

CHAPTER-2

Basic Components of a Computer System/ Block Diagram

1. Input Device

“A piece of equipment/hardware which helps us enter data into a computer is called an input device. For example keyboard, mouse, etc.”

Input refers to **any information, or data, that is sent to a computer for processing**. Input is often sent to the computer from a device such as a keyboard, mouse, or other input device. Putting it simple, input is the act of entering data into a computer.

List of Input Devices –

1. Keyboard
2. Mouse
3. Joystick
4. Trackball
5. Light pen
6. Touch screen
7. Digital Camera
8. Scanner
9. Bar Code Reader
10. OMR
11. OCR
12. MICR
13. ATM etc.

1. Keyboard

The keyboard is an input device that **allows you to enter letters, numbers and symbols into your computer**. The keyboard keys include the alphanumeric keys (letters and numbers), numeric keypad (may not be available on notebooks /laptops), special function keys, mouse cursor moving keys, and status lights.



Computer keyboard has following types of keys:

1. Alphanumeric Keys
2. Numeric Keypad
3. Function Keys
4. Special Purpose Keys
5. Modifier Keys
6. Cursor Keys

1 . Alphanumeric Keys

These keys include the digit keys (0-9) and letter keys (A-Z). Which generally give same layout as that of typewriters?

ALPHANUMERIC KEYS



2 . Numeric Keypad

It is used to enter numeric data or cursor movement. Generally, it consists of a set of 17 keys that are laid out in the same configuration used by most adding machines and calculators.



3 . Function Keys

The twelve function keys are present on the keyboard which is arranged in a row at the top of the keyboard. Each function key has unique meaning and is used for some specific purpose.



Function keys

4 . Special Purpose Keys

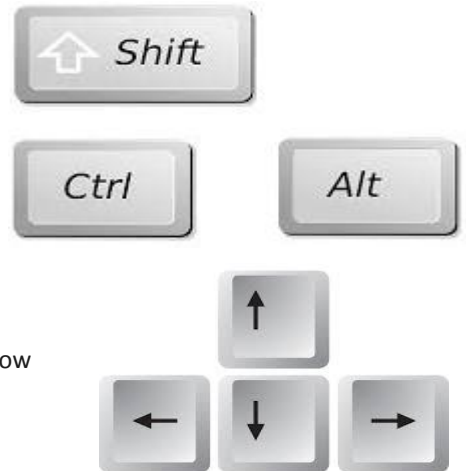
Special Purpose keys also include Home, End, Insert, Delete, Page Up, and Page Down.

Keyboard also contains some special purpose keys such as Enter, Shift, Caps Lock, Num Lock, Space bar, Tab, and Print Screen.



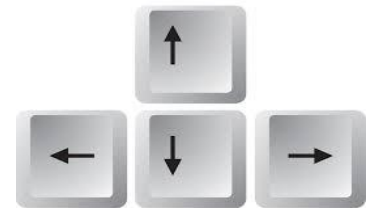
5 . Modifier Keys

These keys provide modifier keys. It includes three keys. Modifier keys also Control (Ctrl), Alternate (Alt), Shift.



6 . Cursor Keys

These keys provide cursor and screen control. It includes four directional arrow keys.



Types of Keyboard

1. Normal Keyboard
2. Wireless Keyboard
3. Ergonomic Keyboard

Normal Keyboard



Wireless Keyboard



Ergonomic Keyboard



2. Mouse

A **computer mouse** is an input device that is used with a computer. Moving a mouse along a flat surface can move the cursor to different items on the screen. Items can be moved or selected by pressing the mouse buttons (called clicking). Today's mouse has two buttons, the left button and right button, with a scroll wheel in between the two. Today, many computer mouse use wireless technology and have no wire.



Work of Mouse

- Clicking
- Double Clicking
- Right Clicking
- Dragging
- Scrolling

Types of Mouse

1. Mechanical Mouse



2. Optical Mouse



3. Cordless Mouse or Wireless Mouse



3. Joystick

A joystick is an **input device consisting of a stick that pivots on a base and reports** its angle or direction to the device it is controlling. ... Joysticks are often used to control video games, and usually have one or more push-buttons whose state can also be read by the computer.



4. Trackball

A trackball is a **computer cursor control device** used in many notebook and laptop computers. The trackball is usually located in front of the keyboard toward the user. Essentially, the trackball is an upside-down mouse that rotates in place within a socket.



5. Light Pen

A light pen is a **computer input device** in the form of a light-sensitive wand used in conjunction with a computer's cathode-ray tube (CRT) display. It allows the user to point to displayed objects or draw on the screen in a similar way to a touch screen but with greater positional accuracy.



6. Touch Screen

A touch screen is a computer display screen that **is also an input device**. The screens are sensitive to pressure; a user interacts with the computer by touching pictures or words on the screen.



7. Bar code reader

A barcode scanner, also called a point-of-sale (POS) scanner or a price scanner, is a device used **to capture and read information contained in a barcode**. The scanner consists of a light source, a lens and a light sensor that translates optical impulses into electrical ones.



8. Scanner

Types of scanning devices which are of interest include **flatbed scanners, sheet fed scanners, print- head scanners and hand-held scanners**. Flatbed scanners operate in a similar way to office copiers. The image page to be scanned is laid, face down, on a glass platen.



9. OMR

Optical Mark reading (OMR) is a **method of entering data into a computer system**. Optical Mark Readers reads pencil or pen marks made in pre-defined positions on paper forms as responses to questions or tick list prompts.



10. ATM

An Automated Teller Machine, better known as an ATM, is a **specialized computer** that makes it convenient for bank account holders to manage their money.



11. MICR

The magnetic ink character recognition line enables a **computer to rapidly read and record numbers or other information** from printed documents, such as a personal check. In this case, that information is a check number, routing number, and account number.



2.. Output Device

“An output device is **any piece of computer hardware equipment which converts information into human readable form**. It can be text, graphics, tactile, audio, and video. Some of the output devices are Visual Display Units (VDU) i.e. a Monitor, Printer graphic Output devices, Plotters, Speakers etc.”

Output Devices-

- Monitor
- Printer
- Plotter
- Projector
- Sound Speaker

Monitor

Monitors, commonly called as **Visual Display Unit (VDU)**, the main output device of a computer. It forms images from tiny dots, called pixels that are arranged in a rectangular form. The sharpness of the image depends upon the number of pixels.-

Monochrome

The effect of a monochrome monitor is somewhat like that of a black and white television set. The earliest designs called for a simple black background, with white text appearing on the screen. Some models reversed the process, using a white background to display black text.

Gray-Scale

The simplest way to go from gray scale to full color mode is to hit **CTRL + Windows Key + C**, which should work right away. If you hit the same key combination again, you'll go back to grayscale.



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Color Monitors

A monitor or TV screen generates three colors of light (**red, green, and blue**) and the different colors we see are due to different combinations and intensities of these three primary colors. Each pixel on a computer screen is composed of three small dots of compounds called phosphors surrounded by a black mask.

Types of Monitor

- CRT Monitor
- Flat Panel Monitor
- LCD (Liquid Crystal Display)
- LED (Light Emitting Diode)

CRT Monitor (*cathode Ray tube*)

(Cathode Ray Tube) A vacuum tube used as a display screen in a computer monitor or TV. The viewing end of the tube is coated with phosphors, which emit light when struck by electrons. In the past, CRT was a popular term for a computer display terminal.



LCD (Liquid Crystal Display)

Liquid Crystal Display (LCD) monitors feature a layer of liquid held between two pieces of polarized glass. The LCD monitor does not produce its own light. Instead, additional lighting behind the screen shines through the glass and illuminates the crystals. LCD monitors are usually backlit by fluorescent lamps.



Flat panel Monitor

A thin, often lightweight video display used in computer monitors and televisions as an alternative to the cathode-ray tube. Flat-panel displays often employ liquid crystals or electroluminescent materials such as light-emitting diodes. Also called flat screen.



LED (Light Emitting Diode)

Light Emitting Diode (LED) monitors also feature a liquid crystal display, but the backlighting is produced by LEDs, not fluorescent lamps.



Printer

“A printer is basically an output device **which prints a hard copy of the electronic data** that is stored in the computer or any other devices. The electronic data may include documents, text, images or even the combination of all three. Particular printers are available for printing particular data types.”



Types of Printer

Impact Printing

Any method of printing that uses the physical force of an impact to transfer a printing ink or pigment from a ribbon to the substrate. The ink or pigment is transferred when a hammer strikes either the ribbon against the substrate or the substrate against a ribbon and drum, chain, or bar. -

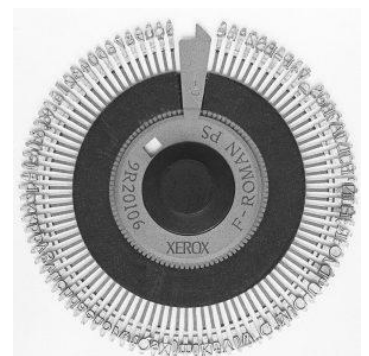
- Dot Matrix Printer
- Daisy Wheel Printer
- line Printer
- Chain Printer
- Drum Printer etc.

1. Dot Matrix Printer

Dot matrix printers can print multiple sheets at once, printing directly onto the white front sheet, then following on to the coloured carbon copies behind. In general, dot matrix printers are more reliable than laser or inkjet machines, especially when used in dirty environments such as warehouses or car garages.

2. Daisy Wheel Printer

Daisy wheel printing was used in **electronic typewriters, word processors and computers from 1972**. The daisy wheel is considered to be so named because of its resemblance to the daisy flower. By 1980 daisy wheel printers had become the dominant technology for high-quality text printing.



3. Line Printer

A line printer is an **impact printer** which makes use of a continuous feed of paper and prints one line of text at a time. Although they have been replaced in most instances by high-speed laser printers, they are still used in some business as they are low cost and have the ability to print on multi-part forms.

- Drum Printer
- Chain Printer
- Band Printer

Drum Printer

A wide-format **inkjet** printer. The paper is taped onto a drum for precise alignment to the nozzles. (2) An old line printer technology that used formed character images around a cylindrical drum as its printing mechanism.

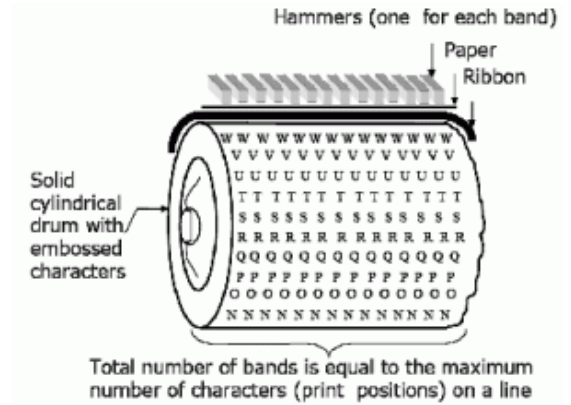
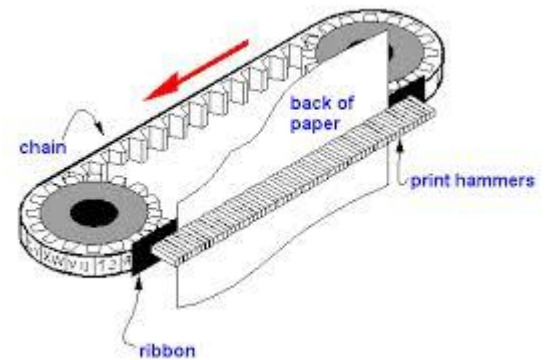


Fig. 5.17 Printing Mechanism of a Drum Printer

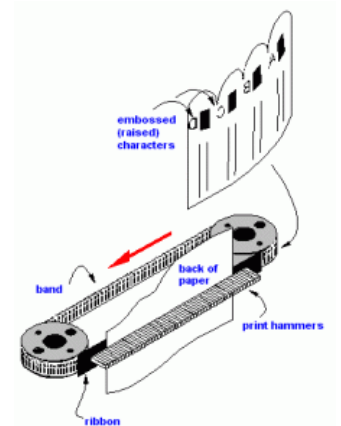
Chain Printer

An early line printer that used **type slugs linked together in a chain as its printing mechanism**. The chain spins horizontally around a set of hammers. ... Chain and train printers gave way to band printers in the early 1980s.



Band Printer

A line printer that uses a metal band, or loop, of type characters as its printing mechanism. The band contains a **fixed set of embossed characters** that can only be changed by replacing the band. ... Band printers and line matrix printers are the two surviving line printer technologies.



Non-Impact Printing

Any method of printing that does not use the physical force of an impact to transfer a printing medium to the substrate. This term encompasses a variety of printing methods (new and old); much of the print work that used to be done using impact printing methods is now done using thermal printers (direct and transfer), inkjet printers, and laser printers, although the term also applies to other methods of printing such as electrostatic, ion deposition, xerography, letterpress, flexographic, lithographic, gravure, screen printing, and various methods of offset printing.

- Laser Printer
- Photo Printer
- Inkjet Printer
- Portable Printer
- Multi functional Printer
- Thermal Printer.

Laser printer

A **laser printer** is a popular type of personal computer printer that uses a non-impact (keys don't strike the paper), photocopier technology. When a document is sent to the printer, a laser beam "draws" the document on a selenium-coated drum using electrical charges.

Print capacity and speed: Personal laser printers are sufficient for printing an average of 200 pages per week. These are low-end and cost. They can print up to eight and more ppm (pages per minute). A workgroup printer is needed if an average of 1000 pages per week is needed. These print up to 24 ppm and more. Production printers are needed for printing 50,000 or more pages per week. These are quite expensive and are used by commercial publishers. They can print up to 700 ppm. They can print 24 hours a day, seven days a week.



Advantages of laser printer

Long life

Fast printing speed

Long-term non-printing effect will not change

Suitable for mass printing, low cost

The machine is relatively stable

Low quality requirements for paper

Thermal Transfer Printer

Direct thermal printers are most commonly used to **print items such as receipts and shipping labels**. Thermal transfer printers use a thermal print head to transfer a solid ink from a ribbon onto a label supply (usually made from vinyl, polyester, nylon, or other thicker materials) to produce a permanent print.

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Photo Printer

A printer designed to print on extremely white photo paper that is coated to keep the ink from smearing. Photo printers are available that support all sizes of photo paper; however, some are dedicated to only wallet-sized 3x5" or 4x6" prints.



Inkjet Printer

Inkjet printers, as the name implies, use **ink to print text, graphics, and images onto various types of paper**. These printers are most common in homes and small offices, though many commercial printing companies use inkjet printers to produce high-quality brochures, flyers, and other pieces.

The most popular printer for home computer users that prints by spraying streams of quick-drying ink on paper. The ink is stored in disposable ink cartridges, and often a separate cartridge is used for each of the major colors. These colors are usually CMYK (cyan, magenta, yellow, and black). The picture is an example of a computer inkjet printer. Although **inkjet printers** themselves are often relatively inexpensive, the ink cartridges used in the printers can increase the overall cost of the printer.

Multi functional / All in one Printer

An all-in-one printer is a device made up of multiple peripheral functionalities and capabilities, including printing, copying and scanning.

All-in-one printers provide centralized document management for large and small enterprises. Manufacturer's segment all-in-one printers by page-per-minute (PPM) speed and cost varies by output quality and usage.



Plotter

Plotters are **used to print graphical output on paper**. • It interprets computer commands and makes line drawings on paper using multicoloured automated pens. It is capable of producing graphs, drawings, charts, maps etc.

Types of Plotter

- Drum pen Plotter
- Flat bed Plotter



Sound Card & Speaker

Sound card, also called **audio card**, integrated circuit that generates an audio signal and sends it to a computer's speakers. The sound card can accept an analog sound (as from a microphone or audio tape) and convert it to digital data that can be stored in an audio file.

Speakers are **used to connect to a computer to generate sound**, which are one of the most common output devices. ... With the computer speaker, the computer's sound card creates a signal that is used to produce sound. The primary objective of speakers is to offer audio output for the listener.



Projector

A projector is **an output device that is capable of connecting to a computer**, which may be another option for a monitor or television in terms of displaying pictures to a large number of people.

