

The direction of information flow in a Block diagram could be in Both directions From Left to Right & From Right to Left Side or directions.

Chapter Four 'Schematics Diagram'

* What to Learn from this chapter? Identify and draw electronic graphic Symbols using a CAD software.

A schematic diagram is a picture that shows all the parts of a particular system and how they interconnect.

* lines represent simple Connection.

* As drafter, you use components symbols to design electrical and Electronic schematics diagrams from the Engineer's sketches.

Schematic Diagram:- Are drawings which show graphically what components are to be used and how these components are to be connected to form a desired circuit.

Schematic Diagram through a series of lines and forms, describes those circuits that contain electrical, electronic or electro-Mechanical device or components, identified by standard graphical symbols.

There are two Basic types ① Electronic symbols ② Pictorial symbols.

* How to Layout and draw: Is a master Drawing, is used in the preparation of wiring diagram, PCB layouts, Mechanical layout, Part lists, Basically there are 3 elements are included in all schematic diagrams:

① Graphic symbols, representing the components.

② Reference Designations, detailing components Value, tolerance or other ratings. (Specific letter).

③ The interconnections between all components. (Wiring)

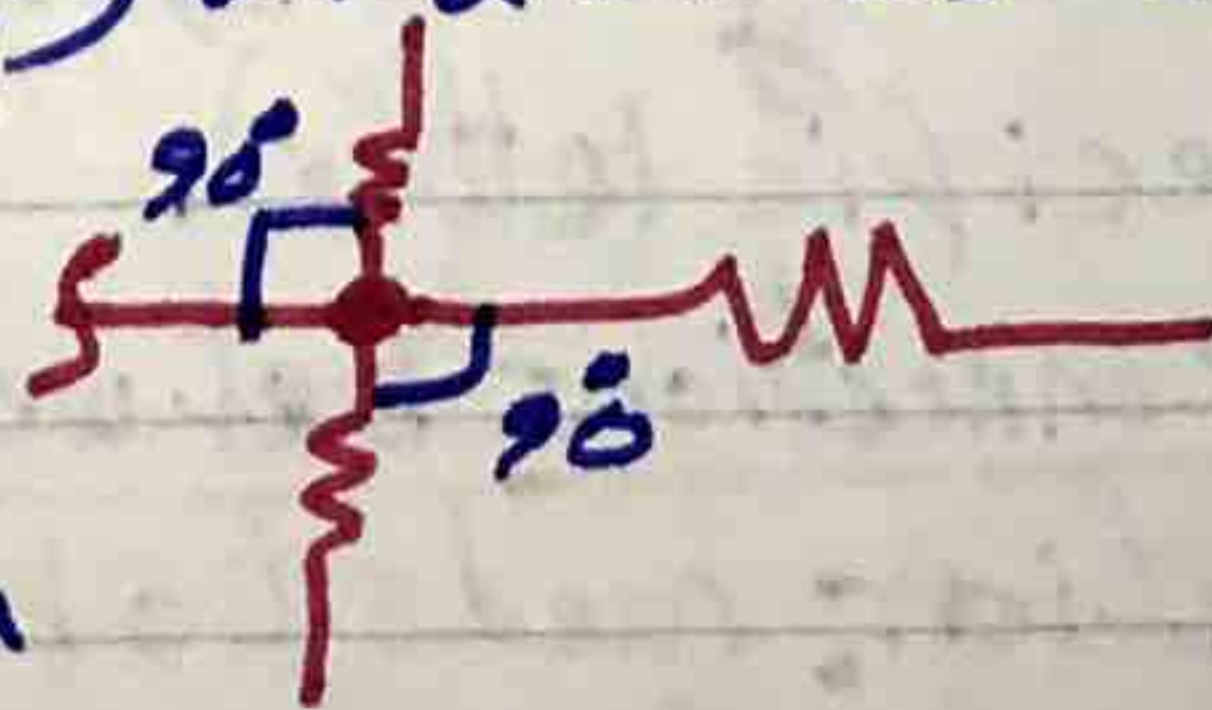
Flow direction: needs to be read from left to Right with (input - I/P) coming into the upper-Left hand and (output - O/P) going out the lower-right hand side of drawing. See Fig 4.3 P 4-4.

* There is a component sequence numbers should also begin with lowest component number in the upper-Left hand area of the schematic diagram and continue consecutively from (Left to Right).

Drafting standards:- Frequently, the engineer's sketch (very rough sketch) is not met the drafting standards, drafter responsibility to provide a drawing easy to follow and read the symbols should be drawn clearly and neatly with heavy black lines, all symbols values and identification numbers should be located as close as possible. See Fig 4.4 P 4-5 drafter needs to change lines, setup diagram, do some orientation simplify and all change need to meet technical Engineering standards like ANSI, IEEE.

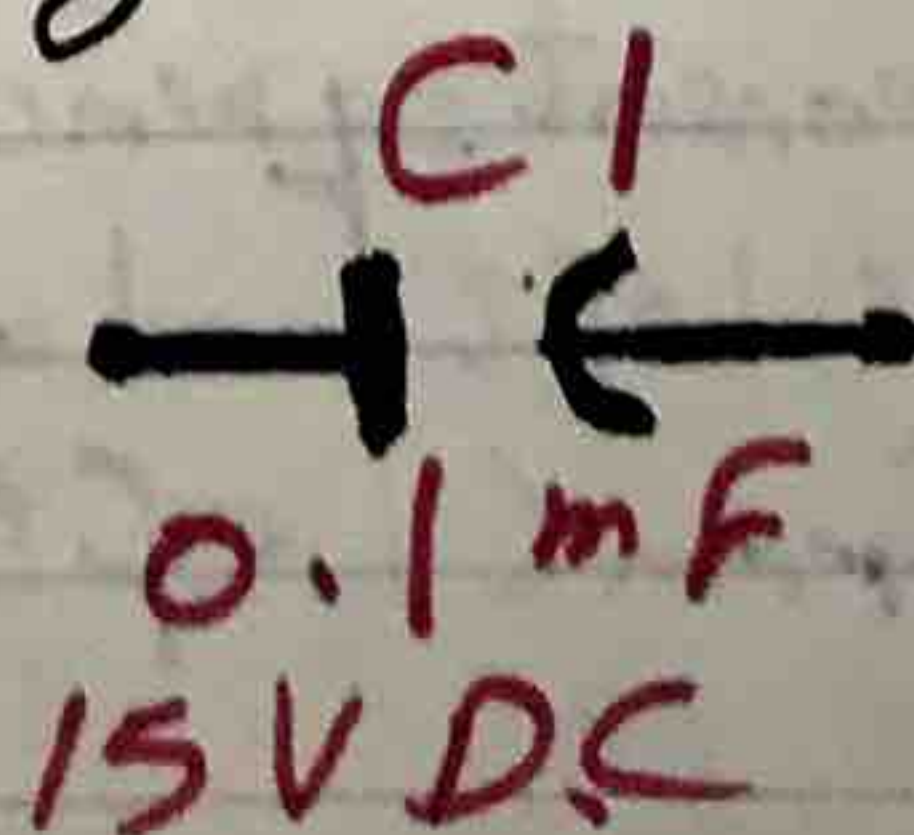
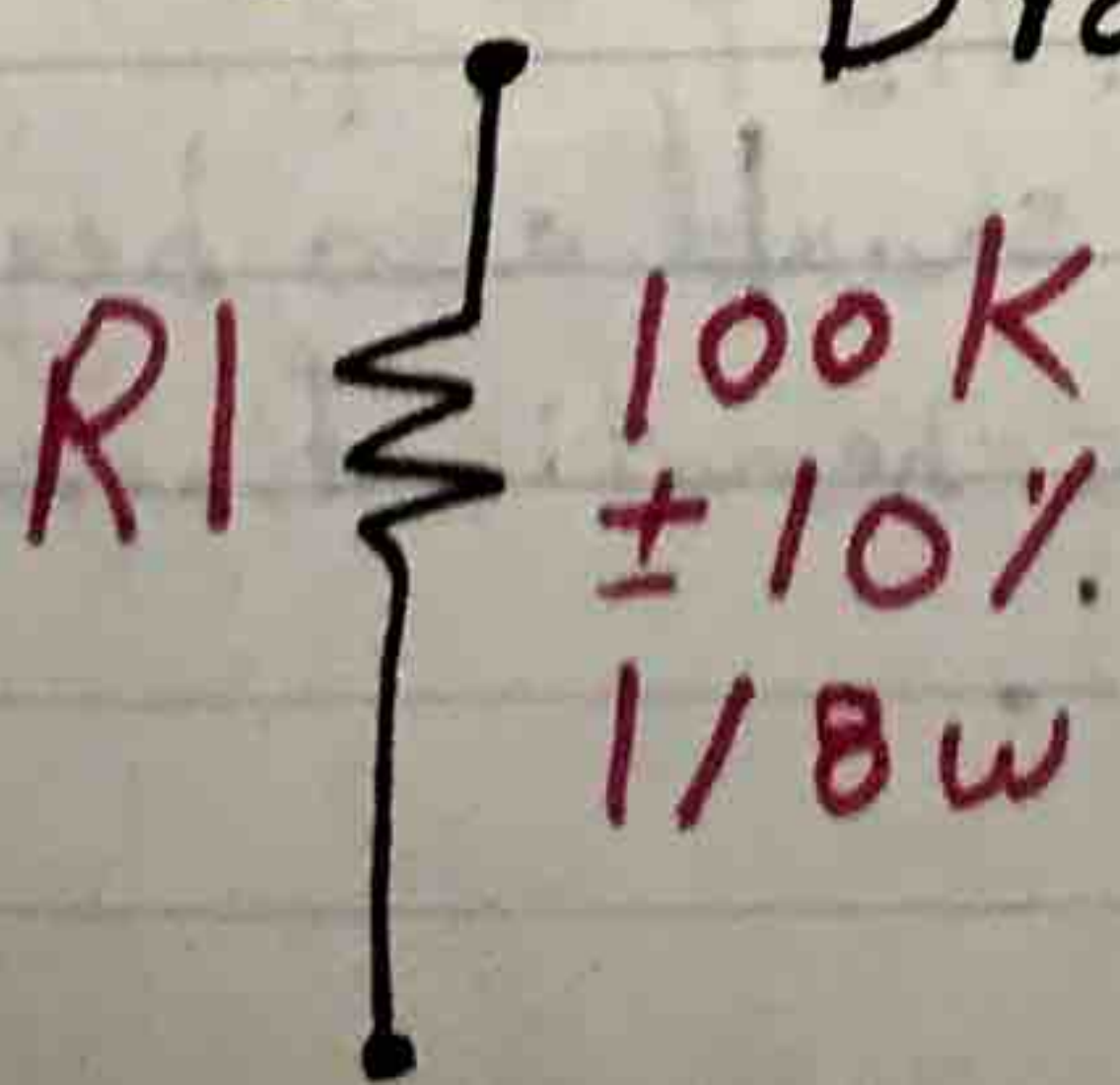
Crossover and Intersection:

- Connection lines: are drawn only horizontally and vertically (-or-) (No Inclined line)
- Avoid connecting more than four lines at any point unless there is a severe space.
- Spacing between parallel connecting lines should be .25" to .38"
- Longer parallel lines can be arranged in groups (the best to show three to a group).
- Need to provide full information of component, letters, number must be placed as close as possible to the point of interruption.
- Uniformity and Consistency are extremely important consideration when producing a schematic diagram (uniformity in connecting line weight, spacing of lines, Location of components, lettering and overall appearance).
- Connection or junction Dot (•) drawn as 0.090" Dia (Dia $\leq$ 0.090") solid circles
- No curvy corner
all corners must be sharp with Right angle



See Fig 4.7 P 4-7

Drafting Symbols standard

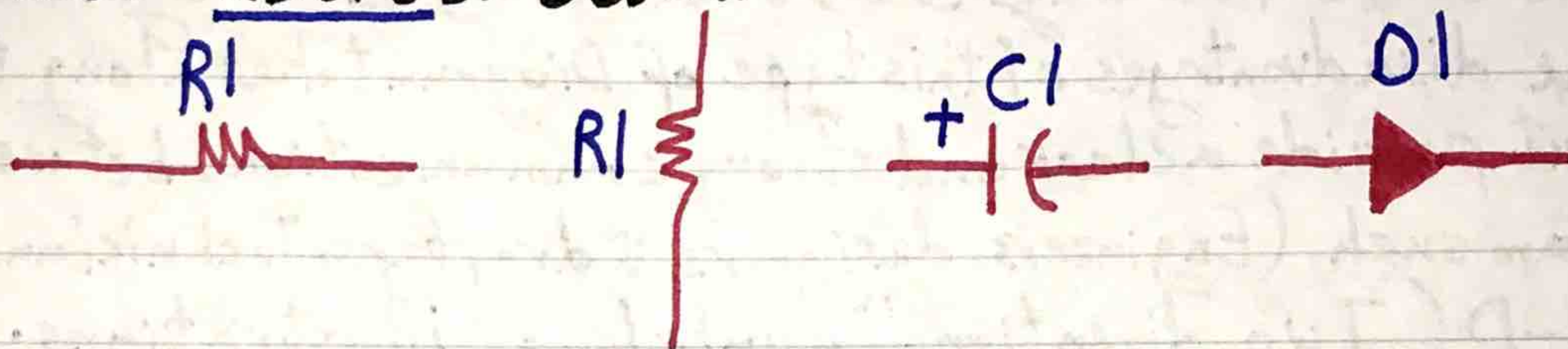


(2)

Reference Designation: All electronic components should be identified by their appropriate reference designations.

- ① Letters: only upper case. Accepted.
- ② Sequence Number: The first electronic device in diagram like Resistor is Marked as "R1" & 2nd Resistor is Tagged as (R2).

Reference specific letter: must to place on left or Right of component above or below



The size of a symbol does not affect its meaning.

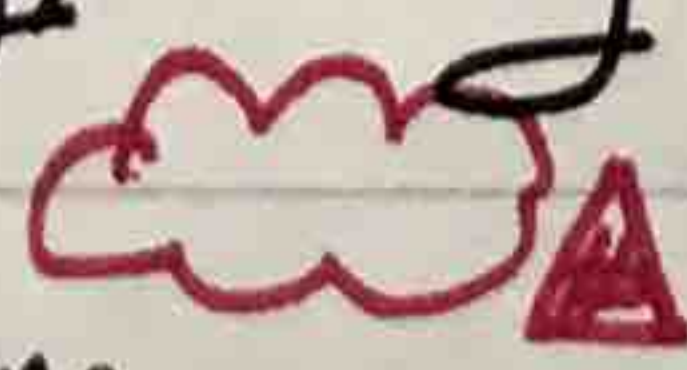
Component Values:- Each component has a value, Rating Code, Technical specifications.

To represent any electronic device by units

- Resistor (Ω , $k\Omega$, $M\Omega$ = Mega = 10^6)
- Capacitor (picoF = 10^{-12} , μF (10^{-6}))
- Inductors (μH), H = Henry

Foot notes: placed on Lower Left side of drawing multiple notes of drawing to avoid repeating same information about component on diagram and more details for device.

Example:- We donot need to place device value close to each single component only listed on footnote same as Book.

Drawing Revisions:- No need to create table to list all the change on diagram in Electrical, Removing, adding new devices just need to create Clouding area and add tag,  to mention the change number and show on title Block of drawing.

- all change done based on project needs like over Killed budject, major change of project equipments.

ECO: Engineering Change Order.

ECR: Engineering Change Request

CPR: Change Procurement Request

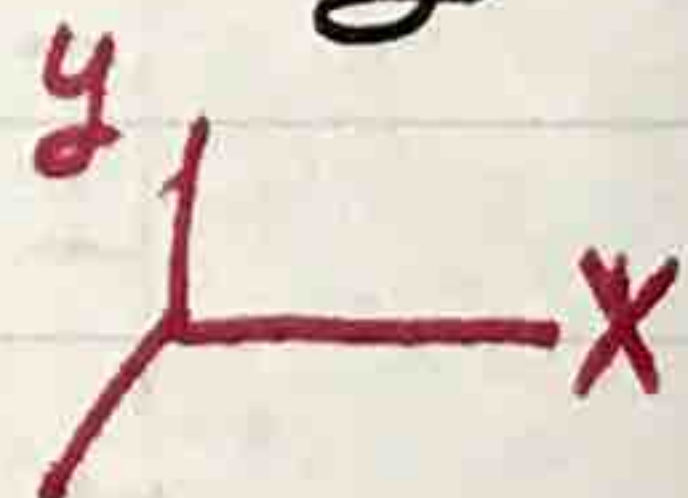
Pictorial Schematic Diagram:- It's really help full Diagram to use the Real shape of devices and represent electrical - electronic item in diagram.

There are Two ways ① Isometric ② 2-D Symbols

The disadvantages of this type of Diagram takes along time to finish but provide a clear and strong communications between Engineering team such (Engineers, designers, & drafters, Technicians).

2-D (Two dimensional) symbols or illustrations: is a good method to help the Both technical and non-technical people to make them understood. For example: repair manuals, user guide, or manual, sales pro chures. photographic Drawing in many cases is a good way to help people to understand device and provide a clear idea. is easy to catch the information by looking for pictorial drawing instead of providing coded symbols or blocks.

Three-plane pictorial symbols (Isometric)



is great for any person with no electrical knowledge or Background.