

CHAPTER SIX COMPUTER COMPONENTS

6.1 COMPONENTS OF A COMPUTER SYSTEM

It is very important to have the following general discussion about computer system components in order to be familiar with some computer terms that are often used. Basically, the components of a computer system can be grouped into two namely: Internal and external components.

6.2 Internal Components

6.2.1 Internal Components

This comprises of majority of the components that you never see but are right inside the computer and are the heart of your computer. They include:

1. **CPU:** The CPU (Central Processing Unit) is the brain behind your computer. The CPU is responsible for performing calculations and tasks that make programs work. The faster the CPU, the quicker programs can process computations and commands.
2. **Hard Disk Drive:** The hard disk drive (HDD) of the computer is where permanent information is stored. Documents, databases, spreadsheets, and programs are all stored on the hard disk. The larger the hard disk, the more you can fit on the drive. The capacity of the HDD is rated in megabyte (MB), gigabyte (GB) and terabyte (TB).
3. **Power Supply:** The power supply converts the Alternating Current (AC) from the socket into low voltage direct current (DC). The low voltage produced by the power supply which is to be used by the CPU and electronics is about 6 volts.

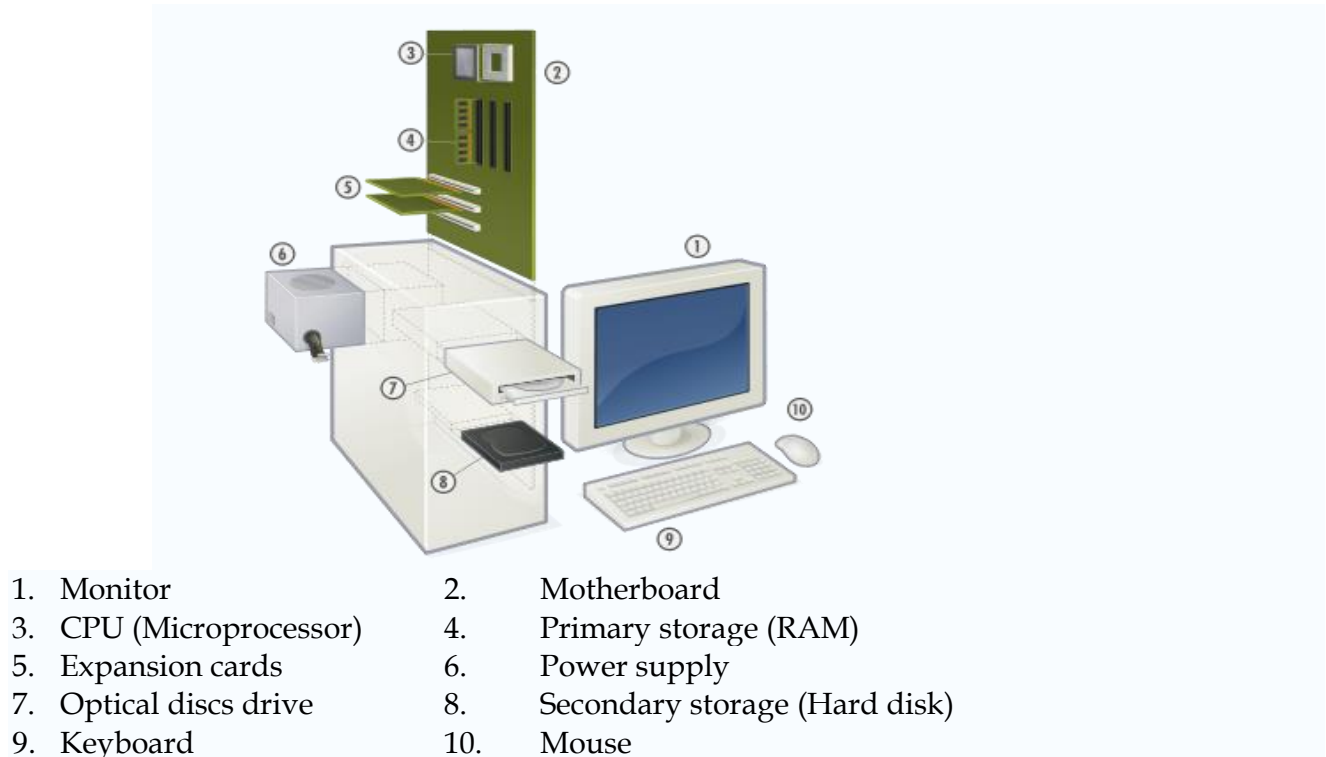


Figure 6.1: Internal and External Components of Computer System
(Picture Courtesy of Wikipedia)

4. **Motherboard:** This is the panel upon which all other components such as the processor chip like the Intel Pentium III, IV and Pentium M, and RAM chips are (memory) built. It also contains the majority of the components that are responsible for your system functioning. These are:

- ❖ **RAM Chip:** RAM is an acronym for Random Access Memory. A fast CPU is useless without an adequate amount of RAM (Random Access Memory). RAM is usually referred to as a computer's memory that is it temporarily stores information that is used by running programs or applications. RAM is rated in multiples of two which are: 2MB, 4MB, 8MB, 16MB, 32MB, 64MB, 128MB, 256MB, and 512MB. With more memory in your system; your applications run very fast without degrading your system's performance.
- ❖ **Drive Bays:** These are the slots to add additional drives (this may include CD ROM or DVD drive, Floppy drive and Zip drive)
- ❖ **Expansion Slots:** To add cards for various devices, including memory chips.
- ❖ **CMOS Battery:** The CMOS battery (CMOS for Complementary Metal Oxide Semiconductor) on the board keeps track of system settings, date and time.
- ❖ **Cooling Fan(s):** The modern Pentium processors generate a great deal of heat and failure to cool may result in the system hanging thereby destroying your hard drive. Introducing one or more fans inside the computer keep circulating air and keep your computer cool.

5. **Cables/Cards:** Numerous wires and flat, ribbon-like cables provide power and communication to the various parts inside your computer. All hardware devices are connected to the central unit either through the use of cables, or through the use of internal cards which are installed into various slots in your computer. Additional cards that you might add are:

- ❖ **Network Card:** A network card allows your computer to be connected either to other computers or to the Internet if you are using a fast Internet connection such as cable.
- ❖ **Video Card:** The video card is a board that plugs into the PC motherboard to give it display capabilities. New video cards come with their own RAM and processor to help speed up the graphics display. Many computers come with video a chip in-built which makes a separate video card unnecessary, unless the computer is going to be used for high-end multimedia work or to play video games.
- ❖ **Sound Card:** Like video cards, sound cards are expansion boards used for enabling a computer to manipulate sound. Most sound cards give you the power to plug in speakers and a microphone. Some even give you the jacks for connecting your computer up to a common stereo. As with video cards, many computers come with sound chips, making it unnecessary to buy a separate card, unless you need higher sound quality for your work.
- ❖ **Modem:** The modem allows your computer to use a telephone line to communicate and connect to the Internet.

6.2.2 External Components

These are the parts of a computer system that you can see without necessarily removing the casing of the computer, although the most thrilling components are hidden from sight. They include the following:

1. **Monitor:** This is the primary output device that the computer uses to communicate with the users by displaying information on the screen.

2. **Keyboard:** Keyboard also remains the principal method of data entry, for entering text, special characters and numerical data into a computer. It is an external component of a computer system.
3. **Mouse:** A mouse is a handheld device for moving the pointer easily on the screen in a window environment. This may be cordless or traditional.
4. **Computer Casing:** The main function of the case is to hold and protect the internal components from dust, dirt and foreign objects that may hamper the operation of the computer system. There are several sizes and shapes of casing available, these are:
 - ❖ **Tower Casing:** This is the most common casing; the tower case sits on the floor thereby freeing the desk space for other devices. The sizes of the tower casing range from **mini** to **full-sized** tower.
 - ❖ **Standard Desktop:** Desktop cases are placed on the desk or tabletop to save the office or room space.
 - ❖ **Standard AT**
 - ❖ **Slim Line or Shallow Footprint:**
5. **Port:** A port is a specialized outlet on a piece of equipment to which a plug or cable connects. In computer hardware, a port serves as an interface between the computer and other computers or devices. Hardware ports may be physically male (this is becoming unusual, since protruding pins can easily break) or female (becoming very common on equipment). A personal computer may have several **ports** for connecting devices such as a trackball, expanded keyboard, flatbed scanner, touch screen, and other device peripherals.

Computer ports in common use cover a wide variety of shapes such as round (PS/2 which is used by keyboard), rectangular (FireWire port used for video equipment), square (telephone modem), trapezoidal (an old printer port and mouse). There are some standardization to physical properties and functions. For example, most computers have a keyboard port (currently a round DIN-like outlet referred to as PS/2), into which the keyboard is connected. Each device communicates with your computer through an IRQ address (IRQ- Interrupt Request) or be assigned a **port**.

Computers basically come with the following ports:

- ❖ **Parallel** ports send multiple bits at the same time over several sets of wires, and are designated as LPT1...LPT4.). Also, there may be some additional devices that may be connected to your computer which your operating system must to have a way to communicate with; this is accomplished through the **device driver** that follows the device.
- ❖ **Serial ports** send and receive one bit at a time via a single wire pair designated as COM1...COM5.
- ❖ **Universal Serial Bus (USB)** is a serial bus standard to interface devices. USB is intended to help retire all legacy varieties of serial and parallel ports. USB was designed to allow peripherals to be connected using a single standardized interface socket and to improve plug-and-play capabilities by allowing devices to be connected and disconnected without rebooting the computer (**hot swappable**). Other convenient features include providing power to low-consumption devices without the need for an external power supply and allowing many

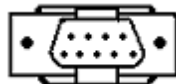
devices to be used without requiring manufacturer specification or individual device drivers to be installed as stated under parallel port.

USB can connect computer peripherals such as mouse devices, keyboards, PDAs, gamepads and joysticks, scanners, digital cameras, printers, personal media players, and flash drives. For many of those devices USB has become the standard connection method. USB is also used extensively to connect non-networked printers; USB simplifies connecting several printers to one computer. USB was originally designed for personal computers, but it has become common phenomenon on other devices such as PDAs and several thousands of computer devices in the world.



At is an abbreviation for **Advanced Technology**. It was introduced in 1984 and used by IBM, IBM Compatibles, and IBM Clones.

Serial (DB-9)



Serial DB-9 is a 9-pin D-type connector that meets EIA-232 standard. It is used for connecting trackballs, mouse, modems and monitors.

ADB



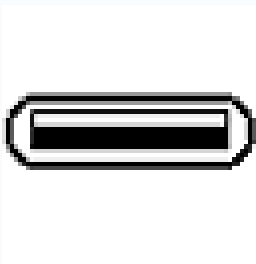
ADB is short form for **Apple Desktop Bus**, and used by Apple Computers before the iMac. Apple computer now use the USB port.

PS/2



A mini DIN port contains 6 pins. It was developed by IBM for connecting the keyboard and mouse.

USB



USB is an abbreviation for **Universal Serial Bus**, and is becoming the commonest port for connecting device peripherals to personal computers.

Additional external devices that are becoming standard are a printer, scanner, film recorder (for generating 35mm slides), a zip drive, DVD and CD-ROM read/write drives. A modem is frequently included with your system. Some of these devices may be purchased as either external or internal models. The choice is yours.

Additional external components include the following:

- ❖ **Scanner:** This device is used for scanning text, graphics, or slides into a format that may be imported into many of your applications.
- ❖ **Plotter:** It is used with various graphics applications such as CAD- Computer Aided Design. Lines are generated by pens of varying thickness and colors. Plotters are used to generate blueprints and other forms of architectural drawings.
- ❖ **Digitizing Tablet:** This is used with architectural programs where dimensioning and accuracy are very paramount.
- ❖ **Pen Stylus:** This device is similar to a mouse except that you point rather than moving the mouse cursor.
- ❖ **Joysticks:** The device is often used for playing computer games. It is a directional device.

6.3 FUNCTIONAL COMPONENTS OF A COMPUTER SYSTEM

A computer system as already defined accepts data as input and produces information as output. The process of transforming this input into output is carried out by electronic circuit, which is controlled by a sequence of instructions (the program) that is stored in the computer. The figure 2.19 illustrates the basic organization or architecture of a computer system. All the various internal and external components of computer system earlier can be grouped into the following basic units:

(i) Input Unit

Before any meaningful thing can be done by a computer system, it must accept data. The data entered into the computer is called input. The functions of the input component of a computer are to:-

- ❖ To accept data in the required form
- ❖ To convert the data into a machine understandable form
- ❖ And to transmit this data to the central processing unit.

Examples of input devices are: keyboards, light pen, mouse, scanner, magnetic ink character reader (MICR), optical character reader (OCR) and Joystick.

(ii) Storage Unit

The primary or main memory is one of the components of a computer system that holds data for processing instructions or program for processing the data into information. Main storage is supplemented by less costly **auxiliary storage**. This is also called **backing storage**.

(iii) The Central Processing Unit

The central processing unit (CPU) can also be described as the **heart** or **core** of a computer system. It is the part that executes program or instructions one by one. A typical CPU uses semiconductor chips called **microprocessors**, a very large-scale circuit technology that integrates the computer's memory, logic and control on a single chip. The central processing unit has two parts:

- (a) The control unit and
- (b) The arithmetic logic unit (ALU)

(a) Control Unit

The functions of the control unit are:

- ❖ It is the nerve center of the computer that controls all the hardware operations (i.e. input, output devices, storage and itself).
- ❖ It controls and coordinates data movements within the CPU and between the CPU and other components of the computer system.

(b) Arithmetic Logic Unit (ALU)

The functions of the ALU are:

- ❖ To carry out arithmetic operations like addition, division, multiplication, subtractions etc.
- ❖ To carry out logical operations, that is operation requiring “YES” or “NO” / “TRUE” or “FALSE” as an answer. For example to compare two numbers in order to establish which is larger.

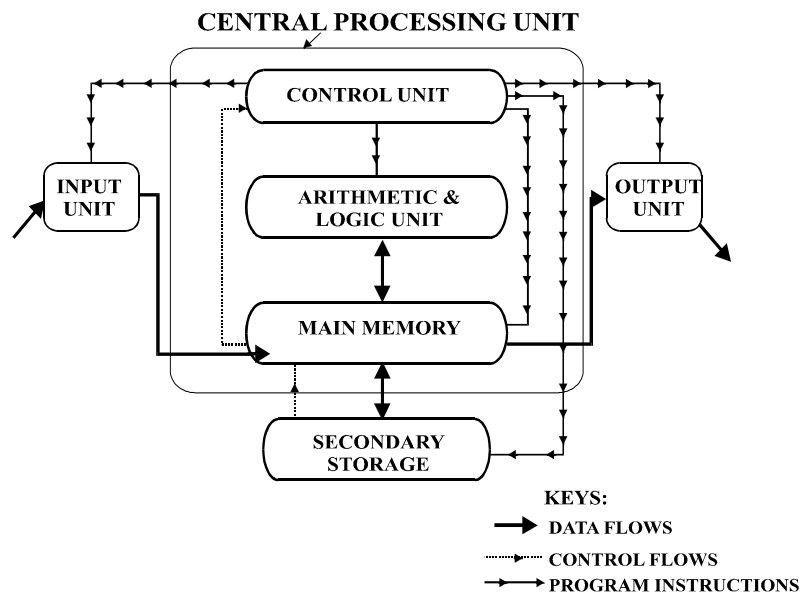


Figure 6.3: Functional Components of Computer System

(iv) Output Unit

The functions of the output unit are:

- ❖ To accept processed data or information from CPU.
- ❖ To convert this information into the required output form.

Examples of output devices are: Printers, monitors and voice output synthesizers.

REVIEW QUESTIONS ON CHAPTER SIX

1. (a) Write a short note on fifth generation of computer. State the features that make it different from fourth generation computer?
(b) Why did the size of computer reduce in third generation computer?
2. (a) Write short notes on the following:
(i) Versatility of computer (ii) Storage
(iii) Computer automation
(b) Distinguish between microcomputer and mainframe computer.
3. (a) Computers may be classified into mainframe, minicomputer, microcomputer and supercomputers. Outline the characteristics of these four computers.
(b) The term GIGO has become a slogan to almost all computer users. Briefly explain what you understand by the term and state its relevance.
4. (a) What do you understand by computer system?
(b) Differentiate between analog and digital computer.
(c) What is a hybrid Computer?
5. (a) State the features of the micro-computer that makes it distinctive from mainframe computer.
(b) Enumerate the business application areas where microcomputer can be used.
6. (a) What is a Computer machine?
(b) Explain any four of the following types of computer:
(i) Laptops (ii) Workstations
(iii) Notebooks (iv) Supercomputers
(v) Midrange Computers
7. (a) State five characteristics of a computer system
(b) How does a special purpose computer differ from a general purpose computer?

CHAPTER SEVEN

COMPUTER HARDWARE

7.1 INTRODUCTION

As earlier defined that a computer system is made up of software and hardware; it is very important we explain in details what is meant by computer hardware. In this chapter we shall be looking at the meaning of hardware, identifying the various computer components and their functions in a computer system. Also to be discussed are the different types of computer input and output devices and their functions.

7.2 COMPUTER HARDWARE

The term computer hardware refers to the physical components or parts of a computer system that can be grouped into two:

- (i) The central processing unit (CPU) which is the processing hardware and
- (ii) The computer peripheral that connotes other components of the computer system that are not part of the CPU, these are the input, output and auxiliary devices. Details of these computer components shall be immensely discussed in this chapter.

7.3 THE CENTRAL PROCESSING UNIT (CPU)

The central processing unit (CPU) can be described as the **heart** or **brain (core)** of a computer system. It is the part of a computer that executes program or instructions. A typical CPU uses semiconductor chips called **microprocessors**; this is a very large scale circuit technology that integrates the computer's memory, logic and control on a single chip. The central processing unit is made up of three parts: the control unit, the arithmetic logic unit (ALU) and memory unit.

(a) Control Unit

It is the nerve center of the computer system and performs the following the functions:

- (i). It controls all the hardware operations (i.e. input, output devices, storage and itself)
- (ii). It controls and coordinates data movements within the CPU and between the CPU and other components of the computer system.

(b) Arithmetic Logic Unit (ALU)

The functions of the ALU are:

- (i). To carry out arithmetic operations like addition, division, multiplication, subtractions etc.
- (ii). To carry out logical operation, that is operation requiring 'YES' or 'NO'/'TRUE' or 'FALSE' as an answer. For example to compare two numbers in order to establish which is larger.

(c) Memory Unit

The memory unit which is the main memory or core storage performs a significant role in the operation of the processor as it represents the internal storage areas in a computer system. Its major function is to store data and programs for immediate processing, and the data in this memory is almost instantly accessible to processor.

7.4 COMPUTER PERIPHERALS

The term computer peripheral or peripheral devices refer to components of a computer system that are not part of the central processing unit (CPU). Peripheral devices are sometimes referred to as input/output

devices and are hardware in nature. It is only through these devices that the computer users can interact with the computer systems.

7.4.1 Input Devices

These are hardware components that feed data into the computer system for processing. The input device first of all accepts data in the required form and converts it into a machine understandable form; and then transmits this data to the central processing unit. Such devices include: Keyboard, cursor controlling devices (Mouse, Joystick, and Light-pen), Document Readers (OMR – Optical Character Recognition and MICR- Magnetic Ink Character Recognition, Bar Code Reader), digital scanner etc.

1. Keyboard

A Keyboard is an electro-mechanical device consisting of a set of typewriter-like keys that allows the computer user to enter data/instruction into the computer. Keyboard remains the principal method of data entry, for entering text, special characters and numerical data into a computer.

The commonest keyboard device used is the **QWERTY** keyboard. This is so called because of the first six letters on the top left of the second row on the keyboard. Keyboards convert the downward contact of a key push into a binary code (strings of 0's and 1's) for the key selected.

Basically there are two types of keyboards namely:

- (a). Standard keyboard
- (b). Enhanced keyboard.

The **standard keyboard** is the first type of keyboard to be manufactured. It is mainly used by IBM PC/XT compatible and has about 84 keys with ten functional keys inclusive. This type of keyboard is no longer in vogue. The **enhanced keyboard** has about 107/110 keys. The functional keys on the board ranges from F1 to F12 with indicator light for **Num Lock**, **Caps Lock** and **Scroll Lock**. Enhanced keyboard was developed to have an improvement over the standard keyboard.

The keys on the keyboard can be divided into four parts namely:

- (i) **Numerical Keys:** The numerical keypad is used for entering numbers from 0 to 9
- (ii) **Typing Keys:** These keys are used to type in the user's document or text, either in lower or upper case. The typing keys are laid out in similar **QWERTY** format as in the typewriter.
- (iii) **Functional Keys:** These keys are labeled F1 through F10 or F12. Under different computer application packages, the keys perform different functions. However, key F1 is also known as **HELP KEY** and has a unique function in all application packages.
- (iv) **Computer Keys:** Computer keys are the ones with special character generation. They are used by the computer to generate some special internal commands. These keys are: Arrow keys, backspace, Capital lock, Ctrl, Delete, Enter, Escape, Insert, Page Up, Page Down, Print screen, Scroll, Home, End, Power, Sleep, Wake Up, Shift, Spacebar, Tab, Alt, Windows and Number Lock.

Advantages of Keyboard over Other Forms of Input Devices

- ❖ It has a low initial cost.

- ❖ The method is flexible since it is dependent on the person entering the data.

Disadvantages of Keyboard

- ❖ It is costly in operation as it relies on personnel.
- ❖ This method may lead to high error rates because people are prone to error.
- ❖ For efficient use, it will require training of personnel.

2. Mouse

A mouse is a handheld device for moving the pointer easily on the screen in a window environment. It can also be described as a small object one can move around on a flat surface called mouse pad. The name is derived from its shape which looks a bit like a mouse. The computer user moves the mouse around to control the pointer. The mouse can also be used to draw images on the screen.

3. Magnetic Ink Character Recognition (MICR)

This is an input technology that translates characters written in magnetic ink into digital codes for processing. MICR is a direct entry method that is widely used in the banking system for customers' checks. This technology makes use of a special-purpose machine known as reader or sorter which magnetizes the iron oxide particle in the ink. A similar technology is the magnetic strip used on the back of credit cards and bank debit cards which allows readers such as **Automated Teller Machines** (ATMs) to read account information and allow monetary transactions.

The American National Standards Institute (ANSI) defined Magnetic Ink Character Recognition (MICR) as a common machine language specification for the paper-based payment transfer system consisting of magnetic ink printed characters of a special design which can be recognized by high speed magnetic recognition equipment. This series of readable characters provides the receiving party with information needed for processing the check including the check number, bank routing number, checking account number and in some cases the amount of the check.

Advantages of MICR As Compared With Keyboard Entry:

- ❖ This method has a very low error rate.
- ❖ The characters in MICR are resistant to corruption.
- ❖ It is a very fast method of data input; up to 1000 characters per second can be read.
- ❖ It is cheap in operation for high volume of activities such as cheque processing.

Disadvantages of MICR

- ❖ The machine is expensive.
- ❖ The fonts of the characters are not easily readable.

⑆ 1234567890 ⑆ ⑆ 1234567890 ⑆ ⑆ 1234567890 ⑆ ⑆ 1234567890 ⑆

Figure 7.1: Magnetic Ink Character Fonts

4. Optical Character Recognition/Reader (OCR)

Optical character recognition refers to equipment that translates specially designed marks, optical characters and codes into digital form. These devices read characters by using a mechanism that shines a

bright light on the characters and codes in digital form. The most widely used optical code is the bar code, which is used at the point of sale systems in supermarkets and retail store.

Advantages of OCR as Against Keyboard Entry:

- ❖ It has a low error rate.
- ❖ It is faster than keyboard as up to 500 characters per second can be read.
- ❖ The characters of the font can easily be read by people unlike magnetic character fonts.

Disadvantages of OCR

- ❖ The machine is expensive to purchase.
- ❖ The characters can easily be corrupted

0123456789ABCDEFGHIJ
 KLMNOPQRSTUVWXYZÆØÅÀ
 'ÖÜÑÏ'¥H£¥"£%&' *+,-./:
 ; = ? { | }

Figure 7.2: Optical Character Fonts and Reader

5. Bar Code Reader

Bar code readers are photoelectric scanners that read the bar codes, or vertical zebra, striped marks printed on product containers. The bar code readers are widely used at the point of sale system of supermarkets, hospital, libraries, military operations, bookshops and retail stores. The job of the bar code is to identify the product to the computer which already has the description and the latest price of the product.



Figure 7.3 Bar Code

6. Optical Mark Recognition (OMR)

This technique assigns values to marks that are on a document according to their position. The position of marks made by the users on these documents is then translated into a value. For example the grid in figure 3.6 shows a pre-printed document that allows entry of values from 0 to 9. OMR is a method often used to quickly mark multiple choice questions.



Figure 7.4: Optical Mark Recognition

7. **Light-pen**

This is an input device attached to a computer. It resembles a pen at the end of a length of electric cable and consists of a pen-like stylus used in writing on the screen of the monitor. Information is automatically accepted for processing by the CPU once issued an appropriate instructions or commands.



Figure 7.5: Light-pen

8. **Joystick**

A joystick is cursor controlling device that is similar to a mouse, except that with a mouse the cursor stops moving as soon as you stop moving the mouse. It can also be described as a lever that moves in all directions and controls the movement of a pointer or some other displayed symbol. With a joystick, the pointer continues to move in the direction the joystick is pointing, to stop the pointer; you must return the joystick to its upright position. Most joysticks include two buttons called **triggers**. Joystick is used in playing computer games and assistive technology. Joystick got its name from the control stick used by a pilot to control the ailerons and elevators of an airplane. It is a hand-held lever that pivots on one end and transmits its coordinate to a computer. The joystick often has one or more push-buttons called switches, whose position can also be read by the computer.



Figure 7.6: Joysticks

9. Digital Scanner

This is an electronic input device that translates images such as pictures or text into digital form for processing.



Figure 7.7: Digital Scanner

10. Voice Input Device

Voice or speech input device converts a person's spoken words into digital form for processing by the computer. This type of system enables users to operate a computer using voice commands. Documents are created on the system by speaking words into a computer rather than keying them. But currently this device is awaiting technological advances to overcome the limitations of the existing primitive system. The difficulty is that two people may represent the same word verbally in different ways.

11. Smart Cards

A smart card contains information encoded in a microchip built in the form of plastic cards of the size of a standard credit card. These cards are very difficult to copy and can be programmed to self-destruct if incorrect identifying information is keyed into the machine reading them.

12. Digital Camera

This is an input device that is used for translating images such as pictures or documents into digital form. The digital camera takes a still photograph, stores it and sends it as digital input into the computer; these images can then be edited if necessary. A **web cam** is another type of camera that allows users to make basic videos, transmit videos of themselves over the Internet, and to take pictures.

13. Graphics' Tablet

A graphics tablet or digitizing tablet (or graphics pad, drawing tablet) is a computer input device that consists of a flat surface which allows one to hand-draw images and graphics using an attached stylus (a pen-like drawing apparatus). This is similar to the way one draw images with a pencil and paper. Generally, the image does not appear on the tablet itself but, rather, is displayed on the computer monitor.



Figure 7.8: Computer Graphics Tablet with Stylus

7.4.2 Output Devices

These are the devices that translate the result of the data processed by the computer in the form of digital pulses into human understandable form. Broadly speaking there are two forms of output namely:

- (i) **Softcopy:** This output from a computer system does not persist over time and goes off when the system is shut down. Examples are the output from a visual display unit (VDU) or speech from a synthesizer.
- (ii) **Hardcopy:** These are permanent and readable copies of computer output such as printed paper or microfilm.

Examples of computer output devices include monitor, voice output device, printers and plotter.

1. Monitor

The monitor of a computer system consists of the cathode ray tube (CRT) and the screen. The screen displays the output and communicates to users via this medium. The monitor can also be referred to as the Visual Display Unit (VDU), so called because it allows you to see whatever you enter into computer through the keyboard. The newer model of the monitor is called the **liquid crystal display (LCD)** whose screen does not use a cathode ray tube but built on **thin film transistor (TFT)** technology which makes the screen flat.

There are two main types of monitors:

- (a) Monochrome Monitor
- (b) Colored or Video Graphic Monitor

(a) Monochrome Monitor

This kind of monitor is designed to display text and graphics in two colors, one for the background and the other one for the foreground. These colors can be black and white, green and black, or amber and black.

(b) Coloured or Video Graphic Monitor

With this kind of monitor, text and graphical objects are displayed in different colors from sixteen to over a million colours. Examples of video graphic monitors are:

- (i) **Coloured Graphic Adapter (CGA):** This monitor can display up to 16 colours

- (ii) **Enhanced Graphic Adapter (EGA):** It has the capacity of displaying up to 64 colours.
- (iii) **Video Graphic Adapter (VGA):** It displays up to 256 colours.
- (iv) **Super Video Graphic Adapter (SVGA):** This monitor can display between 256- 16.7 million colours with good resolution.
- (v) **Extended Graphic Adapter (XGA):** This displays the same numbers of colours as SVGA with super resolution over the whole monitors.

2. Printers

This is an output device that produces the result of processed data in a permanent form on sheet of paper or microfilm for human interpretation. This permanent form of output from the printer is referred to as **hard copy**. The basic classifications of printers are impact and non-impact printers.

(a) Impact Printers

These are the oldest type of printers. It requires the physical contact of the printing head of a printer with the paper and ribbon in between. Examples of impact printers are: Line printers, dot matrix (or Golf-head) printers and daisy-wheel printers.

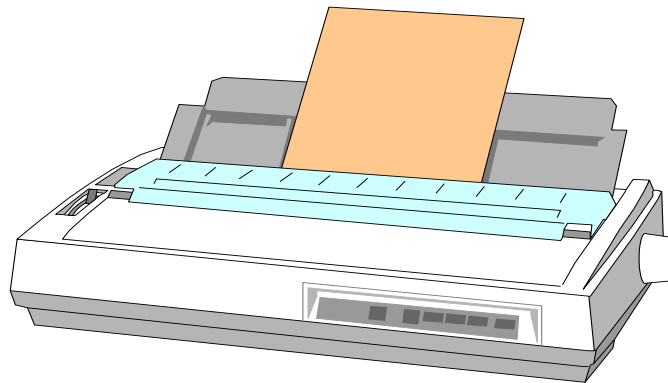


Figure 7.9 (a) Impact Printer

(b) Non-Impact Printers

In non-impact printers, characters or image are produced on paper without making contact with the paper. Examples are: Ink-jet, LaserJet, DeskJet, Spark jet and Thermal Printers.

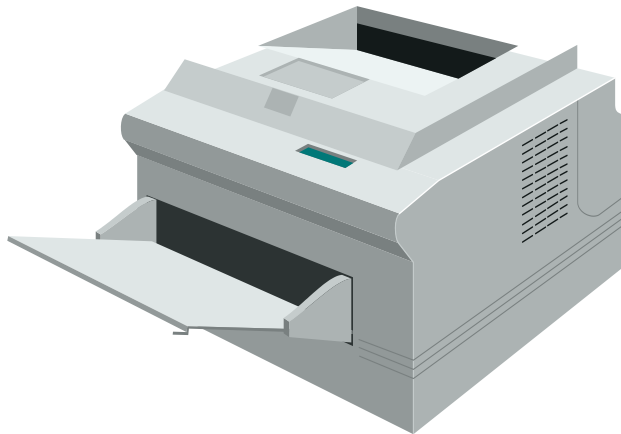


Figure 7.9(b): Non-Impact Printer

Differences between Impact and Non-Impact Printers

- (i) Impact printers are relatively cheaper than non-impact printers.
- (ii) Impact printers are usually noisy unlike non-impact printers.
- (iii) Some impact printers have the capabilities to print in multi-pages form that is carbon copies (e.g. dot-matrix and daisy-wheel printer) while impact printer such as laser and ink-jet printers may not be able to produce these copies.
- (iv) Non-Impact printers are capable of producing high quality print out unlike the impact printers.
- (v) In impact printers inked ribbons are hit against paper whereas in non-impact printers no contact is made with the paper.

3. Plotter

A plotter is another type of output device that is used to produce continuous lines or graph-like output based on commands from a computer. Plotters are different from printers in that they draw lines using pen and are more expensive than printers. Plotters are used in engineering applications where precision is very vital.



Figure 7.10 Plotter

4. Voice Output Device

This device converts digital output from the computer back into human intelligible speech. This output can be delivered by speakers connected to the computer. And where there is multimedia application, output can be produced as graphics or video as visual output. (Note: Multimedia is a technology that integrates two or more types of media, such as text, graphics, sound, voice, full-motion video, still video or animation into computer based application.

3.4.3 Auxiliary Devices

These devices are hardware in nature; they help in promoting and ensuring the smooth operation of the computer system and information technology equipment. Examples are Uninterrupted Power Supply (UPS) and voltage stabilizer.

Uninterrupted Power Supply (UPS)

When this device is installed in a computer room, it conserves power or energy for the computer system and IT equipment for sometimes in case of power failure.

-

Review Questions on CSC 205 Digital Logic and Computer Hardware

Revision Questions

1. (a) What do you understand by the term coding system?
(b) Briefly explain the following coding systems:
(i) ASCII Code (ii) Binary Coded Decimal (iii) EBCDIC
(c) Differentiate between binary and floating-point systems,
 2. Using two's complement, subtract the following binary numbers from each other:
(a) 110101 from 011001 (b) 1011 from 1110
 3. Briefly discuss the following the number systems:
(a) Binary Number System (b) Octal Number System (c) Hexadecimal Number System
 4. Briefly describe the usefulness of the following terms in modern day computers:
(a) Check digit (b) Parity bit (C) Differentiate between a computer structure and its function.
-
1. (a) What do you understand by a logic gate?
(b) List and explain the seven types of logic gates you know
 2. (a) Briefly describe the term digital logic gates
(b) What is a truth table?
(c) Draw a truth table for the output states of 2-input and 3-input of an AND gates.
 3. Briefly explain the following logic gates and draw their truth table:
(i) AND gates (ii) OR gates (iii) NOR gates
(iv) NAND gates (v) XOR gates
 4. (a). Briefly describe the term digital logic gates
(b). Identify all the universal logic gates. State the reason why they are called universal gates.
(c). i). Concisely explain the following logic gates: AND, OR, and NOR
(ii). Draw a truth table for the output states of 2-input of an AND, OR and NOR gates.

What is a computer hardware? List and explain the two major classifications of computer hardware and give examples where applicable

1. (a) What do you understand by the term computer hardware?
(b) List and state the functions of five hardware devices you can find in a computer system.
- 2.(a) List and explain the functions of the components of the central processing unit.
(b) Why is an auxiliary device necessary in the operation of a computer system?
3. Your organization involved in desktop publishing is to acquire a personal computer to enhance productivity, efficiency and profits. Your boss, the financial controller seeks your advice on the appropriate computer to purchase. Name two appropriate:

- (i) Input devices
 - (ii) Output devices
 - (iii) Auxiliary storage devices that must be components of the computer system.
4. (a) (i) What does the term I/O devices stand for?
(ii) What is main function of such devices?
- (b) State three advantages and one disadvantage of the laser printer over dot matrix printer.
1. (a) Compare and contrast the ‘main-storage’ and the auxiliary storage of a computer information processing system.
(b) Why are auxiliary storage devices necessary in the computer?
2. (a) Define a secondary storage device. Give another name for the secondary storage device.
(b) Distinguish between primary and secondary storage devices.
3. (a) Briefly explain secondary storage and state its functions?
(b) Explain the following types of secondary storage:
(i) Magnetic disk (ii) Magnetic tape (iii) Optical disk
(c) State two advantages that zip disk have over floppy disk.
4. (a) The use of flash drive is becoming more popular than the conventional floppy disks. As a computer student state two reasons why you will prefer flash drive to floppy disks.
(b) Why is it important to always backup your jobs at the close of the day’s events?