

# OUTPUT DEVICES

Output devices are devices capable of displaying, removing or getting data and information from a computer.

# FORMS OF COMPUTER OUTPUT

a) Soft copy

b) Hard copy

# SOFT COPY

Soft copy refers to information/data displayed visually on the screen or is audio or voice form such as speech or music and this kind of output is not tangible.

Soft copy exists electronically and displays for a temporary period of time.

## **Advantages of softcopy**

- a) Softcopy is more portable compared to hard copy
- b) Softcopy is easily manipulated or edited
- c) Softcopy can be protected using a password
- d) Softcopy conserves physical space since it is stored on storage devices
- e) Multiple copies of the same document can be kept in different versions and one can easily backtrack to an earlier version.

## **Disadvantages of softcopy**

- a) This can be costly as this is energy consuming
- b) Information can be lost if there is a power outage, computer viruses or accidental deletion
- c) Soft copies are usually irreplaceable

# HARD COPY

Hard copy refers to information/data that is in a permanent form that is in print out form. Hard copy is tangible.

Hard copy is considered hard because it exists physically on paper, whereas a soft copy is considered soft because it exists only electronically.

## **Advantages of hard copies**

- a) Hard copy cannot be easily changed without trace
- b) Hard copy can be read off line namely without a computer
- c) Hard copy is cheaper compared to softcopy which requires computer devices to be able to read the information
- d) Hardcopies last longer if stored in a safe place compared to softcopy which must be all the time changed with the technological developments taking place
- e) Hardcopies are universal as both rich and poor readers read them

## **Disadvantages of hardcopy**

- a) Hard copy requires physical space to be stored.
- b) Hard copy is not as portable as some electronic devices.
- c) Hard copy takes a longer time to sort and find.
- d) Hard copies may be lost easily and are sometimes not retrievable.

# EXAMPLES OF OUTPUT DEVICES

- a) Monitors
- b) Data Projectors
- c) Plotters
- d) Facsimile machine
- e) Printers
- f) Multifunction devices
- g) Speakers
- h) Terminals



# 1) SPEAKERS

Speakers are audio output devices that produce music, speech and other sounds from the computer.





## **Advantages of using speakers**

a) Audio output devices are ideal for visually impaired people

## **Disadvantages of using speakers**

a) Speakers are not suitable for use in noisy environment

b) Speakers are not suitable for use in very quiet environment where other people are working for example libraries

c) There is no permanent copy is produced

d) A computer can only repeat the same message exactly the same way therefore when the message is not understood the first time, it may not be understood the second time.

# 2) FAX MACHINE

A facsimile is a machine that transmits and receives documents over a telephone line and prints out the document on paper.



# **Advantages of fax machines**

- a) Fax machines save paper
- b) Fax machines allow a user to store received faxes on the computer
- c) Received faxes can be e-mailed to others
- d) Hard copies are available

# **Disadvantages of using fax machines**

- a) Sending a big document can be slow
- b) There is waste of paper when junk/useless faxes are sent.

# 3) MULTIFUNCTION DEVICE

A multifunction device combines the capabilities of a scanner, printer, fax and copying machine.

## Advantages of multifunction devices

- a) These devices offer space and cost advantages
- b) Are significantly less expensive than purchasing each device separately

## Disadvantages of multifunction devices

- a) The quality and functionality are not quite as good as those of the separate single purpose devices
- b) If the multifunction machine breaks down, the user loses all its functions.



# 4) DATA PROJECTOR

A projector takes images displayed on the computer screen and casts/projects them on a larger screen so that people can see the image clearly.



# USES OF MULTIMEDIA PROJECTORS:

- a) Can be used for **training presentations** to allow the whole audience to see images from a single computer.
- b) Also used for **large scale advertising** of new products.
- c) **Home cinema systems** where images from DVD's or televisions are projected to a large screen.

## **Advantages of multimedia projectors**

- a) Many people to clearly view the same presentation.
- b) Enhance the viewers experience since watching images on a large screen is better than a small screen.

## **Disadvantages of multimedia projectors**

- a) Lower image quality compared to a computer screen.
- b) Very expensive to buy.
- c) Cooling fans in the projector are noisy.

# 5) PLOTTERS

Plotters print their output by moving a pen across the surface of a piece of paper.

Plotters are suitable for architectural drawing, engineering applications and map making.

Plotters create hard-copy in a very different way to printers.





# USES OF PLOTTERS:

- a) Used to produce large, accurate drawings for example Blueprints of buildings (plans/designs), Maps, Giant posters and
- b) Pens can be replaced with cutting tools to produce large signs.

# Advantages of plotters

- a) Plotters can produce much larger printouts than other printers.
- b) The print quality is extremely high.
- c) Plotters can also 'cut out' designs for use in sign making.

# Disadvantages of using plotters

- a) Plotters are only suitable for producing line drawings.
- b) Plotters cannot produce the kind of text and images that an ink-jet or laser printer could.
- c) Plotters have been largely superseded by large-format ink jet printers that can produce more detailed printouts and in full-colour

# 6) TERMINALS

Terminals are output devices that connect you to another type of computer called a host computer.



# 7) VISUAL DISPLAY TERMINALS/VISUAL DISPLAY UNITS/MONITORS

Monitors are the most commonly used output devices.

Monitors present visual images of both the user's input (text and graphics) and computer output.

Monitors display information on the screen thus helping the user to monitor operations carried out by the computer.

Display devices can be monochrome or colour. Monochrome means that information displays in one colour on a different colour background for example white on black.

**Colours are used to make screen displays more attractive and to highlight messages and menu options however screens with a lot of colours take longer time to process and more memory is required to display a lot of colours.**

**Resolution** is the clarity and sharpness of imaged formed on the monitor.

Images are formed on the monitor by a series of dots or **pixels** (picture elements).

**Dot pitch** is the distance between each pixel.

**Refresh rate** indicates how often a displayed image is updated and redrawn on the monitor.

For a monitor to display information, it must be connected to a video card or graphics adapter.

**Near letter quality (NLQ)** is a quality of print that is not quite letter quality but is better than draft quality.

**Drops per inch (DPI)** the number of individual dots that can be placed in a line.

# **EXAMPLES OF COLOUR MONITORS**

- a) Colour graphics adapter (CGA)
- b) Enhanced graphics adapter (EGC)
- c) Video graphics adapter (VGA)
- d) Super video graphics adapter (SVGA)

# TYPES OF MONITORS

## Cathode ray tube (CRT) monitors

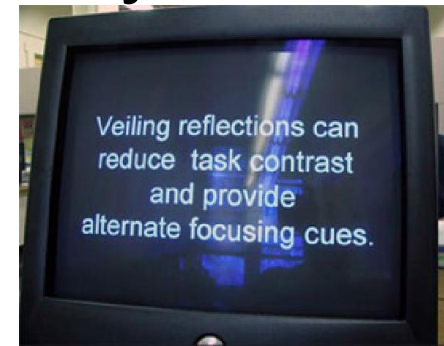
CRT monitors are the most common type of monitors used in office and homes.

CRT's are becoming **rare** as TFT monitors are replacing them.

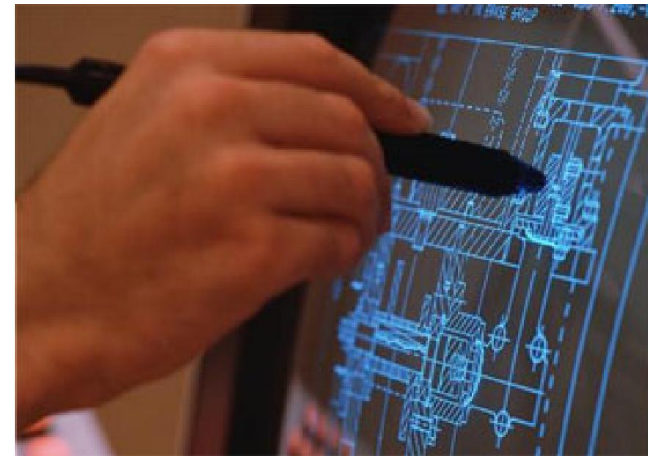


# USES OF CRT MONITORS

a) CRT Monitors allow users to instantly see outputs from the computer.



b) CRT's are also used with light pens to allow drawings to be created on screen.





## **Advantages of CRT monitors**

- a) Can produce fast and rich colour output
- b) Can be viewed from a very wide angle
- c) Are low cost monitors than LCD monitors

## **Disadvantages of CRT monitors**

- a) Emit higher radiations than LCD monitors
- b) Consume more energy than LCD monitors
- c) CRT monitors are bulky
- d) CRT monitors occupy a considerable amount of space on the desktop.

# FLAT-SCREEN MONITOR (TFT OR LCD)

These are thin flat screened monitors that are commonly seen today.

TFT's are used with the newer desktop PC's, laptops and mobile phones.



# USES OF TFT MONITORS

a) TFT Monitors allow users to instantly see outputs from the computer.

TFT Monitors are used as screens in laptops and also mobile phones.



# ADVANTAGES OF TFT/LCD MONITORS

- a) Flat screen monitors are portable.
- b) Flat screen monitors are very thin and do not take up as much desk space as a CRT monitor.
- c) Flat screen monitors produce much less glare than CRT's and so are friendly to the eye.
- d) Flat screen monitors use less power than CRT monitors (cheaper to run).
- e) Flat screen monitors emit less radiation than CRT monitors.
- f) Flat screen monitors produce less heat than CRT's.
- g) Flat screens are easy to mount onto the wall

# **DISADVANTAGES OF TFT/LCD MONITORS**

- a) More expensive than CRT monitors
- b) Can only be viewed from a very narrow angle.

# Examples of flat panel monitors

- a) Gas plasma
- b) Electroluminescent
- c) Liquid crystal display

***TFT and LCD are two of the technologies used in flat-screen monitors:***

TFT is Thin-Film-Transistor

LCD is Liquid-Crystal Display.

## **Advantages of display devices such as monitors over printers**

- a) Are generally quiet
- b) Need no paper
- c) Output can be modified or changed easily
- d) The time taken to display the images is fast

## **Disadvantages**

- a) Need separate devices to produce the hard copy
- b) Unsuitable for users with visual problems
- c) Information produced on the screen is only temporary and will be lost when the power of the display device is turned off.

# 8) PRINTERS

Printers are output devices that produce text and graphics on a physical medium like paper.

Printers are categorized by how images are formed that is whether or not the image is formed by physical contact of the print mechanism with paper.

**There are two major categories:**

- a) Impact printers
- b) Non impact printers



# **Advantages of printers**

- a) Information produced is permanent

# **Disadvantages of printers**

- a) The time to get the printout is slow
- b) Paper is wasted for obtaining the output
- c) Printers are generally noisier than display devices

# **FACTORS TO CONSIDER BEFORE BUYING A PRINTER**

- a) Page per print out
- b) Memory of at least 2MB
- c) Price of cartridge or tonner
- d) Availability of tonner or cartridge
- e) Purpose for which the printer is going to be put to use
- f) Printer drivers

# IMPACT PRINTERS

Impact printers are a class of printers that work by banging a head or needle against an ink ribbon to make a mark on the paper.

Impact printers use pins or hammers which hit a ribbon to transfer images to paper.

## **Examples of impact printers**

- a) Character printers/serial printers
- b) Line printers/high speed printers
- c) Dot matrix printers

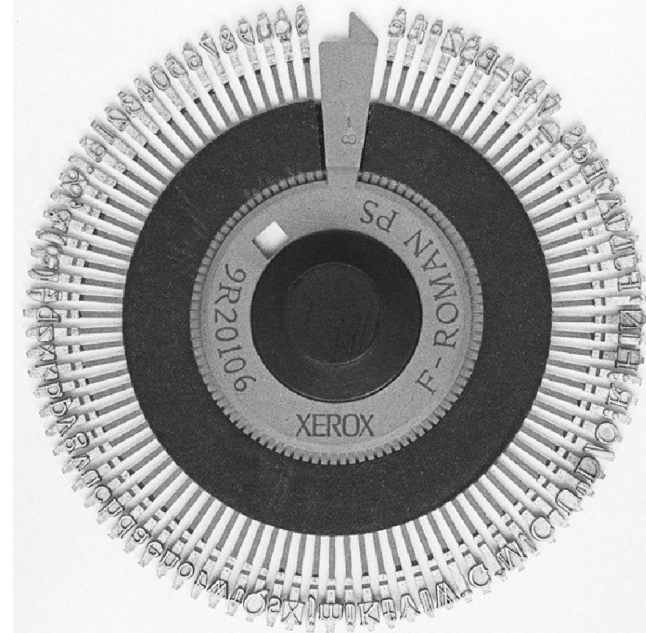
# CHARACTER/SERIAL PRINTERS

These are low speed printers that copy the action of the type writers by printing one character at a time.

## Examples of character printers

a) Daisy's wheel

b) Thimble printers



# **Advantages of character printers**

- a) High quality output
- b) Cheapest type of printers

# **Disadvantages of character printers**

- a) Are very slow
- b) Are noisy
- c) Cannot print graphics
- d) Have limited type styles

# LINE PRINTERS/HIGH SPEED PRINTERS

These are high-speed printers capable of printing an entire line at one time.

## Examples of line printers

- a) Chain printers
- b) Band printers
- c) Belt printers
- d) Drum printers



# **Advantages of line printers**

a) Line printers are speedy

# **Disadvantages of character printers**

a) Line printers have poor quality output

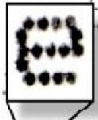
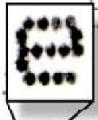
b) Produce lots of noise

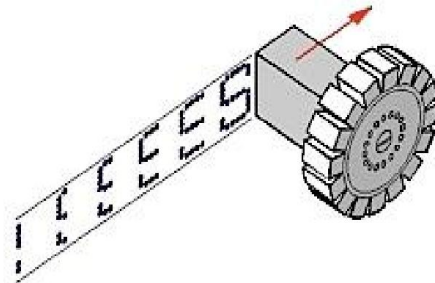
c) Are very expensive

# DOT MATRIX PRINTERS

- Dot matrix printers use a pattern of dots formed by pins on a print head to form out a character on paper.



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## **Advantages of dot matrix printers**

- a) Dot matrix printers are inexpensive
- b) Dot matrix printers reliable
- c) Dot matrix printers are faster than daisy' wheel printers
- d) Dot matrix printers can print on continuous paper or multipart documents
- e) Dot matrix printers have low per page cost



## **Disadvantages of dot matrix printers**

- a) Dot matrix printers do not offer high quality output
- b) Dot matrix printers are generally noisy because of the striking mechanism
- c) Dot matrix printers are relatively slow
- d) Dot matrix printers are not easily serviced because they are based on old technology
- e) Dot matrix printers are not readily available on market.

# NON IMPACT PRINTERS

Non impact printers are printers that use chemicals, lasers or heat to form the images on the paper.

## **Examples of non impact printers**

- a) Inkjet printers
- b) Thermal printers
- c) Laser jet printers

# INKJET PRINTERS

- Inkjet printers form characters on paper by spraying tiny droplets of ink on paper to form out a character.



## **Advantages of Inkjet printers**

- a) Inkjet printers are reliable
- b) Inkjet printers quiet
- c) Inkjet printers have very good quality output
- d) Inkjet printers relatively inexpensive

## **Disadvantages of Inkjet printers**

- a) Inkjet printers need special paper for highest resolution output
- b) Inkjet printers have higher cost per page
- c) Inkjet printers have very high costs of maintenance and buying
- d) With Inkjet printers, nozzles can be blocked if unfiltered ink is used.



## **Advantages of thermal printers**

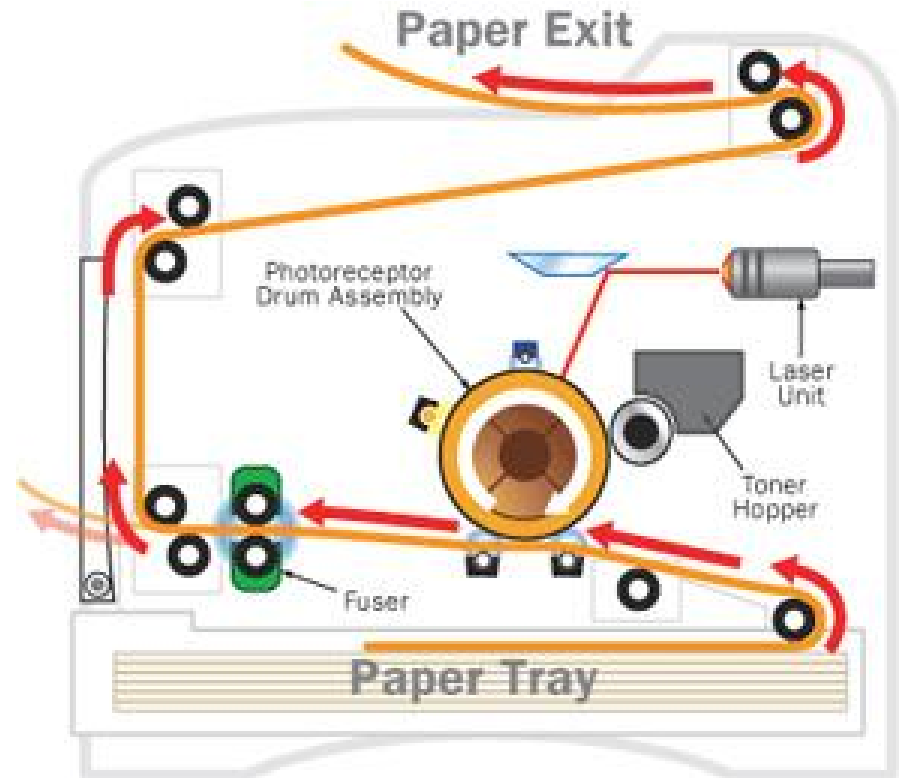
- a) Thermal printers offer high quality desktop colour printing
- b) Thermal printers have low noise levels

## **Disadvantages of thermal printers**

- a) Thermal printers are relatively slow
- b) Thermal printers require special paper that degrades with storage
- c) Thermal printers use special paper that is expensive.

# LASER PRINTERS

Laser printers use a laser light beam to produce images with excellent letter and graphics quality.



## **Advantages of laser jet printers**

- a) Laser jet printers produce high quality text and graphics
- b) Laser jet printers have very productive speed Laser jet printers have low noise levels
- c) Laser jet printers have excellent graphics capabilities
- d) Laser jet printers have low maintenance requirements

## **Disadvantages of laser jet printers**

- a) Laser jet printers are expensive especially the colour printers
- b) Laser jet printers are limited to cut sheet media  
Laser jet printers are slow for graphics output.



# OTHER EXAMPLES OF PRINTERS

- **Portable printers** are small and light and are used to print from a handheld computer while traveling.
- **Photo printers** are designed to produce photo quality pictures directly from a digital camera.
- **Label printers** are small and print on materials that can be attached to a variety of items.
- **Braille printers** produce characters that can be read by visually impaired people.



# COMPARISON OF IMPACT AND NON IMPACT PRINTERS

	Impact printers	Non impact printers
<b>Advantages</b>	<ul style="list-style-type: none"><li>a) Print multipart forms since can easily print through many layers of paper</li><li>b) Can normally withstand dusty environment, vibrations and extreme temperatures</li></ul>	<ul style="list-style-type: none"><li>a) Much quieter because there is no striking mechanism</li><li>b) Can produce high quality output</li></ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"><li>a) Generally noisier because of the striking mechanism</li><li>b) The quality of output is most ideal for labels, envelopes and invoices</li></ul>	<ul style="list-style-type: none"><li>a) Can not print multipart forms</li></ul>

# 9) CONTROL DEVICES

**Control devices are output devices that work in conjunction with sensor input devices and commands from computers in order to control a process.**

**Type of Sensor:**

**Used In:**

**Motor**

**Households:**

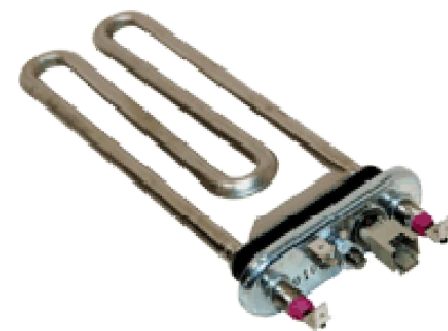
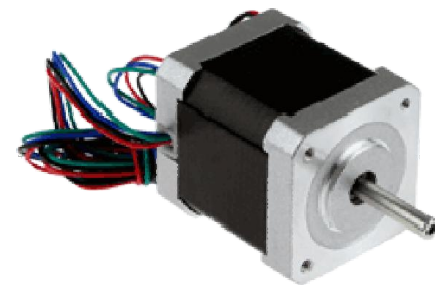
- Automatic washing machines (to make drum spin)
- DVD player (to make disc spin)
- Air conditioners (to make fans spin)

**Industry:**

- Controlling robot arms

**Computer systems:**

- Spinning disks in hard disk drives
- Spinning cooling fans



**Buzzer**

- Microwave ovens (to signal that the food is cooked)
- Alarm systems (loud siren to warn of intruders)

**Heater**

- Central heating systems (to keep rooms correct temperature)
- Washing machines (To keep water the correct temperature)
- Automatic greenhouses (ensures air is correct temperature for plants)

**Light / Lamp**

- Security lights
- Automatic greenhouse (to give plants correct amount of light)



