

**Dr.SNS RAJALAKHMI COLLEGE OF ARTS AND SCIENCE**

**(AUTONOMOUS)**

**DEPARTMENT OF COMPUTER APPLICATIONS (PG)**

**Course Name & Code : OPEN ELECTIVE ( PC HARDWARE AND  
TROUBLESHOOTING) 16PCA903**

**Class : III UG**

**Semester : VI**

**Year : 2022-2023(Even)**

**Prepared By : Ms.S.Lalitha**

## UNIT IV

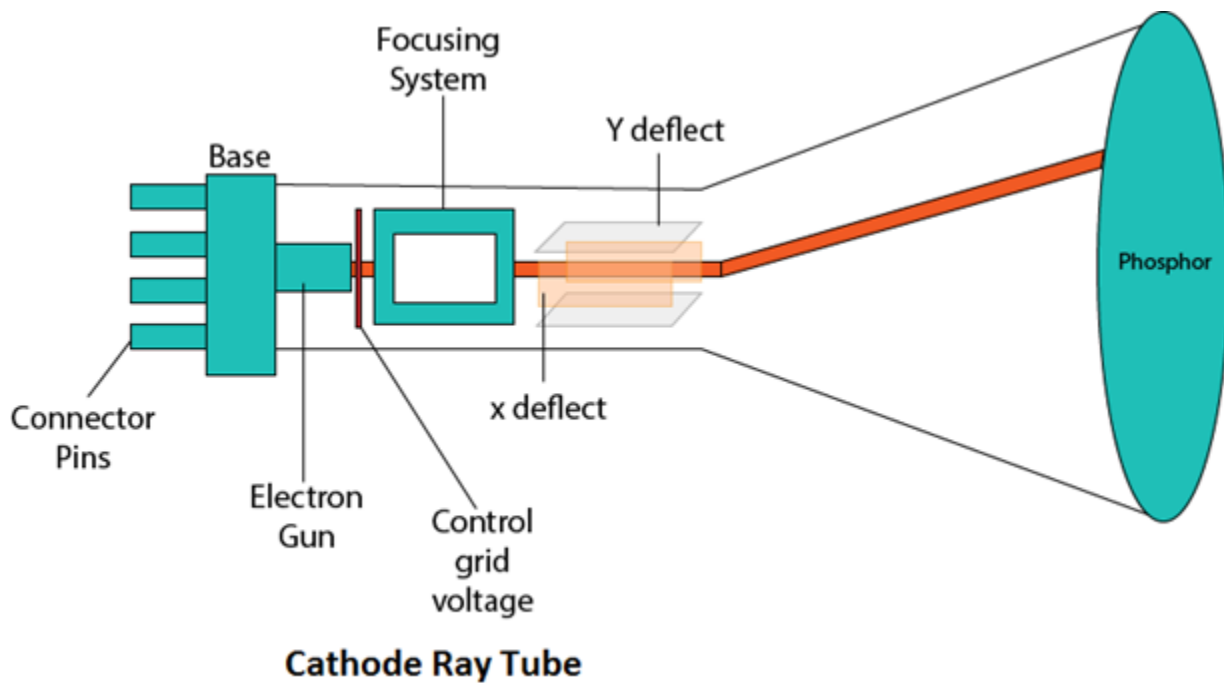
### Computer Monitors

#### What Is a CRT Monitor?

A CRT (cathode-ray tube) monitor is an analog display device that creates a visible image on the screen by directing three electron beams over millions of phosphor dots to make them light up. In a color monitor, the screen is composed of numerous stripes of alternating red, green, and blue phosphor dots, which get activated by the electrons and combine to make countless different hues.

CRT stands for Cathode Ray Tube. CRT is a technology used in traditional computer monitors and televisions. The image on CRT display is created by firing electrons from the back of the tube of phosphorus located towards the front of the screen.

Once the electron heats the phosphorus, they light up, and they are projected on a screen. The color you view on the screen is produced by a blend of red, blue and green light

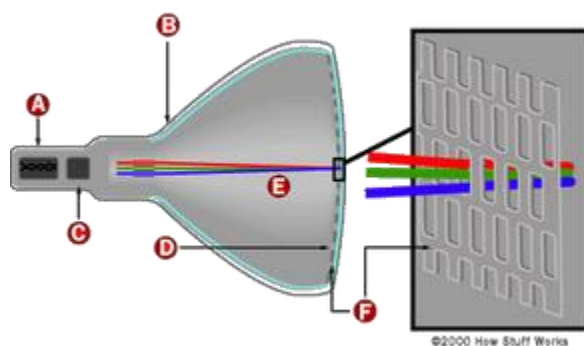


A CRT monitor contains millions of tiny red, green, and blue phosphor dots that glow when struck by an electron beam that travels across the screen to create a visible image. The illustration below shows how this works inside a CRT.

The terms **anode** and **cathode** are used in electronics as synonyms for positive and negative terminals. For example, you could refer to the positive terminal of a **battery** as the anode and the negative terminal as the cathode.

In a cathode ray tube, the "cathode" is a heated filament. The heated filament is in a vacuum created inside a glass "tube." The "ray" is a stream of electrons generated by an electron gun that naturally pour off a heated cathode into the vacuum. Electrons are negative. The anode is positive, so it attracts the electrons pouring off the cathode. This screen is coated with **phosphor**, an organic material that glows when struck by the electron beam.

There are three ways to filter the electron beam in order to obtain the correct image on the monitor screen: shadow mask, aperture grill and slot mask. These technologies also impact the sharpness of the monitor's display. Let's take a closer look at these now



## Specifications

Important display specifications to consider when searching for CRT monitors include:

- diagonal
- image resolution
- vertical scanning frequency
- color

The diagonal is the measurement from one corner to the corner diagonally across from it. Common diagonals include 10 in., 12 in., 14 in., 15 in., 17 in., 19 in., 21 in., and 23 in. Image resolution is a measure of how sharp the image will appear on the screen; the higher the resolution, the sharper the image. The vertical scanning frequency, or refresh rate, is the rate at which each pixel on a screen is re-drawn. A low refresh rate results in an image that flickers, resulting in eyestrain. The standard for flicker-free images is 85Hz. CRT monitors can be supplied in color or monochrome. The range of colors is generated with varying combinations of different discrete colors. One common technique is sensing the red, green, and blue components (RGB) and combining them to create a wide spectrum of colors. A monochrome monitor has an image that is presented in black, white, and grayscale.

Important physical specifications to consider when searching for CRT monitors include:

- mounting
- user controls
- external connections
- technology

Mounting options for CRT monitors include panel mount, chassis mount, rack mount, and desktop. User controls include front panel, rear panel, and on-screen display. Common external connections include serial interfaces, parallel interfaces, USB, SCSI, and mouse port. Technology choices for CRT monitors include shadow mask, aperture grille, and enhanced dot pitch. A shadow mask is a fine metal sheet containing holes that correspond with the tube's phosphor dots. As the electron beam passes through these holes, it becomes slightly narrower and is guided more accurately toward its target phosphor. An aperture grille is made up of fine strips of metal that are strung at high tension

across the inside of the tube. The phosphor lines have no horizontal breaks. The aperture grill design attributes allow a greater amount of the electron beam through, resulting in a brighter picture. The strips run from top to bottom, so the tube can be flat vertically, reducing glare and image distortion. Enhanced dot pitch (EDP) concentrates more on the phosphor implementation. The distance between the phosphor dots on the horizontal has been reduced, and the dots have been elongated so they are oval rather than round.

## **LCD Monitors**

Liquid Crystal Display Monitor (LCD Monitor)

What Does Liquid Crystal Display Monitor (LCD Monitor) Mean?

A liquid crystal display (LCD) monitor is a computer monitor or display that uses LCD technology to show clear images, and is found mostly in laptop computers and flat panel monitors. This technology has replaced the traditional cathode ray tube (CRT) monitors, which were the previous standard and once were considered to have better picture quality than early LCD variants. With the introduction of better LCD technology and its continuous improvement, LCD is now the clear leader over CRT, in terms of color and picture quality, not to mention capabilities for large resolutions. Also, LCD monitors may be made much more cheaply than CRT monitors.

### **LCD – Working**

We always use devices made up of Liquid Crystal Displays (LCDs) like computers, digital watches and also DVD and CD players. They have become very common and have taken a giant leap in the screen industry by clearly replacing the use of Cathode Ray Tubes (CRT). CRT draws more power than LCD and are also bigger and heavier. LCD's have made displays thinner than CRT's. Even while comparing the LCD screen to an LED screen, the power consumption is lesser as it works on the basic principle of blocking light rather than dissipating. All of us have seen an LCD, but no one knows the exact working of it. Let us take a look at the working of an LCD.



[www.circuitstoday.com](http://www.circuitstoday.com)

### **Basics of LCD Displays:-**

The liquid-crystal display has the distinct advantage of having a low power consumption than the LED. It is typically of the order of microwatts for the display in comparison to the some order of milliwatts for LEDs. Low power consumption requirement has made it compatible with MOS integrated logic circuit. Its other advantages are its low cost, and good contrast. The main drawbacks of **LCDs** are additional requirement of light source, a limited temperature range of operation (between 0 and 60° C), low reliability, short operating life, poor visibility in low ambient lighting, slow speed and the need for an ac drive.

### **Basic structure of an LCD**

A liquid crystal cell consists of a thin layer (about 10  $\mu$  m) of a liquid crystal sandwiched between two glass sheets with transparent electrodes deposited on their inside faces. With both glass sheets transparent, the cell is known as *transmittive type cell*. When one glass is transparent and the other has a reflective coating, the cell is called *reflective type*. The LCD does not produce any illumination of its own. It, in fact, depends entirely on illumination falling on it from an external source for its visual effect

## **Types of LCD/Liquid Crystal Displays.**

*Two types of display available are dynamic scattering display and field effect display.*

When *dynamic scattering display* is energized, the molecules of energized area of the display become turbulent and scatter light in all directions. Consequently, the activated areas take on a frosted glass appearance resulting in a silver display. Of course, the unenergized areas remain translucent.

*Field effect LCD* contains front and back polarizers at right angles to each other. Without electrical excitation, the light coming through the front polarizer is rotated 90° in the fluid.

Now, let us take a look at the different varieties of liquid crystals that are available for industrial purposes. The most usable liquid crystal among all the others is the nematic phase liquid crystals.

### **Nematic Phase LCD**

The greatest advantage of a nematic phase liquid crystal substance is that it can bring about predictable controlled changes according to the electric current passed through them. All the liquid crystals are according to their reaction on temperature difference and also the nature of the substance.

### **Colour Liquid Crystal Display**

Colour LCDs are those that can display pictures in colours. For this to be possible there must be three sub-pixels with red, green and blue colour filters to create each colour pixel. For combining these sub-pixels these LCDs should be connected to a large number of transistors. If any problem occurs to these transistors, it will cause a bad pixel.

One of the main disadvantages of these types of LCDs is the size. Most manufacturers try to reduce the height than gain it. This is because more transistors and greater pixels will be needed to increase the length. This will increase the probability of bad pixels. It is very difficult or also impossible to repair a LCD with bad pixels. This will highly affect the sale of LCDs.

## **A Step by Step Guide to Installing a New Monitor to the Computer**

### **LCD Screen Installation**

Generally most laptops provide very easy access to the LCD. Here are the most basic steps that relate to the majority of laptops:

**Disconnect the power and remove the battery whenever possible!**

1. Most laptops come with a bezel that is either secured with screws and plastic snaps, or is just snapped in.
2. After removing the bezel the mounting screws of the LCD will be exposed.
3. Once the screen is unscrewed it can be lowered onto the keyboard.
4. The video connector must be disconnected very carefully using both hands, without a slant.
5. New screen is reconnected using the same video cable, using both hands without a slant.
6. Screen is then remounted and the bezel is reattached.

### **Touch Screen**

What Does Touch Screen Mean?

A touch screen is a computer display screen that serves as an input device. When a touch screen is touched by a finger or stylus, it registers the event and sends it to a controller for processing.

A touch screen may contain pictures or words that the user can touch to interact with the device.

A touch screen has two main advantages. First, it allows users to interact directly with what is displayed, rather than indirectly with a pointer controlled by a mouse or touchpad. Secondly, it does not require the use of an intermediate device. Touch screens can be attached to computers



or to networks as terminals. They also play a prominent role in the design of digital appliances such as the personal digital assistant (PDAs), satellite navigation devices, mobile phones and video games.

How a touch screen event is registered depends on the touch screen's inherent technology. The three main touch screen technologies are:

- **Resistive:** This screen has a thin metallic layer that is conductive and resistive, so that touching results in a change in the electrical current sent to the controller. Pros: More affordable, not damaged by dust or water, responds to finger or stylus. Cons: Only 75% clarity and susceptible to damage by sharp objects.
- **Surface Acoustic Wave (SAW):** Ultrasonic waves pass over this screen. Touching it results in absorption of part of the wave, registering the position of the touch, which is sent to the controller. Pros: Responds to finger or stylus. Cons: May be damaged by dust or water.
- **Capacitive:** This screen is coated with an electrically-charged material. Touching it causes a change in capacitance, which allows the location to be determined and sent to the controller. Pros: Not damaged by dust or water and has high clarity. Cons: Must be touched with a finger only - a stylus cannot be used.

There are other, less-common touch screen technologies. These include:

- **Dispersive Signal Technology:** Introduced in 2002 by 3M, sensors detect mechanical energy during a touch. Complex algorithms interpret the data to determine the location, and data is sent to controllers. Pros: Durability, not affected by elements, excellent clarity and finger or stylus may be used. Cons: After the initial touch, the system is not able to detect a motionless finger or stylus.
- **Acoustic Pulse Recognition:** This system was released in 2006 by Tyco International's Elo division. It uses transducers located around the screen to transform vibration into electrical energy via algorithms that determine location. Pros: Good durability and clarity, resistant to the elements and well-suited to large displays. Cons: Cannot detect a motionless finger.

- Infrared: Detects touch via an array of light-emitting diodes (LEDs) and photo-detector pairs at the edge of the screen. Pros: No damage by elements, a finger or stylus may be used, highly durable with high clarity.
- Optical Imaging: Image sensors (cameras) placed at the edge of the screen pick up infrared black lights on the opposite side of the screen. Pros: Scalable, versatile, affordable and can be used for large displays.

## **Keyboard and Mouse**

### **KEYBOARD**

A keyboard is one of the primary input devices that allows users to input text into a computer or any other electronic machinery. It is a peripheral device that is the most basic way for the user to communicate with a computer.

#### Types of keyboards

Most computer users use the standard keyboard, which connects to the computer. Although there are many types of a computer keyboard, such are as follows:

**1. Flexible keyboard:** It is a type of keyboard that is made of soft silicone with highly portable. It is water and dust-resistant and does not require constant cleaning. It acts the same as a standard keyboard and connects to the computer via a [USB](#) connection serial port. These types of keyboards can also be more durable in terms of some ways, as compared to a traditional keyboard.

The flexible keyboard is made of soft silicone that saves it from a number of different substances. For instance, if you use the keyboard near the liquid spaces, the silicone skin provides excellent protection against spills. Furthermore, it does not make a sound when being used; that's why it is also called a silent keyboard. These keyboards are useful for traveling time because they can be rolled up into a bag and flexible in outdoorsy situations.



**2. Ergonomic Keyboard:** This type of keyboard is beneficial for your body posture. Instead of adjusting yourself to fit the keyboard, it is designed to fit you easily, ease of use, and reduce strain. It is designed in that way; instead of bending their hands, it allows users to straight their hands. Generally, the space-bar is bigger as compared to a regular keyboard, which allows for fast typing.



**3. Wireless Keyboard:** It is a computer keyboard that is connected to computers, laptops, or tablets without any cables. It uses radio frequency (RF), infrared (IR), or [Bluetooth](#) technology to connect with devices. Users can move the wireless keyboard around without having to put it on a desk as it provides portability and flexibility to the users. It is designed by stainless steel material that increases its life for a long time. It can set up very easily by plugging the USB receiver into the computer.

It utilizes light waves to transmit signals to other infrared-enabled devices as it is based on infrared technology. Some wireless keyboards use radio frequency technology, which communicates via signals with a range from 27 MHz to up to 2.4 GHz.



**4. Mechanical Keyboard:** It is made with high quality that commonly used in both home and office. It is designed for long life with high durability and responsiveness. It provides crisp click sound, medium resistance, and better feedback for gaming performance and ultimate typing. It offers framing, switches, type print methods, functionality, PCB board, key construction, [LED](#) lighting, or more other better features as compared to traditional rubber dome keyboards



**5. Virtual Keyboard:** It is a software-based keyboard that enables users to type without the need for physical keys. It is an alternative for a physical keyboard or a digital representation of a QWERTY keyboard. These types of keyboards commonly have many pages of characters, including numbers, letters, punctuation, and symbols. Some virtual

keyboards also include options to insert emojis, stickers, or animated [GIFs](#) on the basis of the device's operating system. The devices that contained virtual keyboard are tablets, smartphones, and other portable devices, because these devices do not require the constant use of a physical keyboard.

#### Examples of virtual keyboards

- **Gboard:** Google created a virtual keyboard for Android and iOS that includes features like GIFs, customizable themes, and translation capabilities.
- **OSK:** It stands for an on-screen keyboard. It is commonly found in Microsoft Windows.



**6. Projection Keyboard:** It is a form of computer input device that can be connected via Bluetooth to the mini PC, tablet computer, or even smartphone. In projection keyboard, the image of a virtual keyboard is projected onto a surface. The device records the corresponding keystroke when a user touches any key from the shown keyboard on the surface. Some devices are connected via Bluetooth devices such as tablets, smartphones, mini-PC with [Android](#), [Windows operating system](#) or iOS, etc.



**7. Gaming Keyboard:** A keyboard that contains a few specific keys used for gamers is known as a gaming keyboard. The W, S, D, A, and arrow keys are widely used for games on the standard QWERTY keyboard. Gaming keyboards (mostly mechanical keyboard), the key switches need less depression that provides faster action for games.



## Keyboard features

Keysticks provides some additional features to make typing easier. It includes word prediction, so suggested words appear next to the screen keyboard to save you typing words in full, and it includes some alternative keyboard layouts designed for efficient text entry.

## What is Mouse?

A mouse is a small hardware input device used by hand. It controls the movement of the cursor on the computer screen and allows users to move and select folders, text, files, and icons on a computer. It is an object, which needs to be put on a hard-flat surface to use. When the users move the mouse, the cursor moves in the same direction on the display screen. The name mouse is derived from its size as it is a small, corded, and elliptical shape device that looks a bit like a mouse. A connecting wire of a mouse is imaginable to be the mouse's tail. Additionally, some of the mice have combined features like extra buttons, which may be assigned and programmed with many commands. The mouse invention is considered as one of the most important breakthroughs in the computer field as it helps to reduce the use of a [keyboard](#).

## What are the uses of a Mouse?

A mouse is capable of performing various functions on a computer, which are as follows:

- **Move the mouse pointer:** The main function of a mouse is to move the mouse cursor on the screen in the desired direction.
- **Select:** A mouse provides users the option to select the text, file, or folder and many files at once. For example, if you want to send multfile to anyone, you can select many files at once and can send them.
- **Open or execute a program:** You can open a folder, icon, or other objects by a mouse. You are required to move the cursor to a file, folder, or an icon, then double click on the object that you want to open or execute.
- **Drag-and-drop:** When you select something, it can also be moved from one location to another by using the drag-and-drop method. In this method, first, you need to highlight

the file or an object that you want to move. Then, move this file while pressing the mouse button and drop it on the desired location.

- **Hovering:** When you move the mouse pointer on any object, hover
- **Scroll Up & Down:** If you are viewing a long web page or working with a large document, you need to scroll up or down a page. The mouse's scroll button helps to up and down your document page; otherwise, you can also click and drag the scroll bar.
- **Perform other functions:** Most of the desktop mouse contains buttons, which can perform any function by programming them according to the requirement. For instance, on the thumb portion, many mouses have two side buttons that can be programmed to go back on web pages.
- **Playing Game:** A mouse provides users the option to play various games like chase games, in which a mouse is used to select any particular objects.
- **Combination Activities:** A mouse can be used in many combination activities like, Ctrl + Mouse click can be used for the hyperlink in new windows.

## Types of Mouse

There are different types of mouse used with a computer. In modern times, an optical mouse is one of the most common types of the mouse for a desktop computer that connects to the USB port, which is called a USB mouse. And the touchpad is the most popular type of mouse used for laptop computers. A list is given below with several types of the mouse:

- Optical
- Joystick
- Mechanical
- Cordless (Wireless)
- Footmouse
- Touchpad (Glidepoint)
- Trackball
- TrackPoint



- J-Mouse
- IntelliMouse (Wheel mouse)
- Laser Mouse
- **1. Optical Mouse:** It is an advanced computer pointing device, first introduced by Microsoft on **19 April 1999**. It tracks movement by using a laser or light-emitting diodes (LEDs). It takes microscopic snapshots thousand or more images per second of the working surface. The images changes at the time of moving the mouse. Instead of interpreting the motion of a rolling sphere, it detects the movement by sensing changes in reflected light. It does not require cleaning as it has no moving parts.
- In **1999**, before introducing the mouse by Microsoft, an optical mouse was invented by many different companies and inventors. In the 1980s, Steve Kirsch and Richard Lyon both developed an optical mouse with their own editions, which needed a special surface to work (move the cursor).
- All-optical mice are not wireless, to analyze the movement, these types of mouse use the optic technology. An optical mouse is available with both types of versions wireless and corded.



**2. Joystick:** It is an input device that moves in all directions and controls a machine or a symbol in a computer program. It is much like a mouse, except that if you stop to move the mouse, the cursor will also stop. But with the joystick, the pointer does not stop and moves continuously in the direction the joystick has pointed. You must need to return the joystick to its upright position for stopping the pointer. Although most of the joysticks have two buttons, which are known as triggers.



**3. Mechanical mouse:** It is a type of computer mouse, also called a ball mouse. It consists of a rubber or metal ball on its underside. It contains the sensors, when the user moves a mouse in any direction, the sensors inside the mouse detect the movement and move the mouse pointer on-screen in the same direction. An optical mouse took the place of the mechanical mouse. In the 1980s, it became the universal tool for computer interaction. Furthermore, a mechanical mouse is similar in shape and function, but rather than on the ball; it depends on optical sensors that make it more reliable.



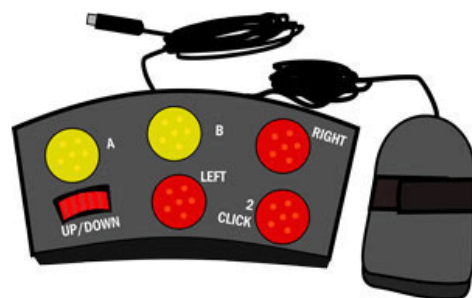
**4. Cordless (wireless) Mouse:** It is an input device that connects to a computer without any wire. Basically, mouse contains cords to connect the computer. With time, wireless technology became popular in the early 2000s, and the wireless mouse started to include Bluetooth, infrared radio waves, and radio frequency technology. Commonly, a USB receiver is used to connect the computer with a wireless mouse, which is plugged into the computer and accepts signals from the wireless mouse.

In 1984, the first wireless was invented and named it the Logitech Metaphor. Wireless mice require batteries to work that can be AAA batteries, AA batteries, or Li-ion or rechargeable NiMH batteries. If a mouse is rechargeable, it needs a base station to charge the batteries.

Around the turn of the millennium, most popular brands like Logitech and apple started to manufacture wireless (cordless) mice by using radio frequency (RF) and Bluetooth technology.



**5. Footmouse:** It is a type of computer mouse that provides users the ability to control the mouse pointer or cursor with their feet. The reason behind developing this mouse is to enable the users to keep their hands on their keyboard while using a mouse. It means a user can use both keyboard and mouse together without interrupting their hands with the footmouse. Hunter Digital company is an example of developing the footmouse. Also, it is more beneficial for users with disabilities or with neck or high-back problems.



**6. Touchpad:** It is a flat control surface, also known as a glide point, glide pad, trackpad, or pressure-sensitive tablet. It is used to move the cursor by using fingers. It is primarily found on laptops and used in place of an external mouse. It is designed to be operated with your finger. By

dragging your fingertip across the touchpad's flat surface, you can move the mouse cursor in the desired direction on the screen. It also includes two buttons under the touch surface like the most computer mouse, which correspond to the left and right-click buttons, respectively. Some modern touchpads have multi-touch technology, which allows users to perform different actions by using their multiple fingers on the computer. For instance, some programs need to use two fingers to pinch and zoom on an image or a document. You can also use two fingers to rotate an image left or right.

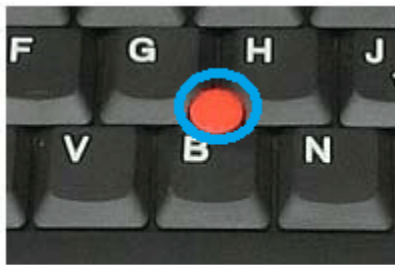


**7. Trackball:** It is a hardware input device that acts the same function as a mouse, but it includes a moveable ball on the top that allows users to move the cursor in any direction. It is designed like an upside-down mouse, which needs less arm and wrist motion as compared to a regular mouse. Because, rather than moving the whole mouse, you are only required to roll the moveable ball until with your hand to generate motion input. Although trackballs are mainly used with computers, you can also find it in other electronics, like self-serve kiosks, mixing boards, and arcade games. These devices commonly include trackballs, which are bigger as compared to ones used with computer input devices.



**8. TrackPoint:** It is a cursor control device, also known as a style pointer, pointing stick, or nub. In 1992, IBM introduced the first TrackPoint mouse used with portable computers. Sometimes, it

is called an eraser pointer, because it looks like a pencil's eraser head. It is located between the "G," "H," and "B" keys in the middle of the keyboard. This technology allows the users to keep their hands on the keyboard, and they can also control the mouse without interrupting their hands. It is operated with the help of pushing in the desired direction where users want to move the cursor.



TrackPoint

**9. J-Mouse:** It is another type of mouse that was used with older portable computer devices. Like a standard computer mouse, it uses the "J" key from the keyboard to operate the functions. Thus, it is known as JMouse. It commonly contains two left and right-click buttons under the spacebar like some other mice. It is no longer used as it was difficult to use this mouse, and also some better technologies were introduced.



**10. IntelliMouse:** It was first developed by Microsoft on 22 July 1996. It is an optical mouse brand, also known as a scroll mouse or wheel mouse, which includes a wheel between the left and right buttons. This wheel is used to scroll up and down a web page. The design of an IntelliMouse was based on the Microsoft Mouse 2.0 from 1993.

For example, when a user hovers on a link and presses down on the mouse wheel, it opens that link to a new tab. It has become the standard mouse for most computers as it got wide popularity. Furthermore, it is a Microsoft trademark; every mouse manufacturer develops the wheel mouse today.



**11. Laser Mouse:** A type of optical mouse, laser mouse uses laser light to identify the mouse movement. It has no moving parts inside, like all-optical mouse. It provides up to 20x greater sensitivity and precision and more appropriate as compared to standard optical mouse design. This advanced precision and sensitivity can be useful for graphical or engineering design applications and gaming applications



#### Common Problem in Monitor

- A blank or black screen
- Color fade
- Fuzzy, blurry, distorted, or stretched image
- Geometric distortion
- Light leakage or light bleeding
- Flickering
- Horizontal or vertical lines
- Light or dark patches
- Dead or bright pixel
- Display driver stopped responding error

- Video freezing

Trouble shooting in Monitor:

### **Troubleshoot Monitor**

- Check for loose electrical and video signal cables.
- Check for bad contrast/brightness adjustments.
- Check for correct refresh rate, resolution and color depth as per the video card and OS.
- Attach the monitor to different computer.
- Try different screen resolutions to resolve the problem.

## BIOS      VERSUS      CMOS

BIOS	CMOS
A nonvolatile firmware that initializes hardware during the booting process and provides runtime services for operating systems and programs	A special memory chip in the motherboard that stores and holds the BIOS configuration settings
Basic Input Output System is the long form	Complementary Metal Oxide Semiconductor is the long form
Nonvolatile	Volatile
Initializes hardware while booting up the computer and provide runtime services for OS and programs	Stores all BIOS settings
	<small>Visit <a href="http://www.PEDIAA.com">www.PEDIAA.com</a></small>

PARAMETER	BIOS	CMOS
<b>Full Form</b>	Basic Input Output system	Complementary Metal Oxide Semiconductor
<b>Memory Type</b>	BIOS is nonvolatile	CMOS is volatile
<b>Main Functionality</b>	BIOS is a program which is used to initialize hardware during the booting process.	CMOS is a memory chip which stores the BIOS configuration settings
<b>Upgradation</b>	It can be upgraded by Flashing.	It can be changed through CMOS setup
<b>Location</b>	BIOS is usually found in separate chipset called EPROM or Flash memory in motherboard.	CMOS is also a memory chip usually found in Southbridge.

<https://ipwithease.com>