

Video Engineering (EC0605)
Unit-4
B.Tech (Electronics and Communication)
Semester-VI

- **Prof. Divyangna Gandhi**

Digital Video Standards and Advanced TV Technology

Digitization

- Digitization is the process of converting information into a digital format. In this format, information is organized into discrete units of data (called bits) that can be separately addressed (usually in multiple-bit groups called bytes). This is the binary data that computers and many devices with computing capacity (such as digital camera) can process
- Text and images can be digitized similarly: a scanner captures an image (which may be an image of text) and converts it to an image file, such as a bitmap . An optical character recognition (OCR) program analyzes a text image for light and dark areas in order to identify each alphabetic letter or numeric digit, and converts each character into an ASCII code

- Audio and video digitization uses one of many analog to digital conversion processes in which a continuously variable (analog) signal is changed, without altering its essential content, into a multi-level (digital) signal. The process of sampling measures the amplitude (signal strength) of an analog waveform at evenly spaced time markers and represents the samples as numerical values for input as digital data.
- Digitizing information makes it easier to preserve, access, and share
- For example, an original historical document may only be accessible to people who visit its physical location, but if the document content is digitized, it can be made available to people worldwide. There is a growing trend towards digitization of historically and culturally significant data.

Why HDTV

- Higher Resolution Picture
- Wider Picture
- Digital Surround Sound
- Easy to interface with computer

HDTV

- High definition television (HDTV) provides a resolution that is substantially higher than that of standard definition television. In HDTV, recent digital techniques are used for processing television signals.

HDTV provides

- Improvement in both vertical and horizontal resolution of the reproduced picture by approximately 2:1 over existing standards.
- Much improved color reproduction.
- Higher speed ratio at least 5:3 and Stereophonic sound
- 1080p → 1920 x 1080p : - 2.1 megapixel (MPx) per frame
- 1080i → 1920 x 1080i : - 2.1 megapixel (MPx) per frame
- 720p → 1280 x 720p : - 0.9 megapixel (MPx) per frame

- Their implementation result is a picture quality as clear as obtained from 35mm cine films and sound as good as from digital audio discs.
- HDTV may be transmitted in various formats
- 1440 x 1080i: - 1.6 megapixel (MPx) per frame
- The letter 'P' stands for progressive scan while 'I' indicates interlaced. Interlaced is fine for still and slow moving images. Progressive is fine for high speed video

HDTV and NTSC

	HDTV USA	NTSC
Aspect ratio	16:9	4:3
Largest frame rate	60 frames/sec	30 frames/sec
Vertical refresh rate	60 Hz	60 Hz
Highest resolution	1080 lines	525 lines

DIGITAL VTR

What is VTR ?

- It is a video tape recorder designed to record video material , usually on magnetic tape
- VTRs originated as individual tape reels , serving as a replacement for motion picture film stock and making recording for television applications cheaper and quicker



A reel of 2-inch quad videotape compared with a mini videocassette



AMPEX VTR VR-3000



BOSCH Quad VTR Model BCM 40

Advantages

- Are so much useful in order to make children mind sharper during studies.
- Increase so much interest of the young students who are keen to learn something.
- A voice recording can be recorded simultaneously with the recording of the image to identify the object and to explain what is being shown.
- A whole tape can be duplicated commercially , or with two tape machines.

Disadvantages

- No hard copies is produced.
- Viewing requires a video tape player and a monitor.
- During the infrared scanning process , the VCR records the slight vibration and temporarily out of focus image produced while the camera is moving.

Liquid Crystal Display

- The LCD screen is a flat panel display that uses the light modulating properties of liquid crystals.
- Liquid crystals do not emit light directly, instead uses a backlight or reflector to produce images in colour or monochrome.
- LCD does not produce any illumination on its own, it in fact depends entirely on illumination falling on it from external source for its visual effect.

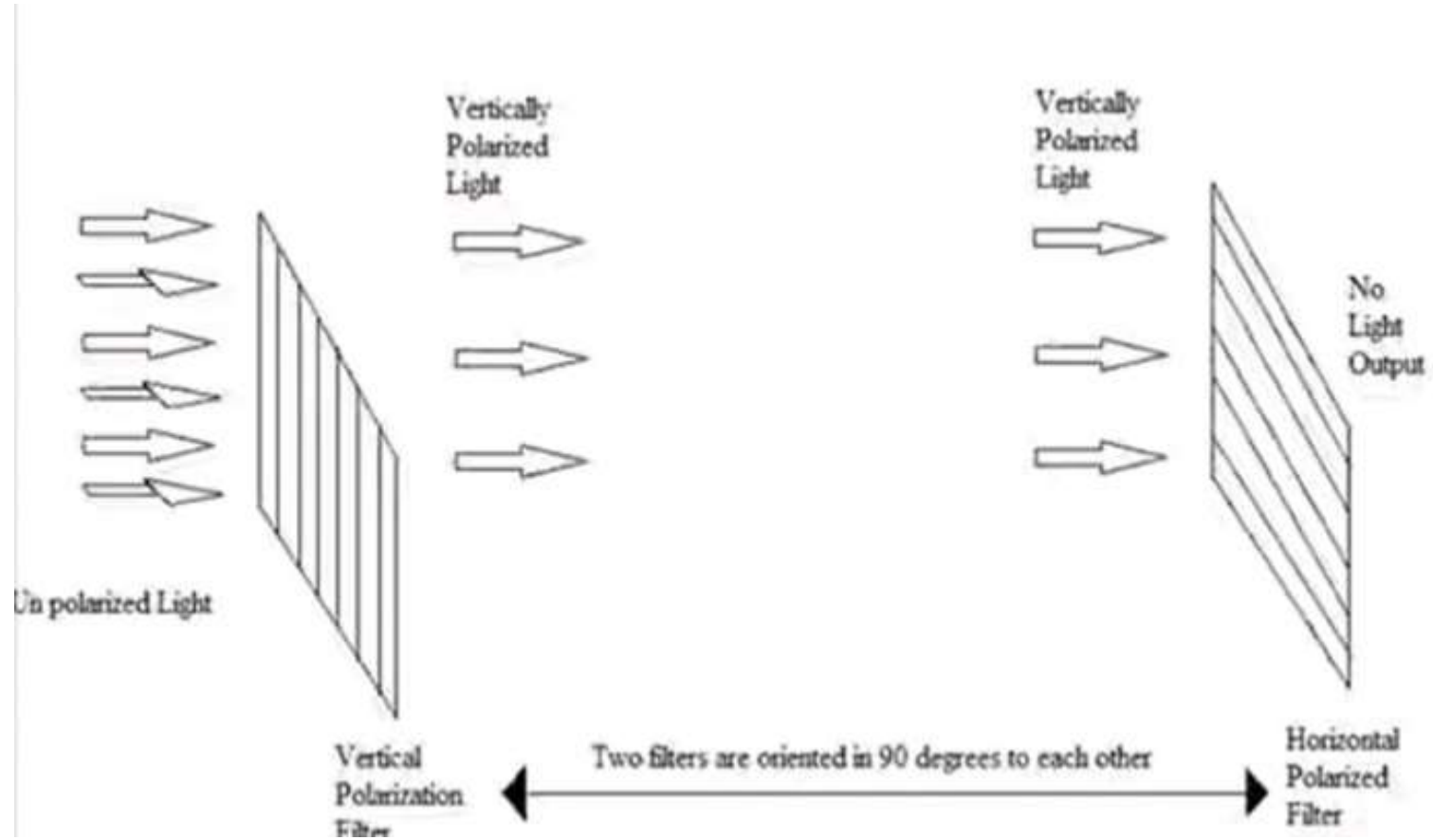
- It is called “liquid crystal display “ because these compounds have a crystalline arrangement of molecules, and still they flow like a liquid.

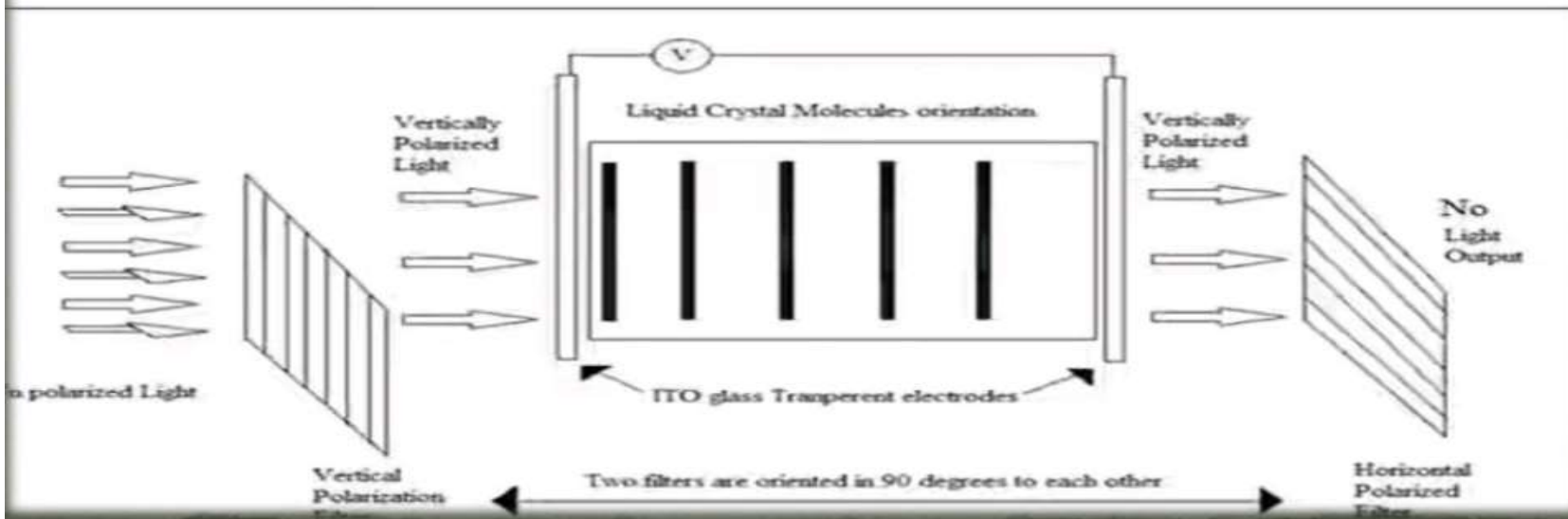
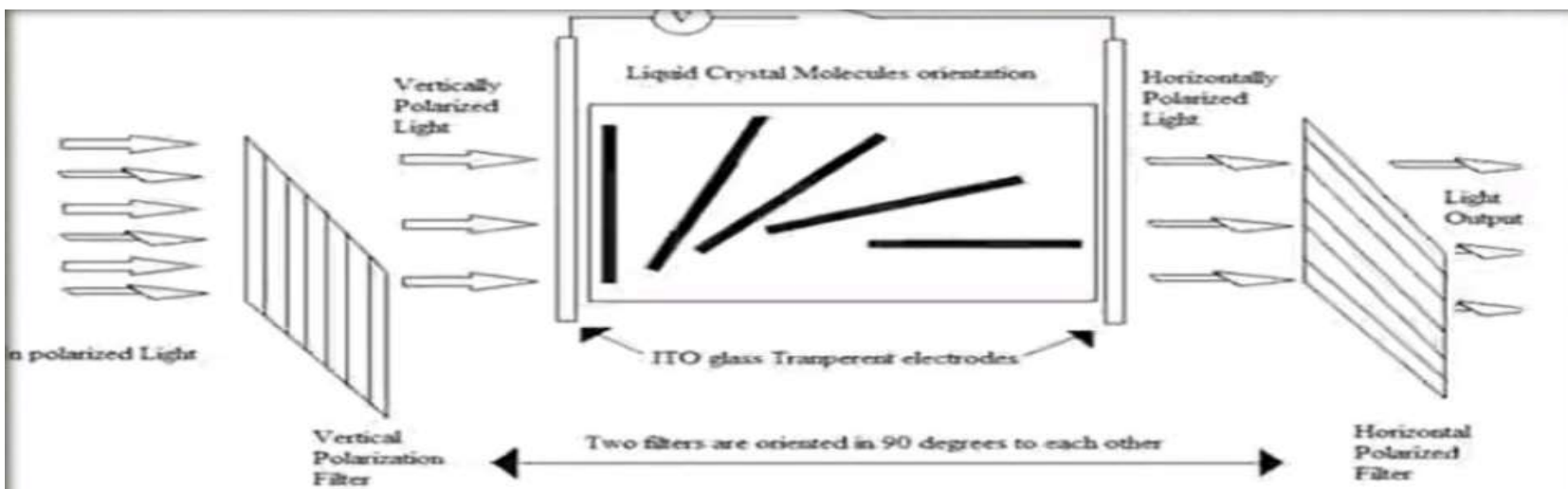
There are two polarization filters oriented at 90 degrees.

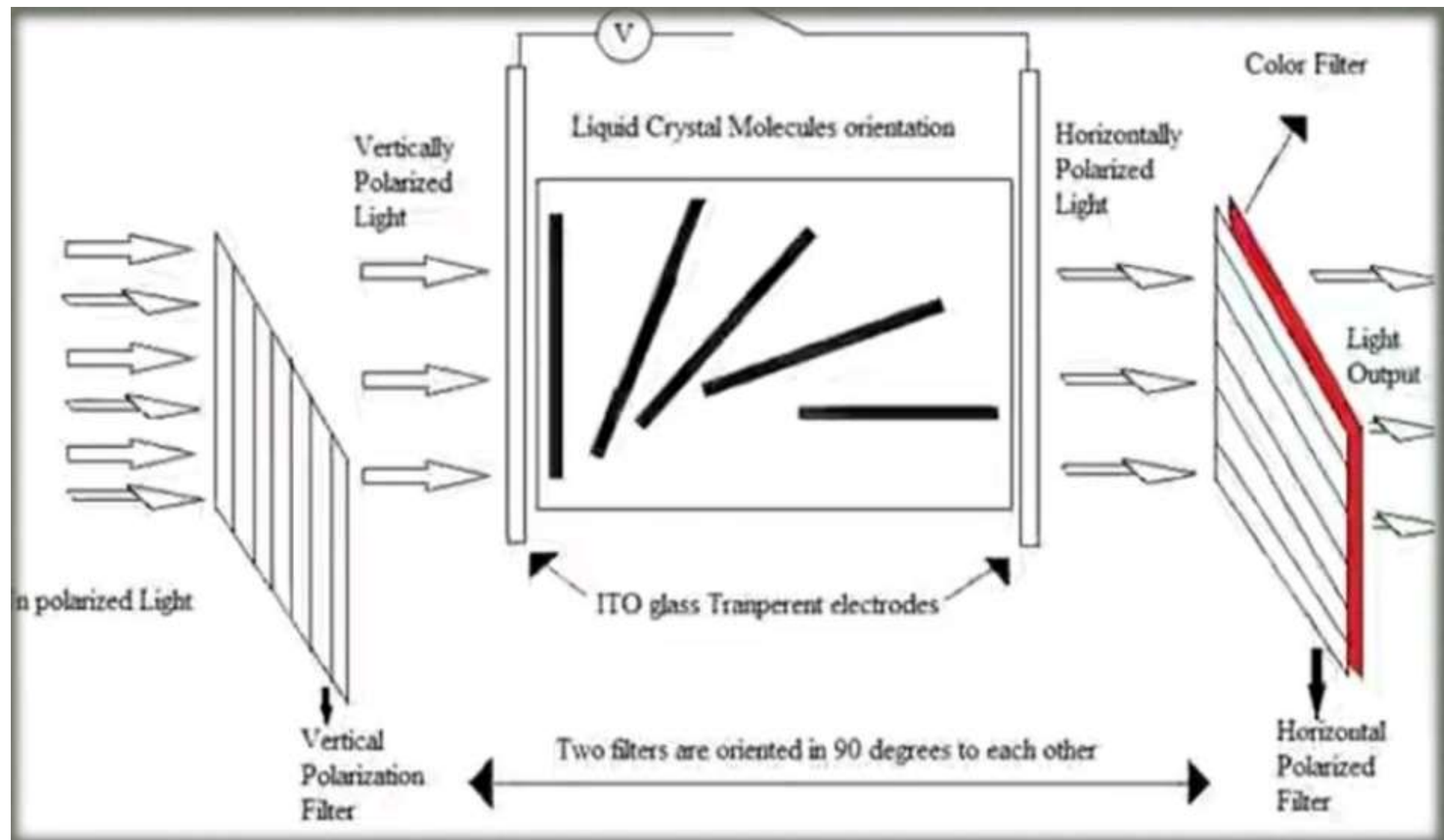
1)Vertically polarized filter

2)Horizontally polarized filter

Working







Advantages

- LCD's consume less amount of power compared to LED and CRT
- LCD's are thinner and lighter compared to CRT
- It does not get affected due to increase and decrease in air pressure
- Can be made in almost any size or shape
- Little heat is emitted during operation during low power consumption

Disadvantages

- It has a limited viewing angle
- Uneven backlighting in some monitors
- It requires additional light source
- It's speed is very slow

Seminar Topics

- Chroma Sub sampling
- Video Interfaces
- Digital color TV receiver
- LED TV

Reference

- From Internet