



SNS COLLEGE OF TECHNOLOGY
An Autonomous Institution
Coimbatore-35



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Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

IIYEAR/ III SEMESTER

19ECT201 Electrical Engineering and Instrumentation

TOPIC -MEASURING INSTRUMENTS-LCD



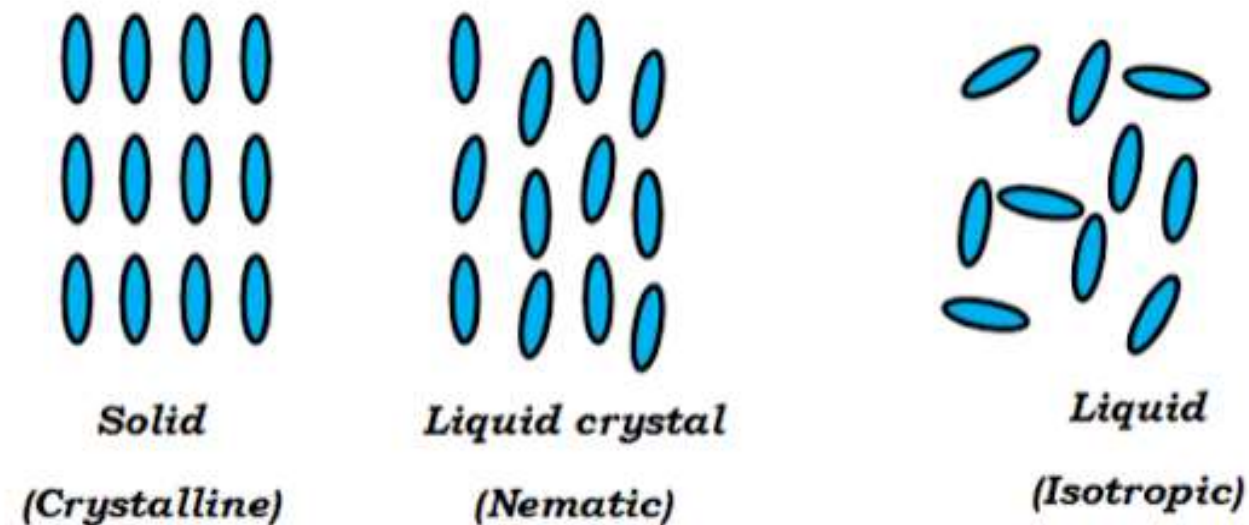
LIQUID CRYSTAL DISPLAY



Liquid Crystal Display (LCD) is a flat display screen used in electronic devices such as laptop, computer, TV, cellphones and portable video games.

As the name says liquid crystal is a material which flows like a liquid and shows some properties of solid. These LCD are very thin displays and it consumes less power than LED

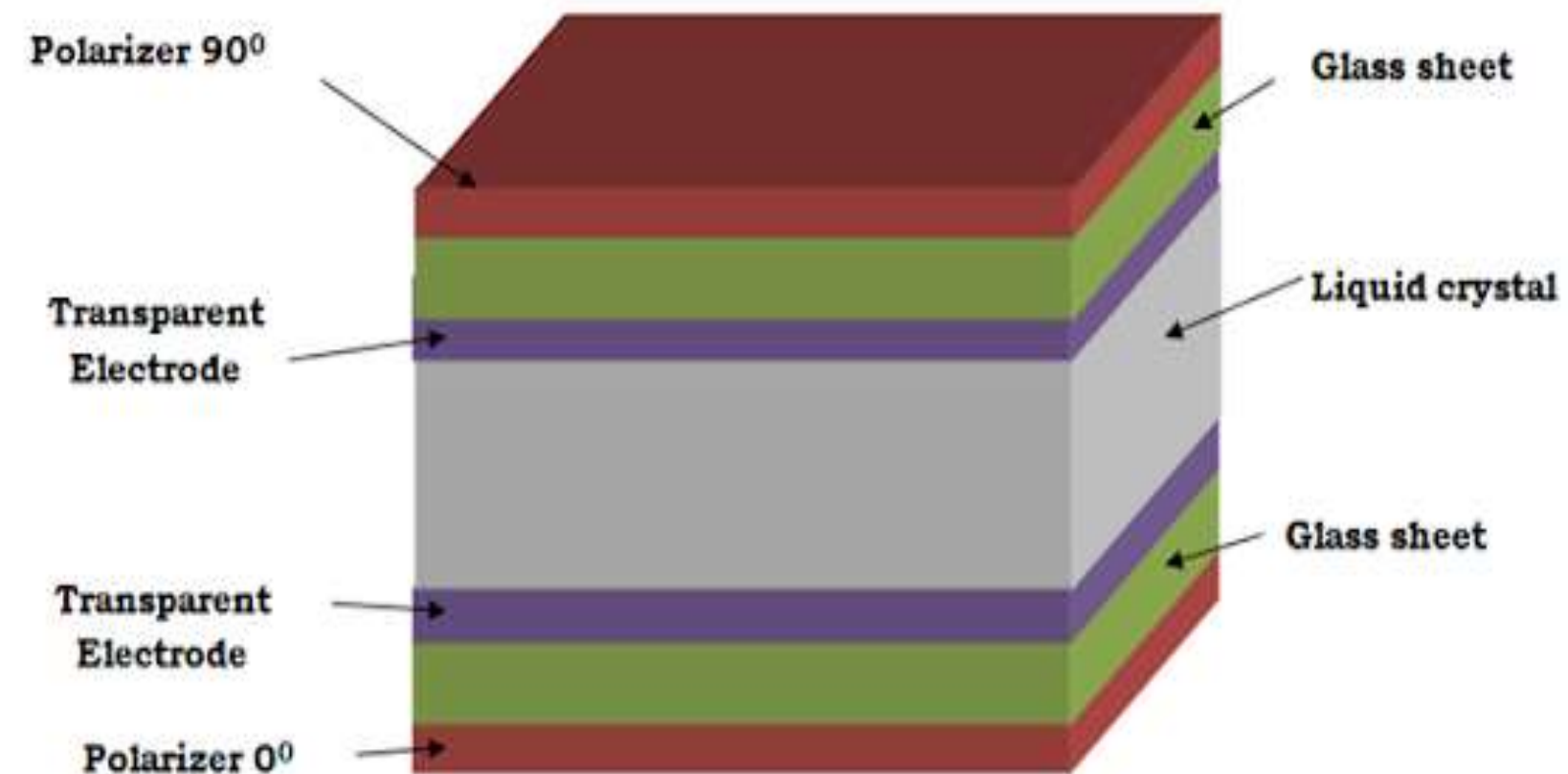
Molecular arrangement of Liquid Crystal



the molecular structure of liquid crystal is in between solid crystal and liquid isotropic. In Liquid crystal display (LCD) nematic type of liquid crystal molecular arrangement is used in which molecules are oriented in some degree of alignment. For example when we increase the temperature the ice cube melts and liquid crystal is like the state in between ice cube and water



Construction of Liquid Crystal Display



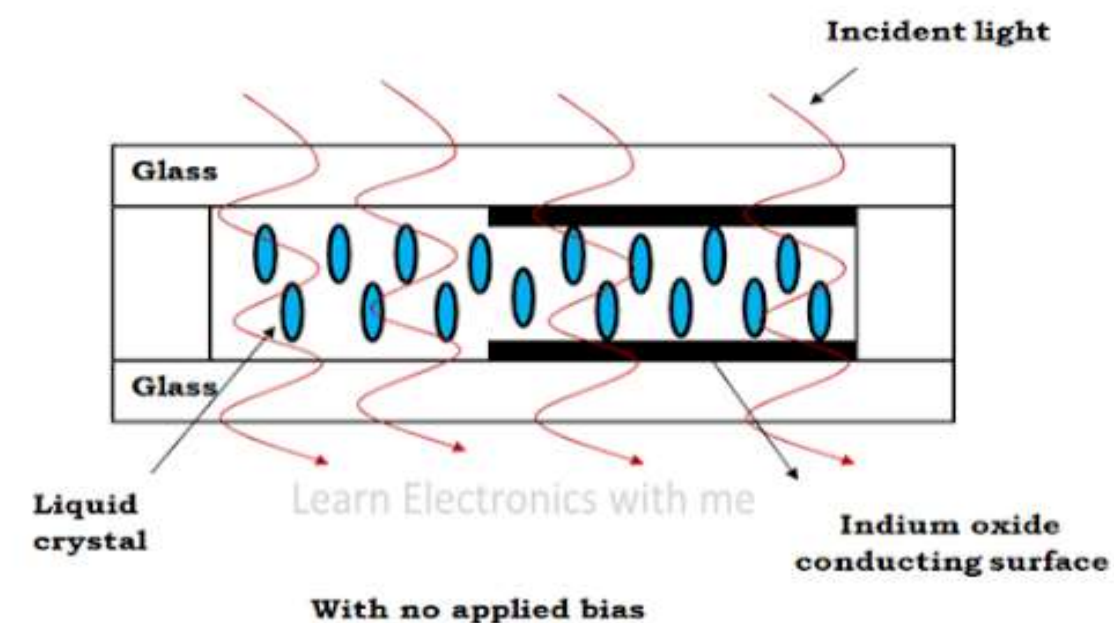
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Construction of LCD consists of two polarized glass pieces. Two electrodes are used, one is positive and the other one is negative. External potential is applied to LCD through these electrodes and it is made up of indium-tin-oxide.

Liquid crystal layer of about $10\mu\text{m}$ - $20\mu\text{m}$ is placed between two glass sheets. The light is passed or blocked by changing the polarization

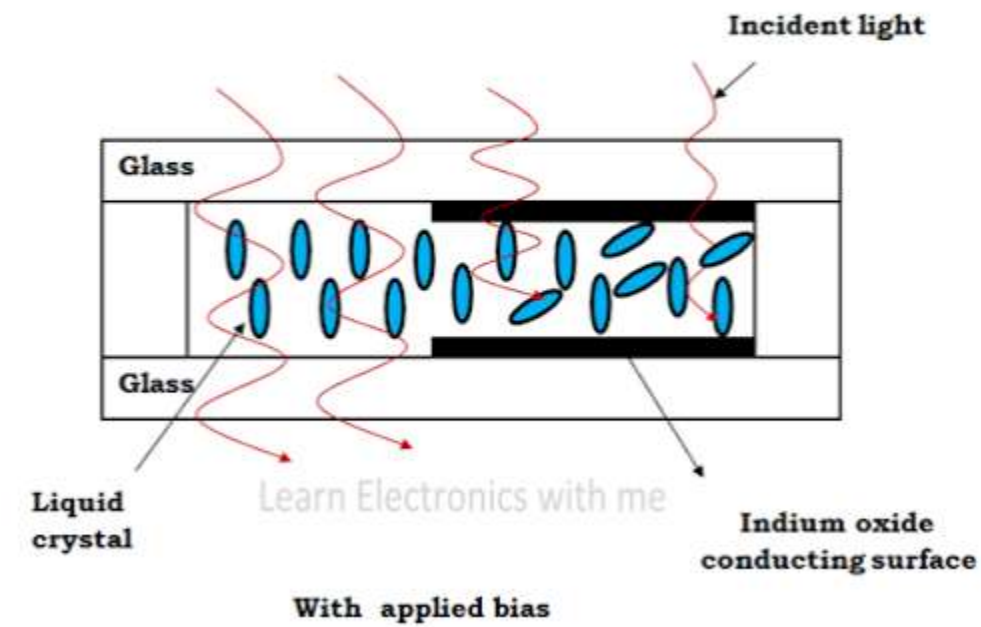
Working of Liquid Crystal Display





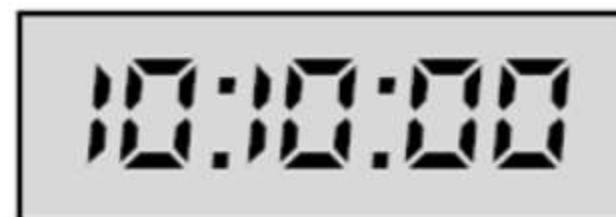
The basic working principle of LCD is blocking of light. It does not produce light on its own. So external light source is used. When the external light passes from one polarizer to the next polarizer, external supply is given to the liquid crystal, the polarized light aligns itself so that the image is produced in the screen.

The indium oxide conducting surface is a transparent layer which is placed on both the sides of the sealed thick layer of liquid crystal. When no external bias is applied the molecular arrangement is not disturbed.



When the external bias is applied the molecular arrangement is disturbed and that area looks dark and the other area looks clear.

Positive and Negative LCDs





In positive LCD display the segments are dark and the background is white and the polarizers are placed perpendicular to each other. In the negative LCD display the segments are white in the dark background and the polarizers are aligned to each other.

Advantages:

- It is thin and compact
- Low power consumption
- Less heat is emitted during operation
- Low cost

Disadvantages:

- Speed of operation is low
- Lifespan is less
- Restricted viewing angles

Applications:

- Used in digital wrist watch
- Display images in digital cameras
- Used in numerical counters
- Display screen in calculators
- Mainly used in television
- Used in mobile screens
- Used in video players, Used in image sensing circuits



THANK YOU