

## **MODULE III(contd...)**

### **Output Devices**

An **output device** is any piece of computer hardware item which utilizes whatever data and commands from your computer in order to perform a task. This leads to the results of data processing carried out by an information processing system (such as a computer) which converts the electronically generated information into human-readable form

#### **Different Types of Output Devices**

##### **1. Monitor**



LCD Monitor



CTR Monitor

Monitor is the most commonly used output device used to display results of processing. It has a TV like shape. Pictures on monitor are formed with picture elements called PIXEL. Monitors may be Monochrome that will display results in Black & White. Color Monitors are also available. They display results in multi colors. Monitor produces soft copy output.

##### **2. Printers**

Printers are used to produce hard copy out put. They print processing results on paper. Printers are divided into two main categories:

- Impact Printers
- Non Impact printers

### **Impact Printers.**



These printers print with striking of hammers or pins on ribbon. For example Dot Matrix printer and daisy wheel printers are impact printers.

### **Non-Impact Printers.**



These printers do not use striking mechanism for printing. They use electrostatic and laser technology. Quality and speed of these printers is better than Impact printers. For example Laser printer and Inkjet printers are non-impact printers.

### **3. Speaker**



Speakers for Desktop computer

Speaker produces sound output. We can listen recorded voices, sounds or music with the help of speaker. Speaker produces sound output with the help of sound card.

#### **4. Plotter**



Plotters are used to draw different designs of buildings or internal structure of machines. Mostly Engineers and Architects use plotters.

#### **5. Multimedia Projector.**



Multimedia Projector

### **Understanding Display Types and Settings**

Most display systems work the same way. First, the computer sends a signal to a device called the video adapter—an expansion board installed in an expansion bus slot or the equivalent circuitry integrated into the motherboard—telling it to display a particular

graphic or character. The adapter then renders the character for the display—that is, it converts the single instruction into several instructions that tell the display device how to draw the graphic—and sends the instructions to the display device, based on the connection technology between the two. The primary differences after that are in the type of video adapter you are using (digital or analog) and the type of display (CRT, LCD, projector, etc.).

### **Video Display Types(VDU)**

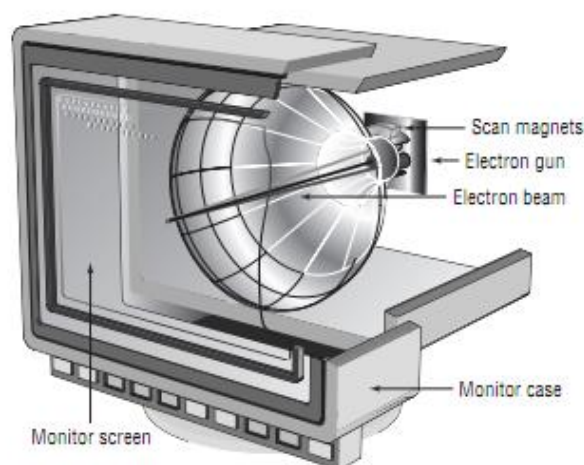
Different VDU types:

- CRT
- Liquid crystal display
- LED displays
- Plasma
- OLED
- Projection systems

#### **CRT Displays**

In a CRT, a device called an electron gun shoots a beam of electrons toward the back side of the monitor screen (see Figure 4.1). Color CRTs often use three guns, one each for red, green, and blue image components. The back of the screen is coated with special chemical dots called phosphors (often zinc sulfide combined with other elements for color variation, but no phosphorus, ironically) that glow when electrons strike them.

**FIGURE 4.1** Cutaway of a CRT monitor



The beam of electrons scans across the monitor from left to right, as you face it, and top to bottom in a raster pattern to create the image. A special metallic screen called a shadow mask (in most implementations) has holes spaced and angled in an extremely precise manner. For color CRTs that employ shadow masks, a trio of dot phosphors is often grouped in a triangle for each hardware picture element. The separate electron beams that control red, green, and blue strike only their own phosphors at the correct angle to cause them to glow.

There are two ways to measure a CRT monitor's image quality: dot pitch and resolution. Dot pitch is a physical characteristic of the monitor hardware, but resolution is configurable through software.

**Dot pitch** :Dot pitch is the measurement between the same spot in two vertically adjacent dot trios.

**Resolution** :Resolution is defined by how many software picture elements (pixels) are used to draw the screen.

### Liquid Crystal Displays

In a LCD display to pass an electric current through a semi-crystalline liquid, the crystals aligned themselves with the current. It was found that by combining transistors with these liquid crystals, patterns could be formed. These patterns could be combined to represent numbers or letters. This screen was very light compared to computer monitors of the day, and it consumed relatively little power.

Two major types of LCD displays have been implemented over the years: active-matrix screens and passive-matrix screens. Another type, dual scan, is a passive-matrix variant.

**Active matrix** : An active-matrix screen is made up of several independent LCD pixels.

**Passive matrix** :A passive-matrix display does not have a dedicated transistor for each pixel or subpixel but instead a matrix of conductive traces.

### LED Displays

LED displays are merely LCD panels with light emitting diodes (LEDs) as light sources instead of the fluorescent bulbs used by conventional LCD monitors.

### Plasma Displays

The word plasma refers to a cloud of ionized (charged) particles—atoms and molecules with electrons in an unstable state. This electrical imbalance is used to create light from the changes in energy levels as they achieve balance. Plasma display panels (PDPs) create just such a cloud from an inert gas, such as neon, by placing electrodes in front of and behind sealed chambers full of the gas and vaporized mercury.

### OLED Displays

Organic light emitting diode (OLED) displays, unlike LED displays, really are the image producing parts of the display, not just the light source. In much the same way as a plasma.

### Projection Systems

Another major category of display device is the video projection system, or projector. Portable projectors can be thought of as condensed video display units with a lighting system that projects the VDU's image onto a screen or other flat surface for group viewing.

### **Adjusting Display Settings**

- Refresh rate
- Resolution
- Multiple displays
- Degauss

#### **Refresh Rate**

The refresh rate is technically the vertical scan frequency and specifies how many times in one second the scanning beam of electrons redraws the screen in CRTs.

#### **Degauss**

Degaussing is the reduction of the magnetic field of an object.

### **Video Standards and Technologies**

#### **Video Standards**

The early video standards differ in two major areas: the highest resolution supported and the maximum number of colors in their palette. The supported resolution and palette size are directly related to the amount of memory on the adapter, which is used to hold the rendered images to be displayed. Display adapters through the years can be divided into five primary groups:

- Monochrome
- CGA
- EGA
- VGA
- DVI, HDMI, and other modern digital video

#### *Monochrome*

The first video technology for PCs was monochrome (from the Latin mono, meaning one, and chroma, meaning color). This is black-and-white video .

### *CGA*

The next logical step for displays was to add a splash of color. IBM was the first with color, with the introduction of the Color Graphics Adapter (CGA). CGA displays 16-color text in resolutions of 320n200 (40 columns) and 640n200 (80 columns), but it displays 320n200 graphics with only four colors per mode.

### *EGA*

Enhanced Graphics Adapter (EGA). EGA could display 16 colors out of a palette of 64 with CGA resolutions as well as a high-resolution 640n350 mode.

### *VGA*

The Video Graphics Array (VGA). This video technology had a “whopping” 256KB of video memory on board and could display 16 colors at 640n480, 640n350, and 320n200 pixels or, using mode 13h of the VGA BIOS, 256 colors at 320n200 pixels.

## **Graphic and CAD/CAM Design Workstations**

Workstations used in the design of graphical content place a heavy load on three primary areas of the system:

- CPU enhancements
- Video enhancements
- Maximized RAM

### *CPU Enhancements*

Graphic design workstations and computer-aided design/computer-aided manufacturing (CAD/CAM) workstations are computers used for similar yet distinct reasons. Graphic design workstations are used by desktop publishers in the creation of high-quality copy consisting of professional text and graphical images. This output is used in advertising, marketing, and other forms of specialized documentation. CAD/CAM workstations are used in the design of engineering and architectural documentation, including blueprints in both two and three dimensions.

## **Graphic Design Workstations**

Computers used by graphic-design artists must process a constant flow of colors and detailed shapes, the combination of which can put a strain on the CPU, RAM, and video components.

## **CAD/CAM Workstations**

Three-dimensional drawings are also common in this technology. These designs drive or aid in the production of 3D models. Software used for such projects requires a high number of CPU cycles during the rendering of the designs before display on the monitor or output to a printer or plotter. Such systems have been used for decades by professionals in the architecture, surveying, and engineering fields as well as by design engineers in manufacturing firms.

#### *Video Enhancements*

Possibly an obvious requirement for such systems, graphics adapters with better graphics processing units (GPUs) and additional RAM on board have the capability to keep up with the demand of graphic design applications

#### *Maximized RAM*

Maximizing the amount of RAM that can be accessed by the CPU and operating system will result in better overall performance by graphic design workstations.

### **Audio/Video Editing Workstations**

Professionals that edit multimedia material require workstations that excel in three areas:

- Video enhancements
- Specialized audio
- Specialized drives

The following sections assume the use of nonlinear editing (NLE) schemes for video. NLE differs from linear editing by storing the video to be edited on a local drive instead of editing being performed in real time as the source video is fed into the computer. NLE requires workstations with much higher RAM capacity and disk space than does linear editing.

#### *Video Enhancements*

Although a high-performance video subsystem is a benefit for computer systems used by audio/video (A/V) editors, it is not the most important video enhancement for such systems. Audio/video editing workstations benefit most from a graphics adapter with multiple video interfaces that can be used simultaneously.

When editing multimedia content, or even generalized documents, it is imperative that the editor have multiple views of the same or similar files.

#### *Specialized Audio*

Although analog audio is not entirely incompatible with quality work, digital audio is preferred the vast majority of the time. In some cases, an add-on adapter supporting such audio might be required to support an A/V editing workstation.

#### *Specialized Drives*



Use separate drives for system and data files, you should also make sure the data drive is large and fast. SATA 6Gbps drives that spin at 7200rpm and faster are recommended for these applications.

### **Virtualization Workstations**

Hardware virtualization has taken the industry by storm and has given rise to entire companies and large business units in existing companies that provide software and algorithms of varying effectiveness for the purpose of minimizing the hardware footprint required to implement multiple servers and workstations.

Virtualization workstations must exceed the specifications of standard servers and workstations in two primary areas:

- CPU enhancements
- Maximized RAM

The following list includes some of the more important components that are shared by the host and all guest operating systems:

- CPU cycles
- System memory
- Drive storage space
- System wide network bandwidth

### **Gaming PCs**

Specialized gaming PCs, computers optimized for running modern video games, fill a niche in the marketplace, leading to a continually growing segment of the personal-computer market.

four areas of enhancement must be considered:

- CPU enhancements
- Video enhancements
- Specialized audio
- Enhanced cooling

### **Home Theater PCs**

Home theater PCs (HTPCs) continue to gain in popularity as a specialized computing appliance. An HTPC might have multiple capabilities, such as storing large amounts of video media and streaming it to an output device, streaming it directly from the Internet, or acting as an A/V tuner and receiver, mating input sources with output devices.

In fact, the following list comprises the specializations inherent in true HTPCs:

- Video enhancements
- Specialized audio

- Special chassis
- TV tuner requirement

### *Video Enhancements*

High-definition monitors are as commonplace as television displays in the home today. HTPCs, then, must go a step beyond, or at least not fall a step behind. Because High-Definition Multimedia Interface (HDMI) is an established standard that is capable of the highest-quality audio, video resolution, and video refresh rates offered by consumer electronics and because HDMI has been adopted by nearly all manufacturers, it is the logical choice for connectivity in the HTPC market.

### **Standard Thick Clients**

A standard thick client is not so much a custom configuration but instead the standard configuration that allows the definition of custom configurations. In other words, a thick client is a standard client computer system, and as such, it must meet only the basic standards that any system running a particular operating system and particular applications must meet.

For example, the operating system requires a certain amount of RAM for its installation and a certain amount of hard drive space. Keep in mind that minimum specifications are just that, the minimum. Better performance is realized by using recommended specifications or higher.

### **Thin Clients**

A thin client is any machine that divests itself of all or most local storage and varying levels of RAM and processing power without necessarily giving up all ability to process instructions and data.

### **Home Server PCs**

Essentially powerful client systems with standard, nonserver operating systems, home server PCs differ from enterprise servers to the point that they qualify as custom configurations. For many generations, desktop operating systems have run server services and have been capable of allowing limited access by other clients but not enough access to accommodate enterprise networks. Nevertheless, because the home server PC is the center of the home network, fault tolerance considerations should be entertained, which is decidedly not the case for standard home systems.

- Media streaming capabilities
- File sharing services
- Print sharing services
- Gigabit NIC
- RAID array