

TOPIC- PLASMA TV

PAPER- ELECTRONICS

CLASS- M.SC.

SEMESTER- IV

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FLAT PANEL DISPLAY

- Flat Panel Display (FPD) devices are the display devices that have less weight, low power consumption and small size in comparison to normal cathode ray tube (CRT). Due to these advantages, FPDs have replaced CRTs in communication and information technology.
- FPD are of two types –
 - Emissive Display:* convert electrical energy into optical energy e.g. plasma panel, LED panel.
 - Non Emissive Display:* convert sun light or other forms of energy into graphic patterns e.g. LCD panel.
- Most of these technologies are based on electroluminescence as in LED, gas discharge plasma, liquid crystal (LC) and vacuum fluorescence (VF).
- The picture elements (pixels) are arranged in a matrix at the intersections of several hundred rows and columns. In a 640× 480 Video Graphic Array (VGA) display, for example, 640 vertically oriented conducting stripes are placed on the inside of a glass plate. The next layer of the panel, placed between the front glass and the back panel, contains 480 horizontally oriented conducting stripes.

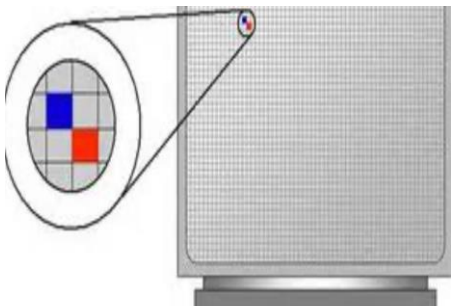


Fig 1

PLASMA TV

- **Plasma-** It is the fourth state of matter, which is formed when a gas is continuously heated. The molecules and atoms break apart, releasing some electrons which move as free electrons and leave behind positive ions. This mixture of positively charged ions and negatively charged electrons conducts electricity easily. This hot soup of electrons and ions is called 'Plasma'. So, plasma is an 'ionized gas'. Plasma can be generated not only by heating but also by subjecting the gas to a strong electromagnetic field
- **Plasma TV-**
 - ❖ *The plasma display panel consists of millions of tiny cells or compartments sandwiched between two panels of glass (fig 2). These tiny compartments are the smallest units of picture display and are called 'Pixels'. The pixel cells in plasma tv are filled with small amount of neon or xenon gas, that form the plasma, and coated from inside with RGB (red, green and blue) trio of phosphor chemicals.*
 - ❖ *The operation of plasma cells depends on the excitation of phosphors by means of UV rays that are emitted by discharge in the plasma. The discharge in plasma in each pixel is controlled by providing driving voltage to the correct rows and columns of the grid of horizontally and vertically mounted electrodes (shown by yellow lines in fig 3).*
 - ❖ *If one wants to activate one of the red pixels, the two specific electrodes leading to that pixel put a high voltage across it, causing ionization of plasma and emission of UV rays. The UV rays when fall on the Red phosphor coating, emit red light.*
 - ❖ *The exact number of pixels depends on the size of the TV screen as well as its resolution. A plasma TV with 854 × 480 has exactly 409,920 pixels. A dot matrix of 640 × 400 pixels is available in the display area of 21 × 13 cm. Resolution of most commonly used enhanced definition (ED) are 840 × 480 and 854 × 480. With the emergence of HDTV, resolution became higher: 1024 × 1024, 1024 × 768, 1280 × 768.*

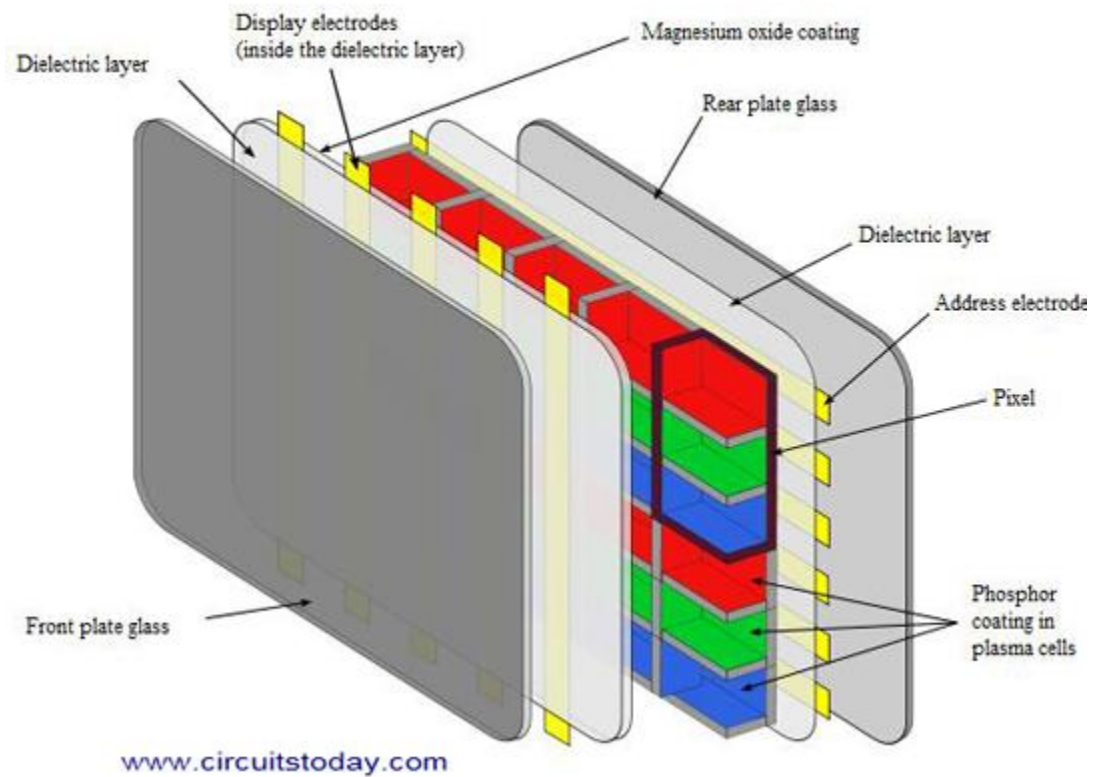


Fig 2

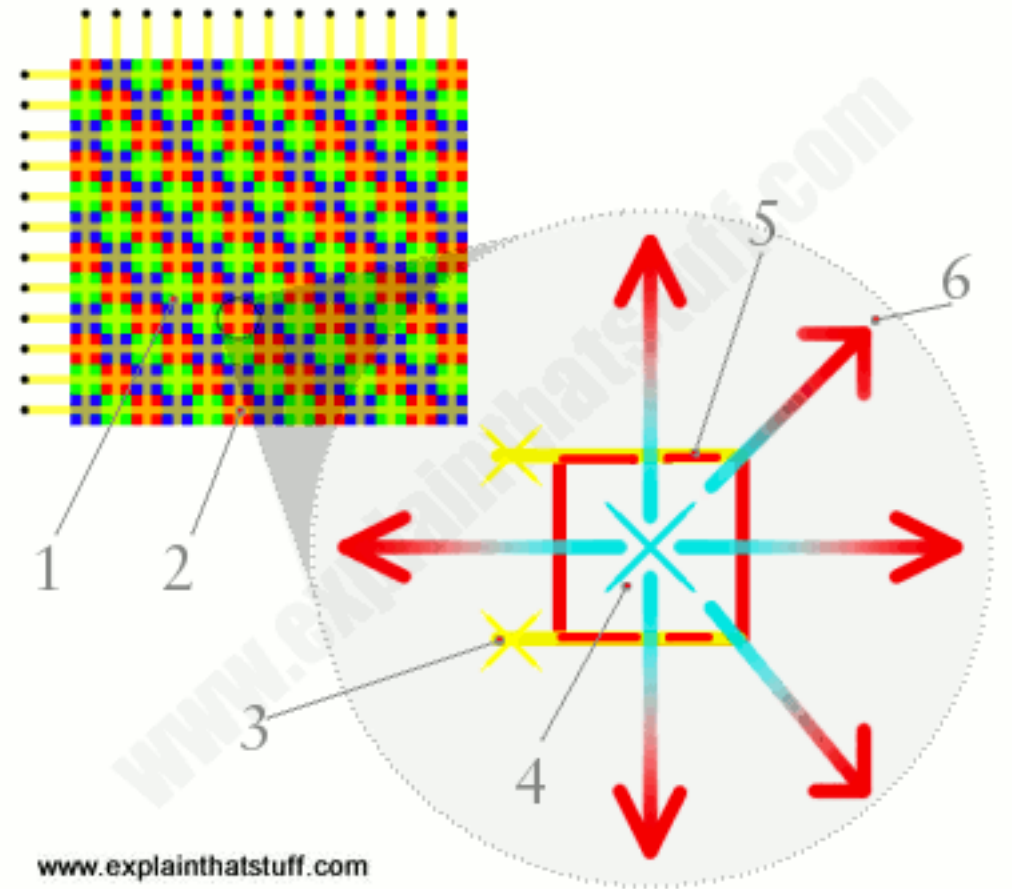


Fig 3

ADVANTAGES AND DISADVANTAGES OF PLASMA TV

- **Advantages**

1. Slim, weighs less than CRT.
2. Can be watched from wider angles without much distortion in the image.
3. High clarity, brighter and better contrast in picture than other displays
4. Pixels switch on and off thousand times faster than LCD.
5. Life span of about 100,000 hours.
6. Little motion blur.

- **Disadvantages**

1. Cost is much higher.
2. Energy consumption is high, nearly 300-700 watt in comparison to 20-250 watt in LCD.
3. Produces glare due to reflection.
4. Displays not available in smaller sizes.
5. Fragile, difficult to transport.
6. When stationary image is left for a long time, the phosphors overheat and leave a mark on the screen.