

COMPUTER HARDWARE

Definition

- Hardware is any physical part of the computer that you can touch, see and pick up
- EXAMPLES
- Monitor, Keyboard, mouse, disk drives, printers, scanners and speakers



Hardware can be classified as

- **Input devices** -- keyboard, mouse etc.
- **Output devices** -- printer, monitor etc.
- **Processing devices** -- CPU, motherboard, RAM etc.
- **Storage devices** -- Hard disk, CD, DVD etc.

INPUT DEVICES

Are hardware components used to enter data and instructions to the computer.

Examples include:-

- Keyboard
- Mouse
- Joy Stick
- Light pen
- Track Ball
- Scanner
- Graphic Tablet
- Microphone
- Magnetic Ink Card Reader(MICR)
- Optical Character Reader(OCR)
- Bar Code Reader
- Optical Mark Reader

Keyboard



- A keyboard is a device with keys which enters data and instructions into a computer system when keys are pressed.
- Keyboard are of two sizes 84 keys or 101/102 keys, but now 104 keys or 108 keys keyboard is also available for Windows and Internet.

Keyboard key classification

Types of Keys	Description
Alphanumeric Keys	These keys include the letter keys (A-Z) and digits keys (0-9)
Numeric Keypad	A set of 17 keys used by most adding machine and calculators.
Function Keys	12 functions keys. Each function key has unique meaning and is used for some specific purpose.
Control keys	Control keys also include Home, End, Insert, Delete, Page Up, Page Down, Control(Ctrl), Alternate(Alt), Escape(Esc), Arrow keys
Special Purpose Keys	Enter, Shift, Caps Lock, Num Lock, Space bar, Tab, and Print Screen

The keyboard layouts

- The keyboard layout comes from the first six letters in the top alphabet row (the one just below the numbers).
- The QWERTY, is the universal keyboard layout
- The QWERTZ
- The AZERTY- Arabic
- ABCDE
- The ABNT –Portuguese Brazilian
- FYROM- Macedonian

Voice Input Devices

- Voice Input Devices - also called speech-recognition devices or voice-recognition systems. This device uses a voice recognition technology that converts a user's speech into a digital code.

Mouse



- A mouse is a most popular pointing device used to move cursor position on a monitor screen.
- Mouse can be used to control the position of cursor on screen, but it cannot be used to enter text into the computer
- It has a left and right button and scroll bar is present at the mid

Mouse clicking skills

- Clicking-this means pressing the left or right button once
- **Right-click-is to press and release the right button once**
- **Left-click-is to press and release the left button once**
- **Double clicking-is to press the left button twice in a succession to execute a command such as opening a file or an application.**
- **Drag and drop-this involves holding down left button and moving the cursor.**

Light Pen

- Light pen is a pointing device which is similar to a pen. It is used to select a displayed menu item or draw pictures on the monitor screen.



Track Ball

- A trackball is used to control the pointer by rotating a ball with your thumb.



Joystick

- The function of joystick is similar to that of a mouse. It is mainly used in Computer Aided Designing (CAD) and playing computer games.



Gamepad

- ***A gamepad controls the movement and actions of players or objects in video games or computer games.***
- ***On the gamepad, users press buttons with their thumbs or move sticks in various directions to trigger events.***



Scanner

- Scanner captures images from paper which are then converted into the digital form that can be stored on the disk. These images can be edited before they are printed.

Common types of scanners include:

- **Flatbed scanner**
- **Pen or handheld scanner**
- **Sheet bed scanner**
- **Drum scanner**

IMAGE SCANNER ILLUSTRATIONS

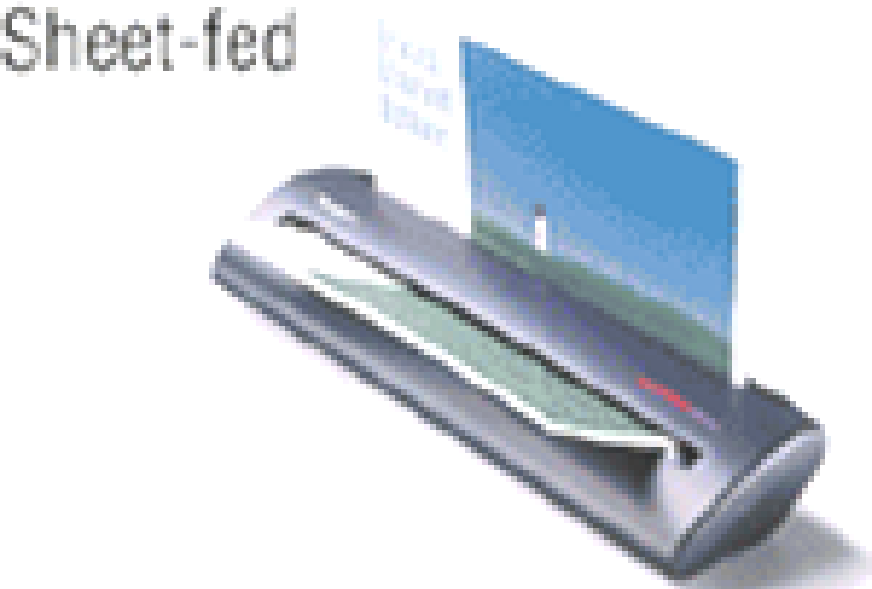
Flatbed



Pen or handheld



Sheet-fed



Drum



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Digitizer

- Digitizer is an input device which converts analog information into a digital form
- Digitizer is also known as Tablet or Graphics Tablet because it converts graphics and pictorial data into binary inputs. A graphic tablet as digitizer is used for doing fine works of drawing and images manipulation applications.

Microphone



- Microphone is used to input sound that is then stored in digital form. The microphone is used for various applications like adding sound to a multimedia presentation or for mixing music.

Magnetic Ink Character Reader (MICR)

- MICR input device is generally used in banks to read cheques.
- The bank's code number and cheque number are printed on the cheques with a special type of ink that contains particles of magnetic material that are machine readable.

- This reading process is called Magnetic Ink Character Recognition (MICR).
- The main advantages of MICR is that it is fast and less error prone.



Optical Character Reader (OCR)

- OCR is an input device used to read a printed text. OCR scans text optically character by character, converts them into a machine readable code and stores the text on the system memory.



Bar Code Readers

- *A bar code reader, is an optical* reader that uses laser beams to read bar codes that are printed on items usually in super markets.
- A bar code is an identification code that normally consists of a set of vertical lines and spaces of different widths.
- The bar code represents some data that identifies the item and the manufacturer.

Barcode readers



Magnetic Strip Card Readers

- *A magnetic stripe card reader reads the magnetic stripe on the back of credit cards, bank ATM cards, and other similar cards.*



Touchpad

- Touchpad - The touchpad has sensors that sense your touch. When they sense your touch they send a signal to the computer to move the mouse pointer to that location on the screen. Common on laptop computers



Touch Screens

- A touch screen is a touch-sensitive input and display device. Users can interact with these devices by touching areas of the screen.
- You touch words, pictures, numbers, letter, pointers or special locations identified on the screen.



Digital Camera

- **A digital camera allows users to take pictures and store the photographed images digitally instead of storing on a traditional film.**
- **When you take pictures, the images are electronically stored on a memory card in the camera.**

Camcorder

- This is a light weight video camera that records data in digital form onto a storage device such as a video tape, memory card.



OPEN

OPEN

CLOSED

CLOSED

OUTPUT DEVICES

An ***output device*** is any type of hardware component capable of conveying information to the user from the computer.

Commonly used output devices include Display devices, printers, Audio Output Devices and e.t.c.

Output is data that has been processed into a useful form called information.

Types Of Output

- **Soft copy:** This is unprinted digital document file. A soft copy can be viewed on the display screen or in the video or audio form.
- **Hard copy:** This is a permanent reproducible copy in the form of tangible object of any media that can be directly used by a user. Examples include; *Computer print outs, Facsimile (fax) pages*
- **Audio** is an output inform of sound.

Display Devices/ VDUs

- A display device is an output device that visually conveys text, graphics, and video information on the output screen.
- Display devices are also known as (Visual Display Units (VDUs))
- Commonly used display devices include CRT Monitors, LCD Monitors, and data Projectors.

Cathode-Ray Tube (CRT) Monitor

A CRT (cathode ray tube) monitor is a desktop screen that contains a large sealed glass cathode-ray tube.

Disadvantage of CRT

- Large in Size
- High Power consumption
- Emit large quantities of radiation.



Liquid crystal display (LCD) Monitor

- LCD monitors are also referred to as *Flat panel display* monitors and they have reduced volume, weight and power requirement compared to the CRT.
- Current uses for flat-panel displays include calculators, videogames, monitors, laptop computer, graphics display.





Disadvantages of LCD monitors

- They are usually more expensive than CRT monitors
- LCD color output is low and very poor
- LCD monitors can only be viewed from a very narrow angle

Note: *A video card (Graphics card or Video Adapter)* converts digital out put from the computer into analogue video signal that is sent through the cable to the display device.

Data Projectors

- A data projector takes the image that displays on a computer screen and projects it onto a large screen or wall so that an audience of people can see the image clearly.
- Presence of excess light affects data projectors and so they perform well in dark rooms.

Data Projectors



Printers

- A printer is a device that produces a hard copy output such as text and graphics on a physical material like paper.
- Printed information (hard copy) exists physically and in a more permanent form than a soft copy on a display device.
- Printers can be grouped into two categories: **impact** and **nonimpact** printers.

Impact Printers

- An impact printer forms characters and graphics on a piece of paper by a striking mechanism against an ink ribbon that physically contacts the paper.
- Impact printers are noisy because of this striking activity.
- Large Businesses, use impact printers because these printers can withstand dusty environments, vibrations, and extreme temperatures.
- Commonly used types of impact printers include **Daisy wheel**, **dot-matrix** , **Braille** and **line** printers.

Non-impact printers

- A nonimpact printer forms characters and graphics on a piece of paper without actually striking the paper.
- Some spray ink, while others use heat or pressure to create images.
- Commonly used nonimpact printers are **ink-jet** printers, **laser** printers, **thermal** printers and **plotters**.

Laser Printers

They use laser lights to produce the dots needed to form the characters to be printed on a page.

- **Advantages**

- Very high speed.
- Very high quality output.
- Give good graphics quality.
- Support many fonts and different character size

Disadvantage

- Expensive.
- Cannot be used to produce multiple copies of a document in a single printing



Inkjet Printers



- They print characters by spraying small drops of ink onto paper. Inkjet printers produce high quality output with presentable features.
- They make less noise because no hammering is done and these have many styles of printing modes available. Color printing is also possible. Some models of Inkjet printers can produce multiple copies of printing also.



Advantages

- High quality printing
- More reliable

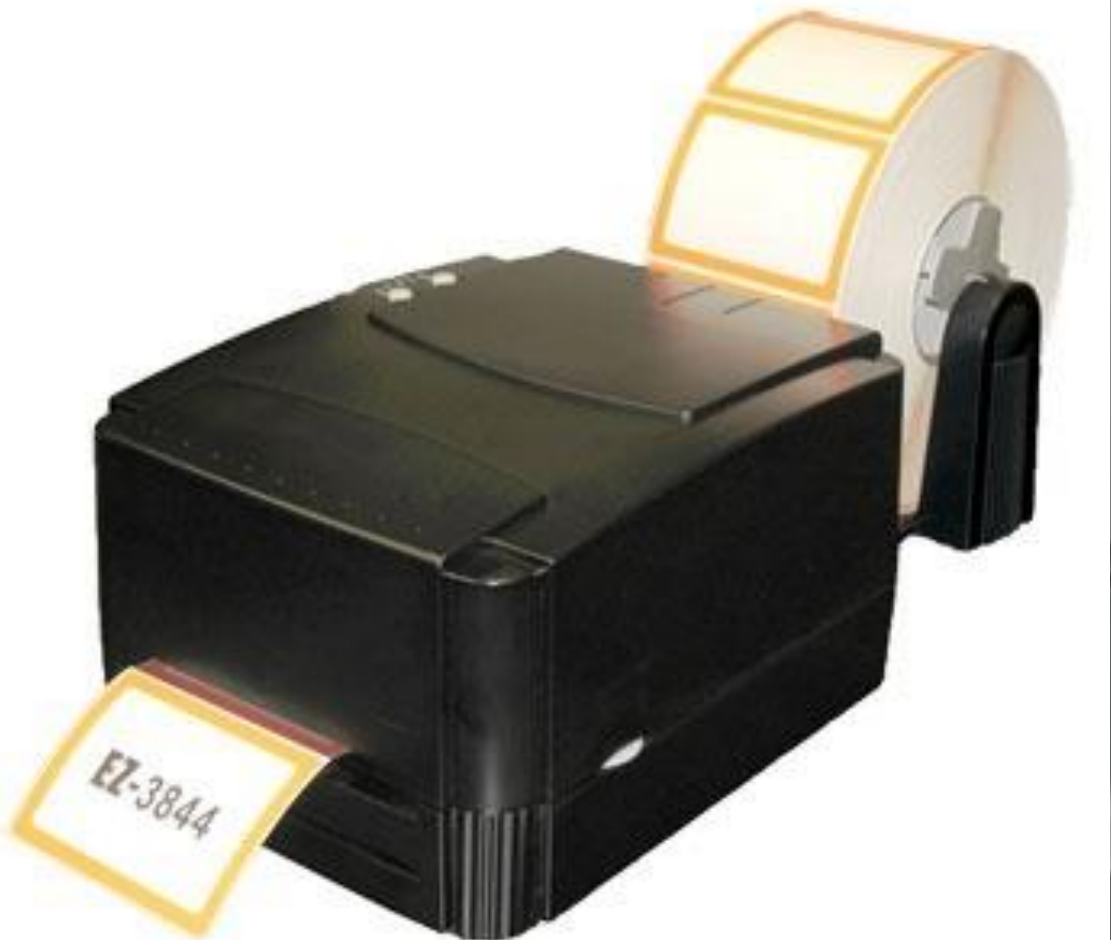
Disadvantages

- Expensive as cost per page is high
- Slow as compared to laser printer

Thermal printers

- A thermal printer generates images by pushing heated pins against a coated heat-sensitive paper.
- The coating turns black in the areas where it is heated, producing an image.
- They are cheap, but the print quality is low and the images tend to fade over time.
- Thermal printing technology is, however, ideal for use in small devices e.g. ATM receipt printers.

Thermal Printers



Plotters

- Plotters are printers used to produce large, high-quality, vector graphic drawings such as blueprints, maps, posters, and signs.
- They are usually very costly, and are used in specialized fields such as engineering, and graphic art.



FACTORS CONSIDERED BEFORE BUYING A PRINTER

- 1. Resolution:** Resolution is the number of horizontal and vertical pixels. Printer resolution helps to determine the quality of the image it produces, the higher the resolution the higher the quality of images printed. The printer resolution is measured in dots per inch, generally 600 d.p.i
- A *pixel* is a single point (dot) in an electronic image

2. Speed: printer's speed determines how fast it can print pages and one has to buy the one with a higher value for a faster printer. Printers speed is measured in two ways i.e. Characters per second (C.P.S) & Pages per minute (P.P.M)

3. Ink cartridges and Toner: Ink for most printers cost a lot of money. laser printers use toner cartridges filled with black powder. laser toner cartridge last longer than ink jet cartridge but cost a little more expensive. *Toner* is a powder used in laser printers

- 4. Memory:** Laser printers have their own memory or RAM. Memory is important for printing complex or high resolution images, laser memory ranges from 2-8 MBs
- 5. Printer buffer and spooler:** This fixes the problem where a computer sends information to the printer at a faster rate than it can handle. Computer buffer works like a drum, it holds back the information and release it at a rate that a printer can handle.

Speakers

- A speaker gives sound output from the computer.
- Some speakers are built into the computers and some are separate



Headphone

- Headphones give sound out put from the computer.
- They are similar to speakers except they are worn on the ears so only one person can hear the output at a time.



Facsimile machine

- Is the device that transmits and receives documents over telephone lines
- Documents sent or received via a fax machine are called faxes
- Fax capability can be added to a computer using a fax modem
- A fax modem is a communication device that allows a user to send and receive electronic documents as faxes

Multi-function machine device

- Is a single piece of equipment that provides the functionality of a printer, scanner, photocopy machine and facsimile machine

