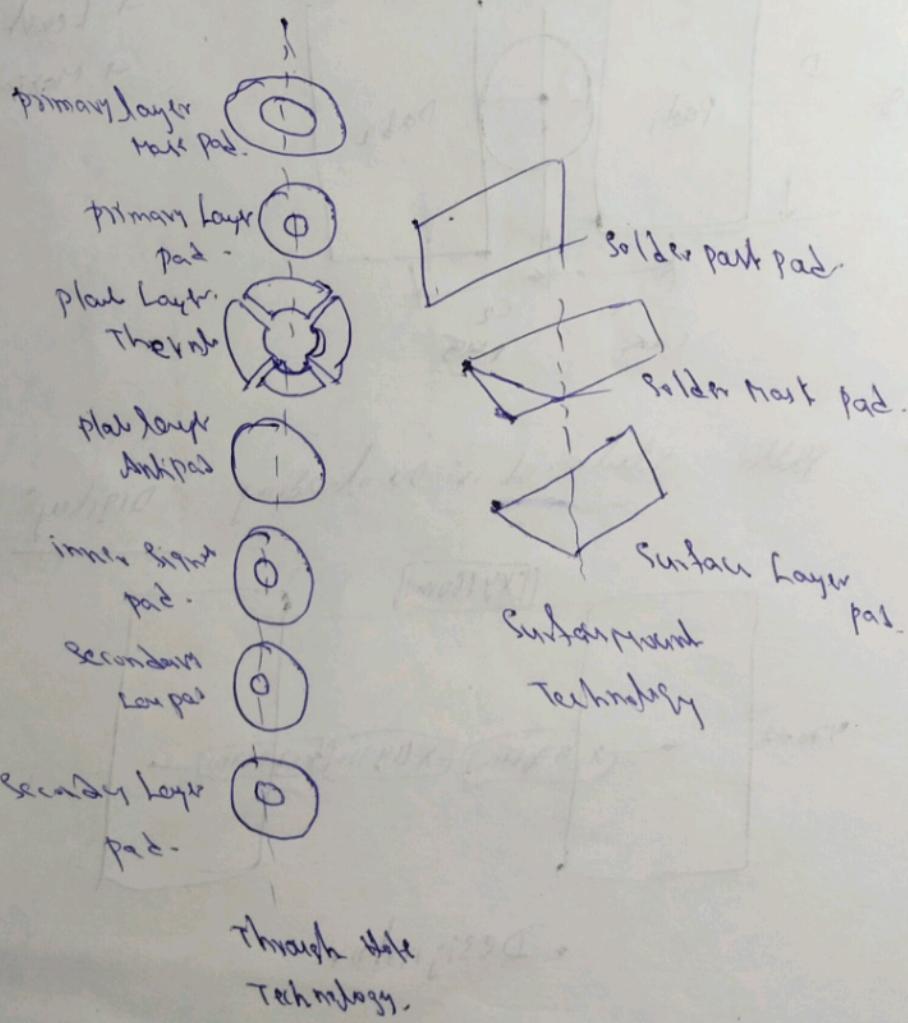
- Component Types
- Pad and its Structure
- Pad Placement and Pin Sequence
- Solder and Assembly
- Restriction Areas
- Mapping with Schematic.

Component Types:-



- * Through Hole Technology (THT)
- * Surface Mount Technology (SMT)
- * Fine pitch Technology (FPT)

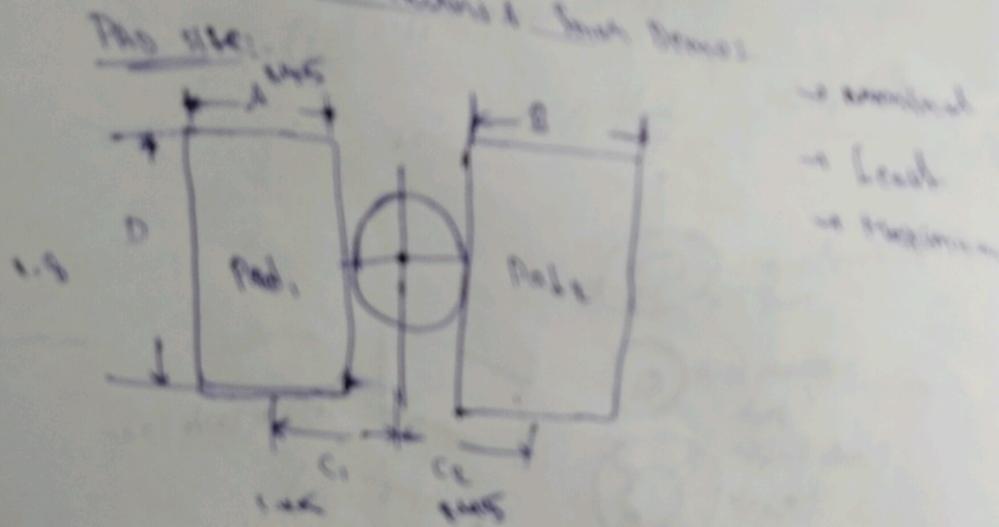
Foot prints - what it contains



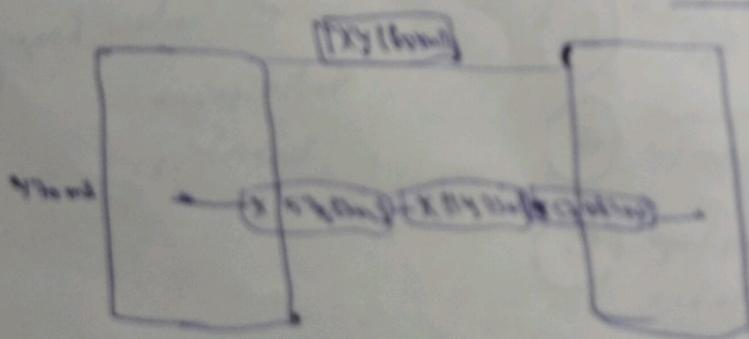
Designing the Library - Part 1

- Sketch Plan side track
 - Land pattern (A to width)
 - Land dimensions (mm)
 - number of lands
 - numbering order
 - Pitch
 - Total outline dimensions (mm)
 - Height
 - Line art Jig

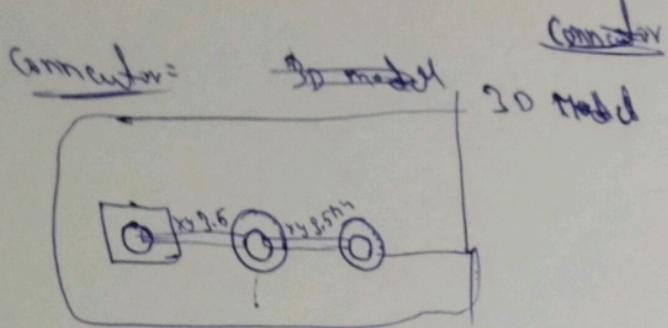
for Return View sketch is Unfilled side sketch
 the library where contains four boxes



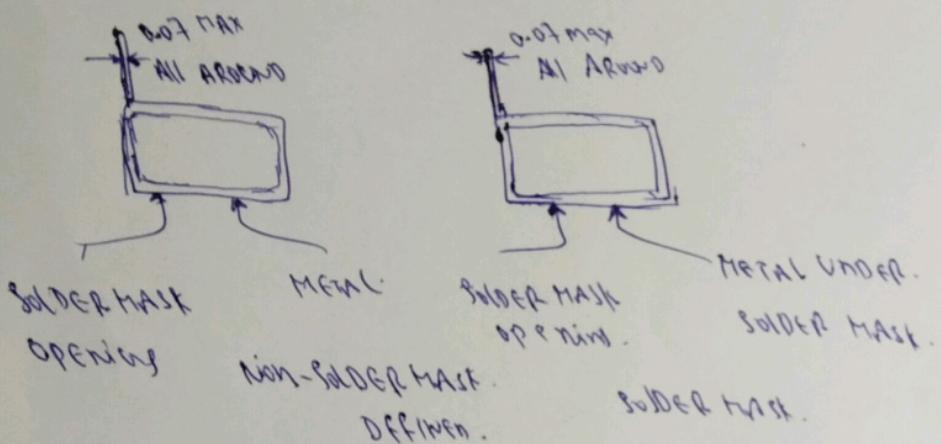
- With relation to manufacturing "Digkey"



• Designator.



LAND PATTERN Example



Solder Mask Details

