



SNS COLLEGE OF ENGINEERING

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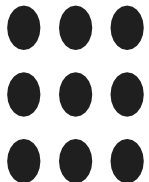
**Approved by AICTE, Recognized by UGC & Affiliated to Anna University,
Chennai**

Department of Information Technology

Computer Graphics

Unit 1 : INTRODUCTION TO COMPUTER GRAPHICS

Topic : Graphics Display Devices





DISPLAY DEVICES

- The display device is an output device used to represent the information in the form of images (visual form).
- Display systems are mostly called a video monitor or Video display unit (VDU).
- Display devices are designed to model, display, view, or display information.
- The purpose of display technology is to simplify information sharing.



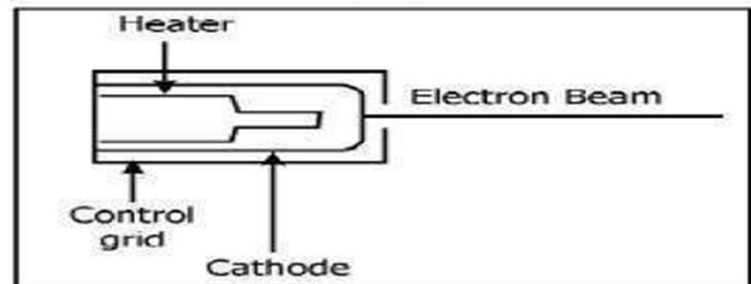
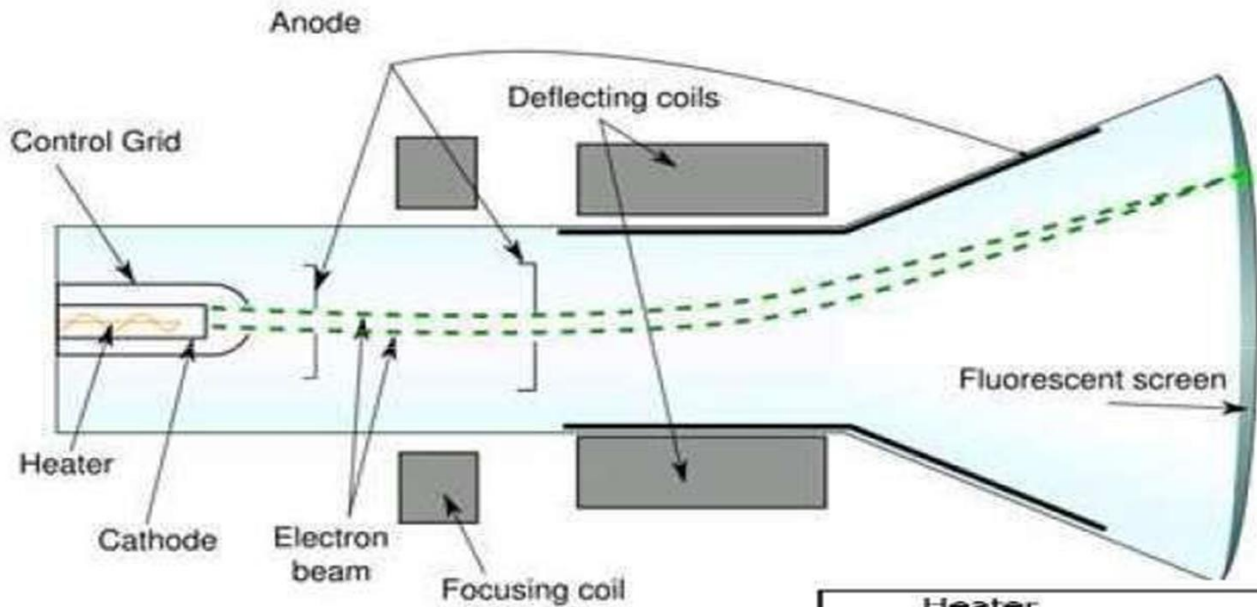


Some of the display devices are

- Cathode Ray Tube (CRT)
- Raster Scan Display
- Random Scan Display
- Liquid Crystal Display (LCD)
- Light Emitting Diode(LED)



1. CATHODE RAY TUBES :





- The primary output device in a graphical system is the video monitor. The main element of a video monitor is the Cathode Ray Tube.
- A CRT is a glass tube that is narrow at one end and opens to a flat screen at the other end.



CRT display works using :

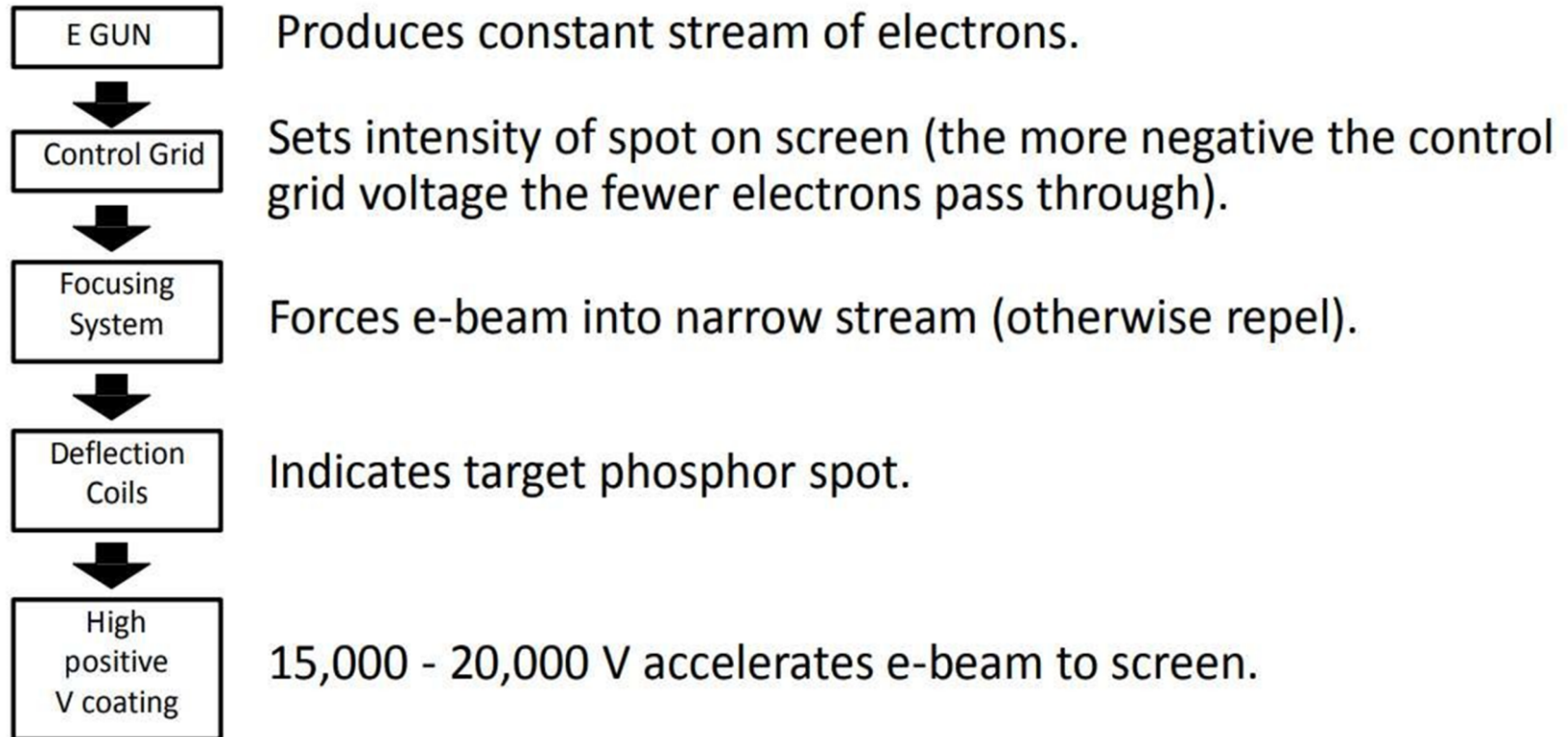
Electron emission

- Electrons are emitted from the Cathode tube.

Phosphorescence

- It is the emission of visible light, when electron beam strikes Phosphor material.

Components of CRT





Advantages:

- Offers greater resolution .
- Widest viewing angle when compared to any other technology.
- It is cheap as compared to LCD, PLASMA displays.

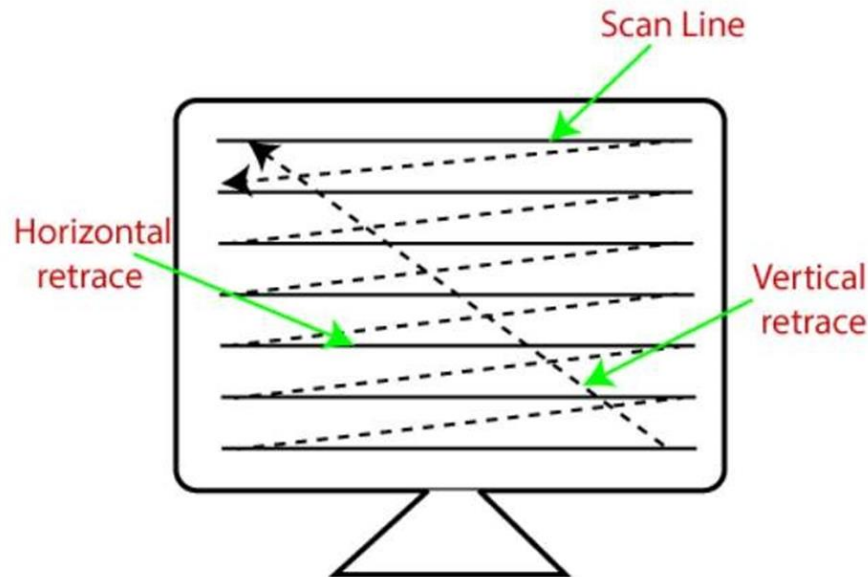
Disadvantages:

- Thickness is much larger as compared to LCD, PLASMA display.
- Cannot be used for smaller displays like watches, calculators, portable devices.
- View area is less than the offered monitor size.
- It is more fragile and bulky.



2. RASTER SCAN DISPLAY

- A Raster scan display is a type of display technology used in computer monitors, televisions, and other visual output devices.
- It works by systematically scanning the screen from top to bottom and left to right to display images.





The electron beam is swept across the screen one row at a time from top to bottom. Each row is referred to as a scan line.

Picture description is stored in the memory area called as Refresh buffer, or Frame Buffer.

Frame buffer is also known as Raster or Bitmap. Raster scan provides the refresh rate of 60 to 80 frames per second.



The beam refreshing has two types:

- **Horizontal Retracing**
 - **Vertical Retracing**
- When the beam starts from the top left corner and reaches bottom right, and again return to the top left, it is called the vertical retrace.
 - It will call back from top to bottom more horizontally as a horizontal reversal.

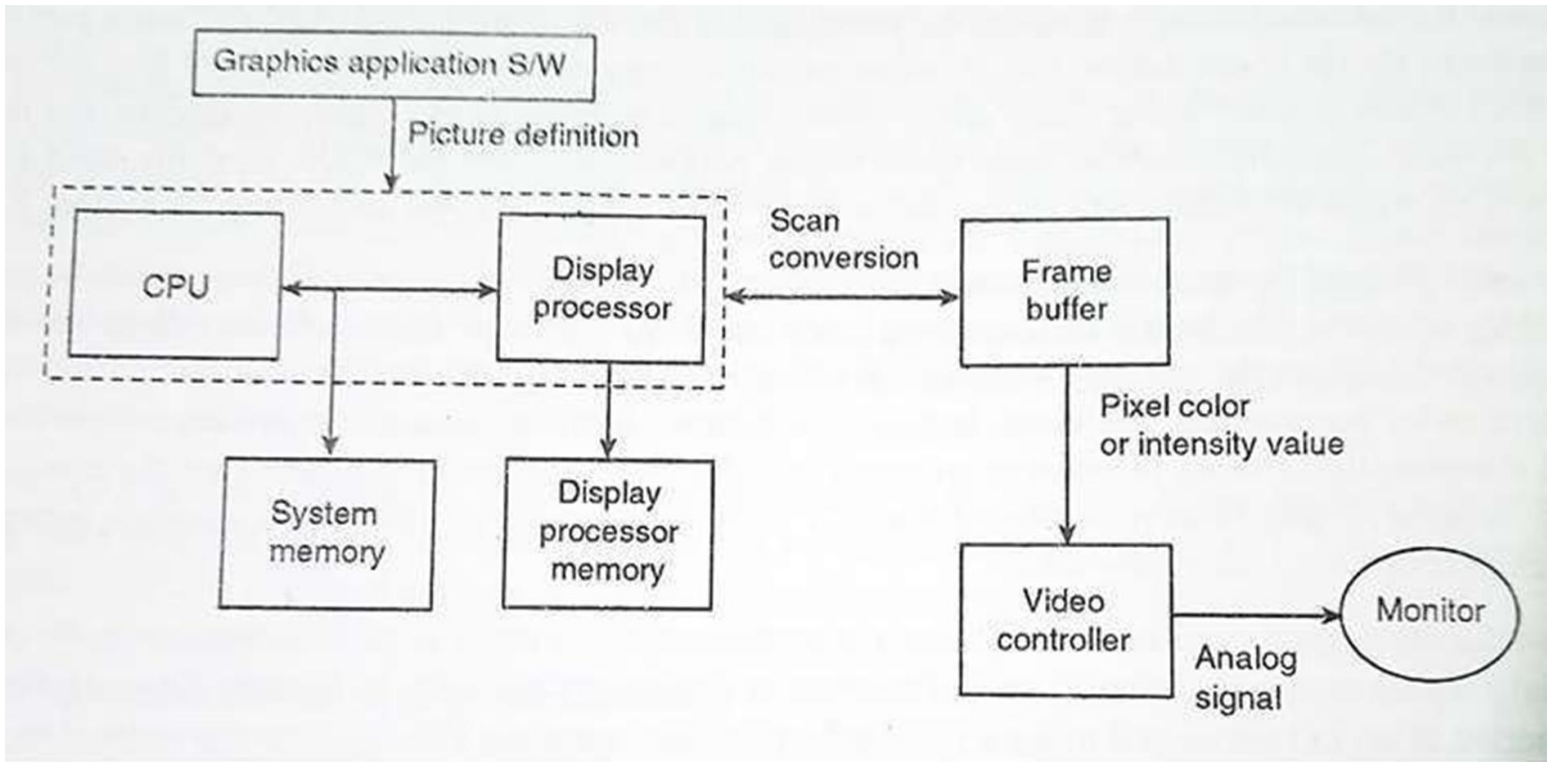


Fig: Architecture of Raster Scan Display

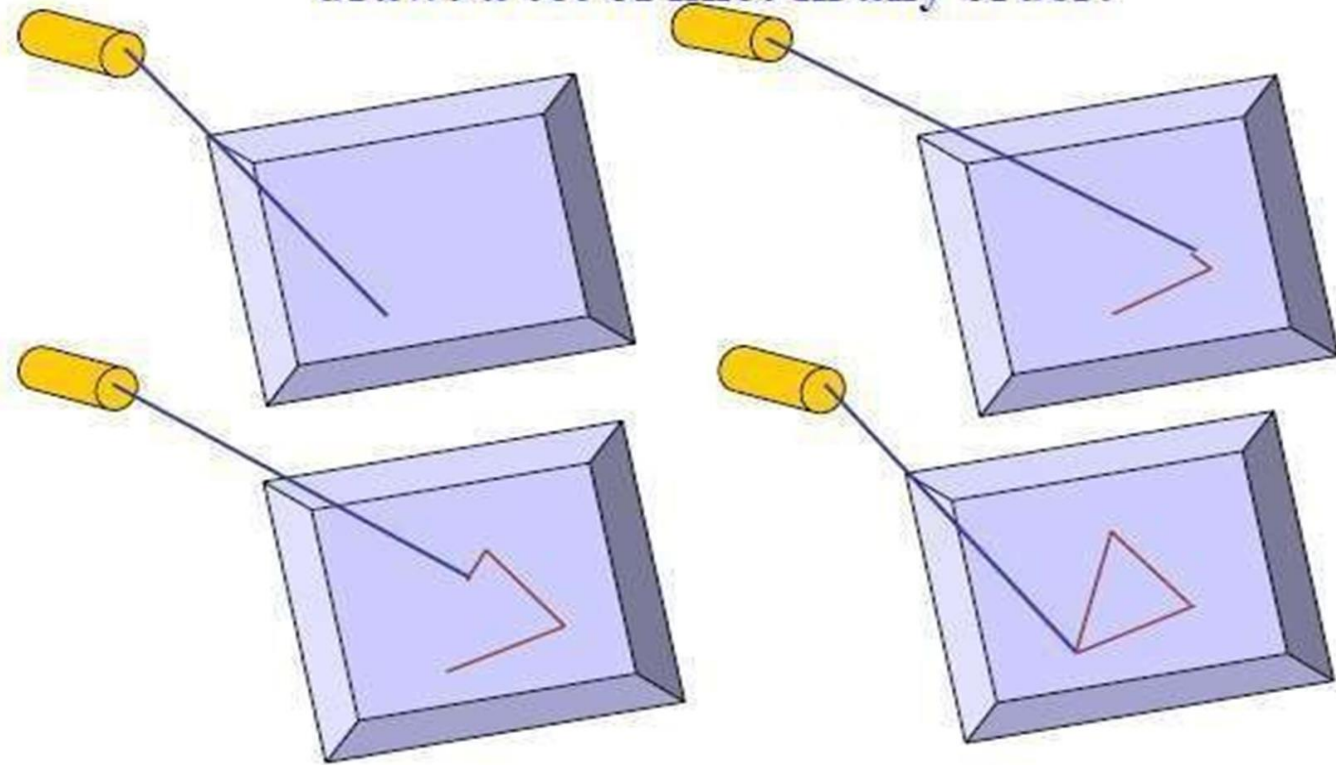


3. RANDOM SCAN DISPLAY

- A random-scan display unit, has an electron beam directed only to the parts of the screen where a picture is to be drawn.
- Random-scan monitors draw a picture one line at a time.
- These are also referred to as vector displays (or stroke-writing or calligraphic displays).
- The component of a picture (lines and curves) can be drawn and refreshed by a random-scan system in any specified order.
- A pen plotter operates in a similar way and is an example of a random scan, hardcopy device.



Random-scan display system draws a set of lines in any order.



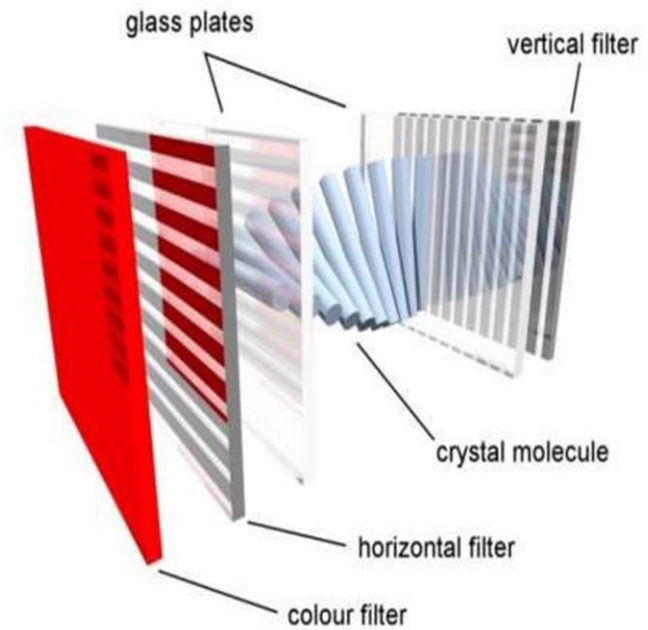
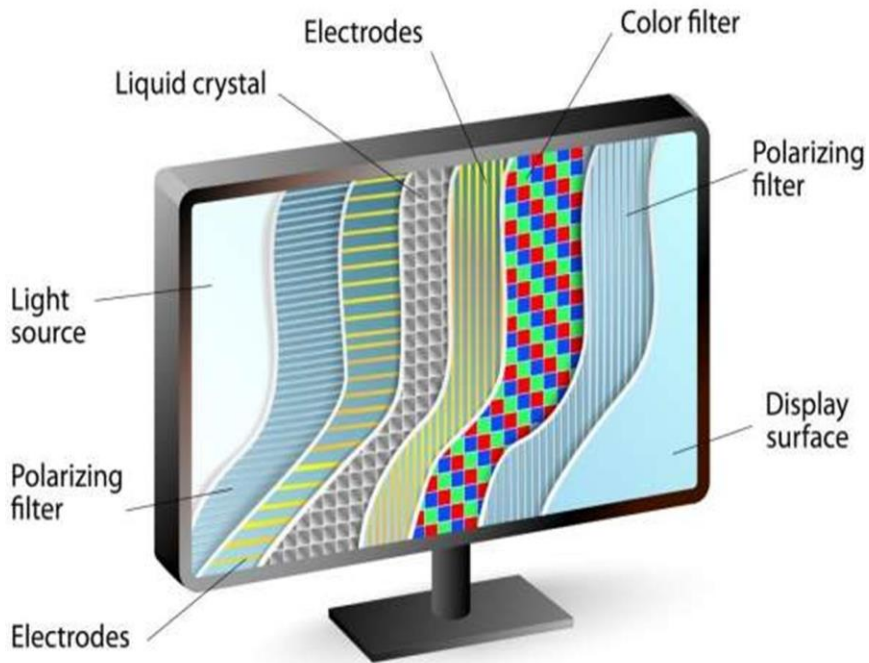


4. Liquid Crystal Display (LCD)

- A liquid crystal display is a thin, flat display device made up of any number of pixels arrayed in front of a light source or reflector.
- It uses very small amounts of electric power, and is suitable for use in battery- powered electronic devices.
- Liquid Crystals are a mixture of solid and liquid. When the current flows inside it, its position changes into the desired color.
- They have characteristics like: rod-like molecular structure, or easily polarizable constituents.



LIQUID CRYSTAL DISPLAY





5. Light Emitting Diode (LED)

- A Light Emitting Diode (LED) is a semiconductor device, which can emit light when an electric current passes through it.
- The size of the LED is small, so we can easily make any display unit by arranging a large number of LEDs.
- It consumes more power compared to LCD.
- LED is mainly used on TV, smartphones, traffic light, etc.
- LEDs are powerful in structure, so they are capable of withstanding mechanical pressure. LED also works at high temperatures.



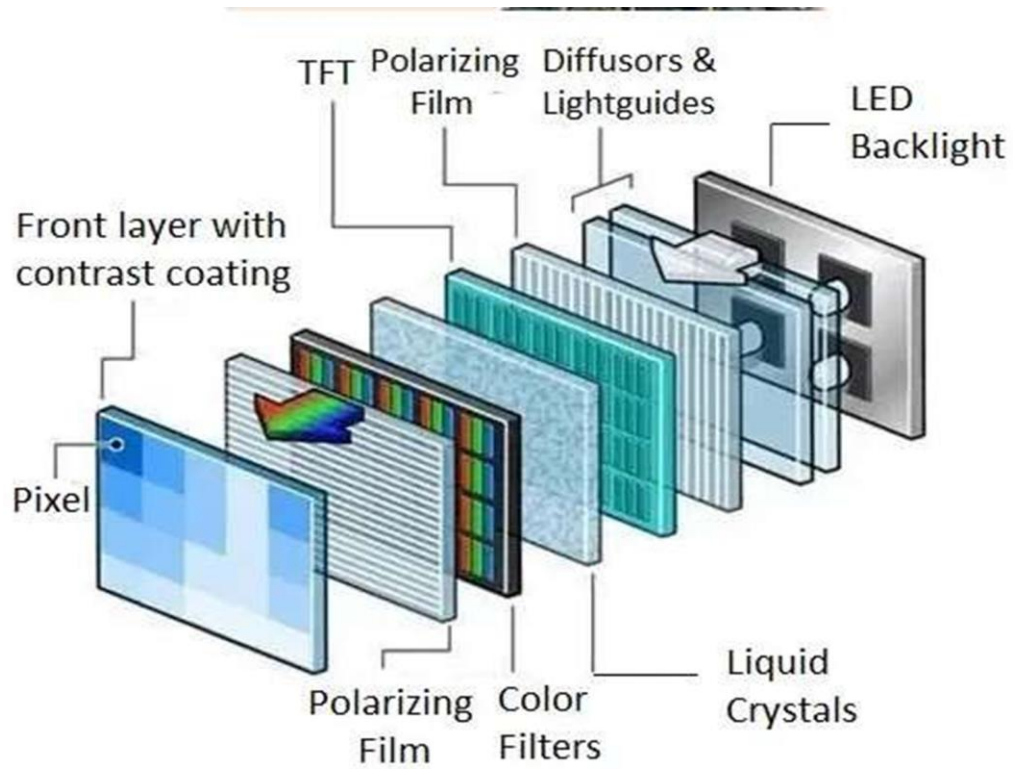


Fig: Light Emitting Diode (LED)