Aim: Study of moniter and understanding faults related to moniter

monitor

A computer monitor or a computer display is an electronic visual display for computers. A monitor usually comprises the display device, circuitry, casing, and power supply. The display device in modern monitors is typically a thin film transistor liquid crystal display (TFT-LCD) or a flat panel LED display, while older monitors used a cathode ray tubes (CRT). It can be connected to the computer via VGA, DVI, HDMI, DisplayPort, Thunderbolt, LVDS (Low-voltage differential signaling) or other proprietary connectors and signals.

Originally, computer monitors were used for data processing while television receivers were used for entertainment. From the 1980s onwards, computers (and their monitors) have been used for both data processing and entertainment, while televisions have implemented some computer functionality.

Types of monitor

Cathode Ray Tube (CRT)

This monitor uses a Cathode Ray Tube (CRT). CRT tube creates an image on the screen using a beam of electrons. CRT consists of one or more guns that fire a beam of electrons inside the screen. The screen is coated with very tiny Phosphor dots from inside. The beam of electrons repeatedly falls on the surface of screen. Every beam fall takes only a fraction of second. CRT in color monitors consists of three guns. These guns generate red, green and blue (RGB) colors. The other colors are generated with a combination of these three colors. Nowadays, most of the CRT monitors are replaced by Flat Panel Monitors.

Flat Panel Monitors

Flat Panel Monitors take less space and are lightweight. These monitors use much less power than CRTs. It does not emit harmful radiations. It is much expensive than CRT. Notebook computers, PDA and cellular phones use flat panel monitors. Flat panel monitors are available in different sizes such as 15”,

17”, 18” & 19” etc.

Flat panel display is made up of two plates of glass. These plates contain a substance between them. The substance is activated in different ways.

There are two types of technologies used in flat panel display screens.

Liquid Crystal Display

Liquid crystal display screen contains a substance called liquid crystal. The molecules of this substance line up in such a way that the light behind the screens blocked or allowed to create an image. LCDs provide a sharper picture than CRTs and emit less radiation. LCD displays requires less power and take up less space than CRT.

Gas plasma Display

Gas plasma display uses gas plasma technology. This technology uses a layer of gas between two glass plates. The gas release ultraviolet light when voltage is applied. The pixels on the screen glow due to this ultraviolet light and form an image. Plasma display is available in the sizes of upto 150 inches wide. It provides richer colors than LCD monitors but are more expensive. That is why, it is not commonly used. It provides higher display quality. This type of monitor can hand directly on a wall.

Touch Screen Monitors

Touch screen monitors are used for input as well as output. A touch screen is a special type of visual display unit. It has a grid of light beams or fine wires on the screen. It lets the user to interact with a computer by the touch of a finger rather than typing on a keyboard or moving a mouse. The user enters data by touching icons or menus identified on the screen.

Most touch screen computers use sensors to detect touch of a finger. Touch screen is well suited for simple applications like ATM. It has also become common in department stores and supermarkets.

Types of touch Screen Monitors

There are different types of touch screen technology. The most common types are Resistive, Surface wave & Capacitive.

Resistive Touch Screen

This monitor usually has a coat of thin electrically conductive and resistive layer of metal. A change in electrical current occurs when it is pressed. The input can be processed by a computer. These monitors are the most popular types of touch screen monitors used today. They are usually not affected by dust or liquids which make them very reliable.

Surface Wave Touch Screen

These monitors use ultrasonic waves to process input from the screen. These waves flow over the touch screen. The wave is absorbed and processed by computer when a person touches the pad.

Capacitive Touch Screen

These screens are coated with indium tin oxide. This material provides continuous current across the screen. The current can be measure by the processor when the pad is touched. It is usually used with a bare finger instead of stylus. These screens have high clarity and are not affected by dust. Nowadays most of the smartphones have Capacitive Touch screens.

what is screen resoluation

Screen resolution refers to the clarity of the text and images displayed on your screen. At higher resolutions, such as 1600 x 1200 pixels, items appear sharper. They also appear smaller so more items can fit on the screen.

The number of horizontal and vertical pixels on a display screen. The more pixels, the more information is visible without scrolling. Screen resolutions have a pixel count such as 1600x1200, which means 1,600 horizontal pixels and 1,200 vertical pixels.

In computers, resolution is the number of pixels (individual points of color) contained on a display monitor, expressed in terms of the number of pixels on the horizontal axis and the number on the vertical axis. The sharpness of the image on a display depends on the resolution and the size of the monitor. The same pixel resolution will be sharper on a smaller monitor and gradually lose sharpness on larger monitors because the same number of pixels are being spread out over a larger number of inches.

A given computer display system will have a maximum resolution that depends on its physical ability to focus light (in which case the physical dot size - the dot pitch - matches the pixel size) and usually several lesser resolutions. For example, a display system that supports a maximum resolution of 1280 by 1023 pixels may also support 1024 by 768, 800 by 600, and 640 by 480 resolutions. Note that on a given size monitor, the maximum resolution may offer a sharper image but be spread across a space too small to read well.

Display resolution is not measured in dots per inch as it usually is with printers. However, the resolution and the physical monitor size together do let you determine the pixels per inch. Typically, PC monitors have somewhere between 50 and 100 pixels per inch. For example, a 15-inch VGA (see display modes)

monitor has a resolution of 640 pixels along a 12-inch horizontal line or about 53 pixels per inch. A smaller VGA display would have more pixels per inch.

megapixel

A megapixel (that is, a million pixels) is a unit of image sensing capacity in a digital camera. (A pixel - a word invented from "picture element" - is the basic unit of programmable color on a computer display or in a computer image.) In general, the more megapixels in a camera, the better the resolution when printing an image in a given size. A digital camera with a 1.3 megapixel resolution will print a good quality 4 x 3 inch print at 300 dpi (dots per inch). If a higher quality is needed or a larger print at the same quality, a camera with a higher megapixel value will be needed.

The number of images that can be stored in a given size of flash memory for the camera is determined by the size of the flash memory and the size of each image in terms of megapixels.

components of LCD monitor

A liquid crystal display, or LCD for short, is a thin, flat monitor used as an electronic display for computers. There are a variety of components that sync together to create a working monitor power supply board. The main eight component parts are responsible for keeping an LCD monitor working efficiently, with the lowest possible used voltage, and as safely as possible.

Bridge Rectifier

Bridge rectifier's are two small pieces of plastic, one circular and one rectangular in shape, with four short wires attached around the body. Their role within the LCD monitor is to convert AC voltages into DC voltages. A short within the bridge rectifier can cause a monitor's screen to stay black, requiring repair.

Filter Capacitor

The filter capacitor is a small black rectangular component located above the SMPS transformer. Not to be confused with the output filter capacitor, the filter capacitor mediates high currents with low voltages within the monitor.

SMPS Transformer

An SMPS transformer's role in an LCD monitor is to transfer all passing energy from neighboring windings while storing little or no energy in the process. This allows the monitor to require the least amount of energy to run. The transformer varies in color, but is most widely distributed as a yellow rectangular box with an ID code written across the top. The SMPS transformer is positioned almost directly in the center of the monitor internal power supply board.

Schottky Diodes

The Schottky diode is a semiconductor diode used in LCD monitors for their ability to create a low forward voltage drop with an ideal fast switching action. Lower voltage drops when turning on a monitor help provide an increased system efficiency in start-up times. Depending on the manufacturer, there are usually two diodes positioned directly next to each other above the output filter capacitor in the supply board.

Output Filter Capacitor

Depending on the LCD monitor, there can be between one and six electrolytic output filter capacitors per supply board. Sealed in a plastic shield complete with a plastic cap, these components work below the Schottky diodes to charge voltage to their peak value and discharge the voltage once achieved.

Fuse

The LCD monitor fuse is a sacrificial over-current protection device to prevent excessive damage or overheating within the supply board if there is an overload of current flow. Each LCD monitor has at least one fuse, which contains a metal wire or strip that melts when overloaded, requiring a replacement. Fuses are located to the left of the bridge rectifier and power IC components.

Power IC

Power integrated circuits, or ICs for short, are made up of a thin rectangular body with six to 10n leg pins which extend from the base. The ICs are responsible for connecting to the power rails of a respective circuit, translating incoming positive and negative signals from a microprocessor to a voltage and processing the signals into a current level that can energize the incoming load.

Opto-isolator

The opto-isolator's purpose is to transfer electrical signals by creating light waves to provide electrical isolation between the incoming and outgoing voltages. Their job is to prevent high voltages from transferring through other components and damaging the monitor.