

CHAPTER 2

COMPUTER HARDWARE

2.1 Computer system

A **computer system** is made up of three major components: hardware, software and humanware (user). The physical units of a computer system constitute its hardware. Hardware consists of mechanical, electrical and electronic parts of the system. Sets of programmed instructions constitute the software. Humanware is the people element in the system.

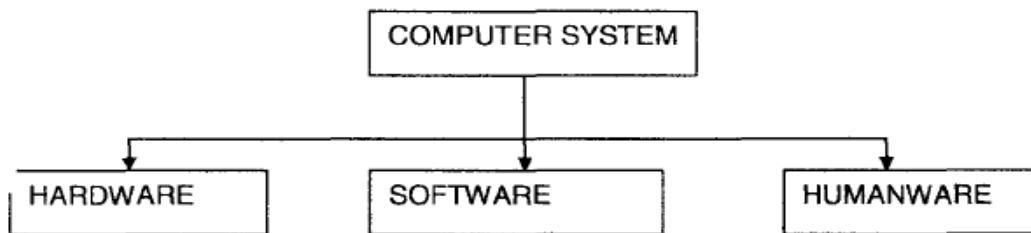


Fig.1.4: Computer system

2.2 Hardware

A computer, like human brain, receives data and instructions, stores them and processes the data according to the instructions given to it. It receives data from input devices, stores them in memory and displays them through an output device. The physical devices that make up a computer are referred to as hardware. **Computer hardware** can be broadly' classified into two: CPU and peripherals. The CPU is the most important part of a computer. The other **hardware** pieces like **input devices, output devices**, etc. are called **peripherals**.

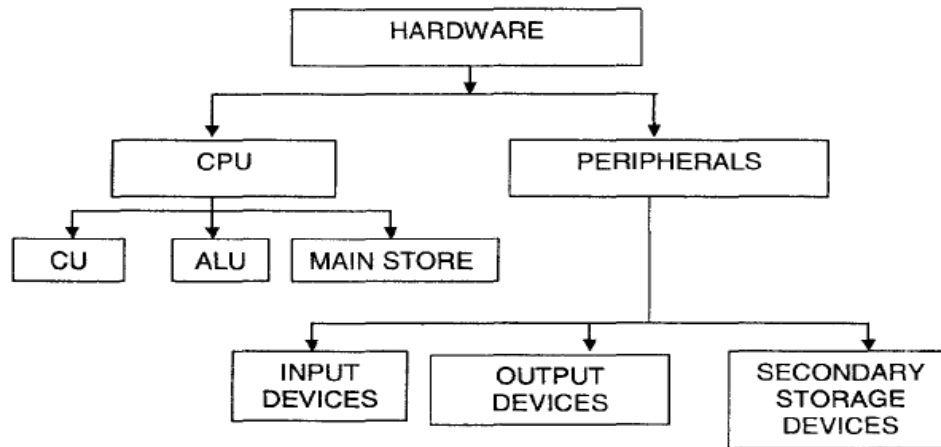


Fig.1.5: Hardware components

2.2.1. Central Processing Unit (CPU)

CPU is the brain of a computer. It has an ¹⁾arithmetic logic unit (ALU) to perform arithmetical and logical operations. It has a ²⁾control unit to co-ordinate the activities of the CPU and ³⁾main memory for primary storage.

a. Memory or Storage Unit

This unit can store instructions, data and intermediate results. This unit supplies information to the other units of the computer when needed. It is also known as internal storage unit or main memory or primary storage or Random access memory (RAM).

Primary memory and secondary memory are two types of memories in the computer. **Functions of memory unit are:**

- It stores all the data and the instructions required for processing.
- It stores intermediate results of processing.
- It stores final results of processing before these results are released to an output device.
- All inputs and outputs are transmitted through main memory.

b. ALU (Arithmetic Logic Unit)

This unit consists of two subsections namely

- Arithmetic section
- Logic Section

Arithmetic Section

Function of arithmetic section is to perform arithmetic operations like addition, subtraction, multiplication and division. All complex operations are done by making repetitive use of above operations.

Logic Section

Function of logic section is to perform logic operations such as comparing, selecting, matching and merging of data.

c. Control Unit

This unit controls the operations of all parts of computer but does not carry out any actual data processing operations.

Functions of this unit are:

- It is responsible for controlling the transfer of data and instructions among other units of a computer.
- It manages and coordinates all the units of the computer.
- It obtains the instructions from the memory, interprets them, and directs the operation of the computer.
- It communicates with Input/output devices for transfer of data or results from storage.
- It does not process or store data.

2.2.2. Computer Peripherals

The input/output and storage devices surround the central processing unit (CPU). Hence, they are called the peripheral devices. These peripherals can be further divided into ¹⁾ input devices, ²⁾ output devices and ³⁾ secondary storage devices.

a. Input Devices

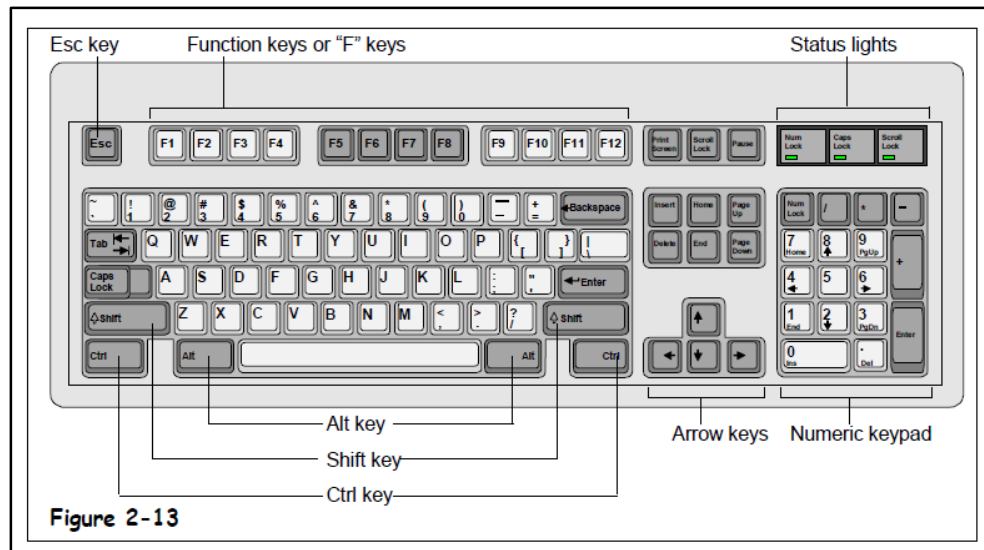
Input devices allow the user to input data and instructions to the computer. There are a variety of input devices. Direct entry of data generally requires a keyboard. It may also use other devices for direct data entry like a touch sensitive screen, voice recognition system and scanners. The popular input devices are discussed in the following section.

1. Keyboard

Keyboard is the most popular input device for direct entry of data and instructions into computer. The standard QWERTY keyboard is used for computer. The enhanced keyboard has 101 keys. In addition to them, the computer keyboard usually has special keys like PageUp, PageDown, PrintScreen etc. The computer keyboard is very much like the electronic typewriter keyboard. But it has additional keys.

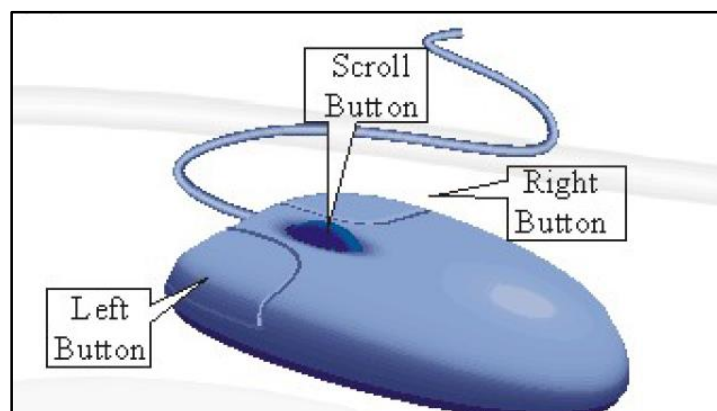
Computer keyboard has three types of keys:

- Alphanumeric keys for typing character and numeric data.
- Punctuation keys like comma, period, colon, semicolon, question mark etc.
- Special keys like function keys, control keys, arrow keys, capslock etc.



2. Mouse

Mouse is a pointing device that allows user to point to a specific position on the screen. It has two or three buttons on top for selecting/executing different operations. Pressing buttons of mouse is known as clicking of mouse. The mouse is placed on flat surface and moved around to move its controlling arrow on screen. The arrow showing the position of mouse on screen is known as mouse pointer. Left button of mouse is used execute the operation associated with it. Right button/Middle buttons are associated with special operations in different situations.



There are different mouse types:

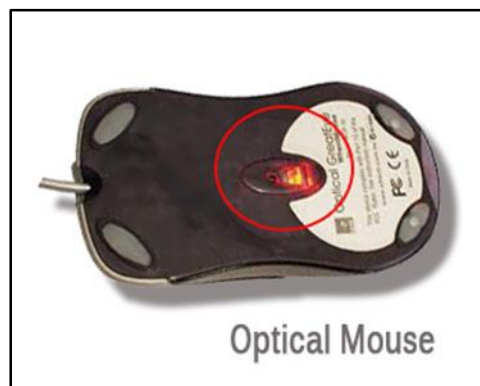
1. Mechanical Mouse

Also called as the ball mouse, a mechanical mouse has rubber or metal ball on its underside. When the ball rolls, mechanical sensors inside the mouse detect the direction and move the pointer on the screen of the PC. This type of mouse requires a flat surface or a mouse pad to work efficiently. One of the disadvantage of the device is that it is more prone to attracting dust.



2. Optical Mouse

Has no moving parts. It emit and senses light to detect the mouse movement. It can be used on any surface.



3. Wireless Mouse

A cordless mouse, also called a wireless mouse, is a mouse that connects to a computer without the use of wires. Instead, the mouse uses some manner of wireless technology, like Bluetooth, RF, or infrared radio waves. Usually, a USB receiver is plugged into the computer and receives signals from the cordless mouse.


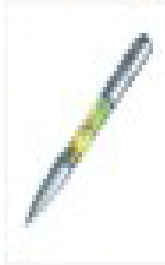






The following provides a brief description of some of the ways the mouse can be used:

- **Click:** By default, the left mouse button is considered the primary button. When instructed to click the mouse, it is understood this means that the left mouse button should be pressed one time. Clicking is done to position the insertion point or to select an object on the screen.
- **Double-click:** Double-clicking is performed by pressing the left mouse button two times in rapid succession. It is important that the mouse does not move while double-clicking or the command will not produce the expected results. Double-clicking is done to activate an object; for example, you double-click to open a file or start a program.

- **Drag:** to carry out this action, press the left mouse button and continue to hold it while dragging, or moving, the mouse. This action can be used to select large blocks of text.
- **Right-click:** pressing the right mouse button one time will open a shortcut menu. Shortcut menus are usually context-sensitive, which means they will vary depending on what you've clicked and what program you are using. The right mouse button is also known as the secondary button and is not typically pressed more than one time—no double-clicking for the right button. After the shortcut menu has been opened, you select the appropriate choice by clicking it with the left mouse button.
- **Scroll wheel:** If your mouse is equipped with a scroll wheel, it can be used to quickly move a page up or down in a window.


Some of the other **Input Devices** are enlisted below:



Device	Identification	Usage
Joy Stick •		It is a device used to control cursor on screen. Normally it is used in Games and specially designed simulation software
Light Pen		It is a device used for drawing pictures and for directly controlling screen operations. Or it is an input device that utilizes a light-sensitive detector to select objects on a display screen. A light pen is similar to a mouse except that with a light pen you can move the pointer and select objects on the display screen by directly pointing to the objects with the pen.

Microphone		It is a device used to accept audio inputs from the user.
Scanner		It is a device used to capture digital images of printed documents, graphics or other Printed media.
Web Camera		It is an easy to connect low resolution digital camera normally employed for transfer of images on the web-based conferencing.
Digital Camera		It is a high-resolution camera, which captures images and stores them in digital format. It has provision to connect to the computer using special computer communication cables (such as USB cables).

b. Output devices

It is a device used to provide the processed data from the computer to the user. The popular output devices are **monitor, printer** and **speaker** (audio response systems).

Device	Identification	Usage
Monitor		A Monitor is an output device, very similar to the television screen. It displays the information as it is typed and also displays the processed result or the output. It is available in many

		forms cathode ray picture tube based display, Liquid crystal based display (LCD), plasma panel display, and touch panel display.
Printer		It is an output device to produce paper copy (hard copy) for a document, pictures etc. The job of a printer is to put on paper what is seen on the monitor. Printers vary mainly in cost, quality, speed and noise levels. example: Dot Matrix Printer, Inkjet / Deskjet / Laser Printer
speaker		This device is connected to a sound card in the system. It used to play music, sound and speech. Most computers have small speaker inside the system unit that beep when a problem occurs in the computer