

UNIT STRUCTURE

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8.0 Learning Objectives :

After working through this unit, you should be able to :

- Specify the principle of working of monitor
- Enlist various types of output devices
- State the types of printers
- Explain the working of dot matrix printer, ink jet printer, laser printer and LED printer
- Discuss the concept of e–book reader, data projector and HDTV
- Identify the role of output devices in computer systems

8.1 Introduction :

Output is defined as a processed data from computer. Output is available to us in the form of hard copy or soft copy of text, graphics, audio, video modes.

The hardware used to provide output processed by the computer is known as output device. Monitors, printers, plotters are the commonly used output devices. For example, let us suppose that you have prepared PowerPoint presentation on some topic. You would practice the presentation on Monitor, take printouts from printer and listen to presentation using audio systems. These output devices translate the information processed by computer into the form that people can understand and use.

8.2 Monitors :

A monitor or display (also called a visual display unit) is a piece of electrical equipment which displays images generated by devices such as computers, without producing a permanent record. The monitor comprises the actual display device, circuitry and an enclosure. The display device in modern monitors is typically a thin film transistor liquid crystal display (TFT–LCD), while older monitors use a cathode ray tube (CRT).

Monitor is the most frequently used output device. The main features of monitor are size and clarity. The size of a display is typically given as the distance between two opposite screen corners. The size of monitor is specified as 15", 17", 19" etc. Larger monitors have the advantage of displaying more information on screen. However, these are more expensive.

Resolution of monitor indicates clarity. The unit of resolution is pixels. Pixels are individual dots or "picture elements" that form images on monitor. For a given size monitor, greater the resolution (i.e. more pixels), better the clarity of image. For a higher level of clarity, larger monitors require higher resolution (i.e. more pixels).

To indicate resolution capabilities of a monitor, several standards are available. The most common standards are SVGA, XGA, SXGA and UXGA.

The resolution standards of monitor are furnished in the Table.

Standard	Expanded name	Pixels	Monitor Size
SVGA	Super Video Graphics Array	800 X 600	15"
XGA	Extended Graphics Array	1024 X 768	17" and 19"
SXGA	Super Extended Graphics Array	1280 X 1024	19" and 21"
UXGA	Ultra–Extended Graphics Array	1600 X 1200	21"

As seen from the above table, the minimum resolution is provided by SVGA and maximum by UXGA. UXGA is the newest and highest standard. The UXGA monitors are primarily used for high end engineering design and graphic arts.

There are two main types of monitors :

[1] The CRT monitor, which is big and heavy. It is the oldest technology used by monitors. It looks like a television, but has a bigger display resolution and often a higher frequency. CRT stands for cathode–ray tube. The advantages of CRT monitor are low cost and high resolution. The disadvantage is larger size.

☐ Check Your Progress – 1 :

- To view the output in soft–copy form _____ output device is used.
[A] Printer [B] Speaker [C] Monitor [D] Scanner
- The resolution supported by SVGA is _____ pixels.
[A] 800 * 600 [B] 1024 * 768 [C] 1280 X 1024 [D] 1600 * 1200
- The type of large size monitor is _____.
[A] LED [B] CRT [C] LCD [D] Plasma

- [2] The LCD monitor (also called Flat Panel Monitor) is thin, flat and lightweight type of monitor. It is a newer technology item than CRT type. The quality can be the same or even better than a CRT, but this type of monitor costs more than a CRT monitor. There are two types of LCD Monitors – passive matrix and active matrix. Passive matrix (also called dual scan monitors) creates images by scanning entire screen.

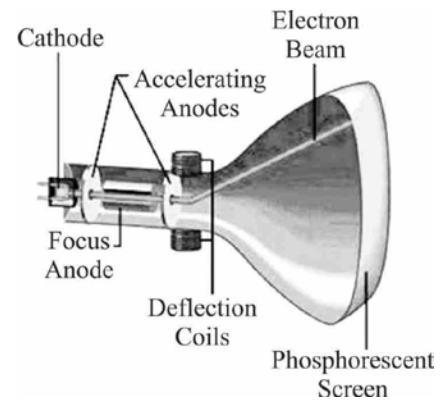


Fig. 8.1 : Working of Monitor

This type of monitor requires a little power but clarity is not much sharp. Active matrix or thin film transistor (TFT) monitors do not scan down the screen. Instead, each pixel is activated independently. More colours with better clarity can be displayed. These types of monitors are expensive and require more power

8.2.1 Other Display Devices :

There are some other types of monitors used for specialized applications. Let us understand the working of these monitors.

1. The hand-held book size devices called is E-book which displays text and graphics. Using contents which are downloaded from the web, these devices are used to read newspapers, magazines and entire books. These readers are very economical. The cost of producing and distributing e-book content is less than publishing. And delivering traditional print media. The other benefit is the time required to create and distribute content is less. Therefore, it is predicted that the e-books will be popular soon
2. Data projectors are specialized devices like slide projectors. These types of devices however connect to computer like microcomputers and project computer output just as it would appear on a traditional monitor. Salesmen, demonstrators, students make and deliver power point presentations on data projectors. The data projectors are mostly used for presentation at any place like classroom and boardroom.
3. High Definition Television (HDTV) is the recent development in the integration of computer and television. The High Definition Television (HDTV) views much clearer and more detailed wide screen picture than a regular television. Because, the output is digital, users can easily freeze video sequences to create high quality steel images. The video and still images can then be digitized, edited and stored on disk for later use. This technology is very useful to graphic artists, designers and publishers.

☐ Check Your Progress – 2 :

1. From the given below, _____ is not a type of monitor.
[A] CRT [B] LCD [C] TFT [D] Data Projector
2. LCD stands for _____.
[A] Large Computer Display [B] Local Crystal Design
[C] Liquide Crystal Display [D] Liquide Crystal Design

3. Identify small hand-held display output device from the given below devices.
- | | |
|--------------------|-----------------|
| [A] E-book Reader | [B] CRT Monitor |
| [C] Data projector | [D] TFT Monitor |

8.3 Printers :

The output view on monitor is referred as a soft copy. The output printed on paper through a printer or plotter is called a hard copy. Printer is an important output device for maintaining a hard copy of documents. The commonly used printers are dot matrix, Ink-jet, laser, LED printers. Let us study these types of printers.

8.3.1 Dot-Matrix Printers :

A dot matrix printer/impact matrix printer is a commonly used printer. It is use in situations where printed content is more important than quality.

The printer mechanism comprises of a print head that runs back and forth, or in an up and down motion, on the page and prints by impact, striking an ink-soaked cloth ribbon against the paper, much like a typewriter. Because the printing involves mechanical pressure, these printers can create carbon copies and carbonless copies.

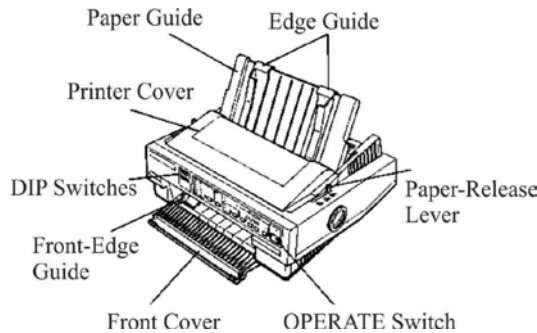


Fig. 8.2 : Dot-Matrix Printer

Typical output from a dot matrix printer operating in draft mode. This image represents an area of printer output approximately 4.5 cm × 1.5cm (1.75 × 0.6 inches) in size.

Each dot is produced by a tiny metal rod, known as a "wire" or "pin", which is driven forward by the power of a tiny electromagnet or solenoid, either directly or through small levers (pawls). Facing the ribbon and the paper is a small guide plate pierced which contains holes to serve as guides for the pins.

Advantages :

1. These machines are highly durable.
2. The cost of these printers is less as compared to other printers.
3. Dot matrix printers such as impact printer, which can make carbon-copies or print on multi-part stationery.
4. Printers like Impact printers which have the lowest printing costs for one page.

Disadvantages :

1. Impact printers can only print low resolution graphics, with limited color performance, limited quality and comparatively low speed.
2. These are noisy printers, to the extent that sound dampening enclosures are available for use in quiet environments.

❑ **Check Your Progress – 3 :**

- To view the output in hard-copy form _____ output device is used.
[A] Printer [B] Speaker [C] Light pen [D] Scanner
- The _____ printer is less-costly, prints like a typewriter.
[A] Ink-Jet [B] Ink-Tank [C] Dot-matrix [D] Laser
- _____ printer is noisy, low-resolution, low-speed impact printer.
[A] Laser [B] Dot-matrix
[C] Ink-Jet [D] None of the above

8.3.2 Ink-Jet Printers :

Ink-Jet printer is a non-impact printer that build a character or graphics shapes on the paper by sprinkling of liquid ink in the shape of tiny dots. The quality of print is far better than the print taken by a dot-matrix printer. Ink-jet printer has two cartridges, one of black ink and another of color ink. These cartridges have ink in liquid form.



Fig. 8.3 : Ink-Jet Printer

There is a small head is there on the bottom part of the cartridge, which consists of tiny dots and a circuit. Circuit will open or close the dots depending upon the shape of the character to be printed on the paper. Ink-jet printers can be used to print greetings cards, business cards, letterheads and so on.

Compare to dot-matrix printer, ink-jet printer is costly and can produce better quality of printout. The speed of an ink-jet printer is measured in ppm (pages per minutes). Ink-jet printer is faster than dot-matrix printers.

❑ **Check Your Progress – 4 :**

- _____ printer use liquid ink to print the paper.
[A] Laser [B] Ink-Jet
[C] Dot-matrix [D] None of the above
- Ink-jet printer used _____ to print the characters or graphics on the page.
[A] Toner [B] Carbon Ribbon
[C] Cartridge [D] None of the above
- _____ printer is non-impact printer, produces high quality printout from tiny dots.
[A] Laser [B] Dot-matrix
[C] Both [A] and [B] [D] Ink-Jet

8.3.3 Laser Printers :

Laser printer is a high-speed, produces high-quality printouts. It is a kind of non-impact printer. Black & White and Color are two models of a laser printer. Color laser printers are very costly printer. It is similar to a copier machine.

A laser printer has special component called tonner, which is filled with carbon powder. The laser beam used in the laser printer produces an image on the drum within printer. The laser light alters the electrical charge on the drum whenever it hits. The toner then sticks the carbon particles on the paper by

Inkjet printers are the most common type of computer printer for the general consumer due to benefits such as low cost, high quality of output, capability of printing in different colors and ease of use.

A laser printer is mostly used printer that rapidly produces high quality text and graphics on plain paper.

In the print head LED technology uses a light-emitting diode array as a light source. The LED bar pulse-flashes across the page width and creates the image on the print drum or belt as it moves past.

8.5 Suggested Answers For Check Your Progress :

- ❑ **Check Your Progress 1 :**
1. [C] 2. [A] 3. [B]
- ❑ **Check Your Progress 2 :**
1. [D] 2. [C] 3. [A]
- ❑ **Check Your Progress 3 :**
1. [A] 2. [C] 3. [B]
- ❑ **Check Your Progress 4 :**
1. [B] 2. [C] 3. [D]
- ❑ **Check Your Progress 5 :**
1. [C] 2. [B]

8.6 Glossary :

CRT : Cathode Ray Tube. It is a technology used in monitor or television.

LCD : Liquid Crystal Display. It is also a type of monitor.

LED : Light Emitting Diode. It is a type of monitor or television.

HDTV : High-Definition Television

TFT : Thin Film Transistor. A type of monitor.

SVGA : Super Video Graphics Array. It a type of display resolution.

8.7 Assignment :

- ❖ **Broad Questions :**
 1. What do you mean by Dot Matrix Printer ? State its advantages and disadvantages.
 2. Discuss the principle of working of output devices in computer systems.
- ❖ **Short Notes :**
 - a. Ink Jet Printers
 - b. LED Printers
 - c. HDTV
 - d. Data Projector
 - e. E-book reader

8.8 Activity :

Explain in brief any five output devices along with their use.

8.9 Case Study :

- Gather the information of other types of printers given below and write a short note on it :
 - o Plotters
 - o Multi-Function Printers

8.10 Further Readings :

1. Computer Fundamentals by P.K.Sinha and Priti Sinha.
2. Discovering Computers 2016 by Shelly Cashman Series. CENGAGE publications.
3. Computer Fundamentals by Pearl Software, Khanna Book Publishing.
4. Computer Essentials, Timothy J. O'Leary, Linda O'Leary, MKCL Publishing
5. Fundamentals of Computers, V. Rajaraman, Prentice Hall of India
6. Introduction to Computers, Peter Norton, McGraw Hill Publishing Technology Edition

BLOCK SUMMARY :

- Computer takes Input (Data) from the user process it and produces Output (Information).
- To process the data, computer need store data, information and instructions into the computer's memory.
- Memories of the computer can be divided into two categories [1] Primary Memory and [2] Secondary Memory.
- Primary memories are faster compared to the secondary memory. They are made from the circuits and they are costlier than secondary memories.
- Primary memories are divided into two categories [1] RAM and [2] ROM.
- RAM stands for Random Access Memory which is based on IC (Integrated Circuits). It is also known as main memory of the system. It is a costly memory available in two types S-RAM and D-RAM.
- CPU directly interact with the RAM as it is fast memory. RAM is volatile memory and loose its content when we turn off the machine.
- ROM stand for Read Only Memory. BIOS is an example of ROM which is responsible to boot the operating system for any computer.
- Improved versions of ROM are PROM, EPROM, EEPROM, and Flash memory.
- Secondary memories are slower compared to the primary memory, they are cheaper and non-volatile memory.
- CPU cannot directly interact with the secondary memory directly. Secondary memory is used to store the data permanently.
- HDDs (Hard Disk Drives) and SSD (Solid State Drives) are popular examples of secondary memories. SSDs are faster than HDDs.
- Optical memories like CD-ROM, DVD and Blu-Ray discs are also secondary memories.
- Portable memories like Pen-drive, Memory card which are made from Flash memories are also an example of secondary memory.
- Cache memory is a high-speed memory placed between CPU and Main memory to reduce speed mismatch problem between CPU and Main memory.
- To input the data to the computer system we need to use Input devices.
- Keyboard and Mouse are popular examples of the Input devices.
- Mouse is pointing input device. Other pointing input devices are trackball and light pen.
- Other input devices which we are using in our daily lives are magnetic strip cards, smart card, barcode reader and RFID tags.
- Cameras like Digital cameras and web cameras are also example of input devices.
- To get the information from the computer system we need to use output devices.
- Monitors and Printers are examples of output devices.

- CRT, LCD, LED, TFT are the different types of monitors. Monitors are used to view soft-copy of the information produces by the computer system.
- do the presentation to a group of people data projector is used, which also an output device.
- Dot-matrix, Ink-jet and Laser printers are popular printers. Dot-matrix is cost effective printer, produces low quality of printout. It is a very slow printer.
- Ink-jet have cartridge, which contain ink in liquid form. Ink-jet printers prints high quality of printout with tiny dots and liquid ink.
- Laser printer produces high quality of printouts. They are much reliable. It is costly printer which can print information faster than dot-matrix and ink-jet printer.

BLOCK ASSIGNMENT :**❖ Short Answer Questions :**

- (1) List the categories of memory
- (2) Differentiate primary memories and secondary memories
- (3) What is cache memory ? How it is useful in the computer system
- (4) What is flash memory ?
- (5) What is smart card ?
- (6) List all pointing devices
- (7) What is OMR ? What is the use of it ?

❖ Long Questions :

- (1) Explain characteristics of memory devices
- (2) Explain Random Access Memory in brief
- (3) Explain characteristics of secondary memory devices
- (4) What are hard drives ? Explain its types in brief
- (5) Write a short note on optical memories
- (6) List and explain different types of printers

**Fundamentals of
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Technology**

❖ **Enrolment No. :**

1. How many hours did you need for studying the units ?

Unit No.	5	6	7	8
No. of Hrs.				

2. Please give your reactions to the following items based on your reading of the block :

Items	Excellent	Very Good	Good	Poor	Give specific example if any
Presentation Quality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Language and Style	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Illustration used (Diagram, tables etc)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Conceptual Clarity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Check your progress Quest	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Feed back to CYP Question	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

3. Any other Comments

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