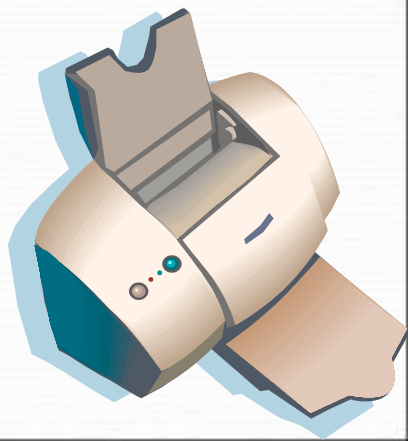
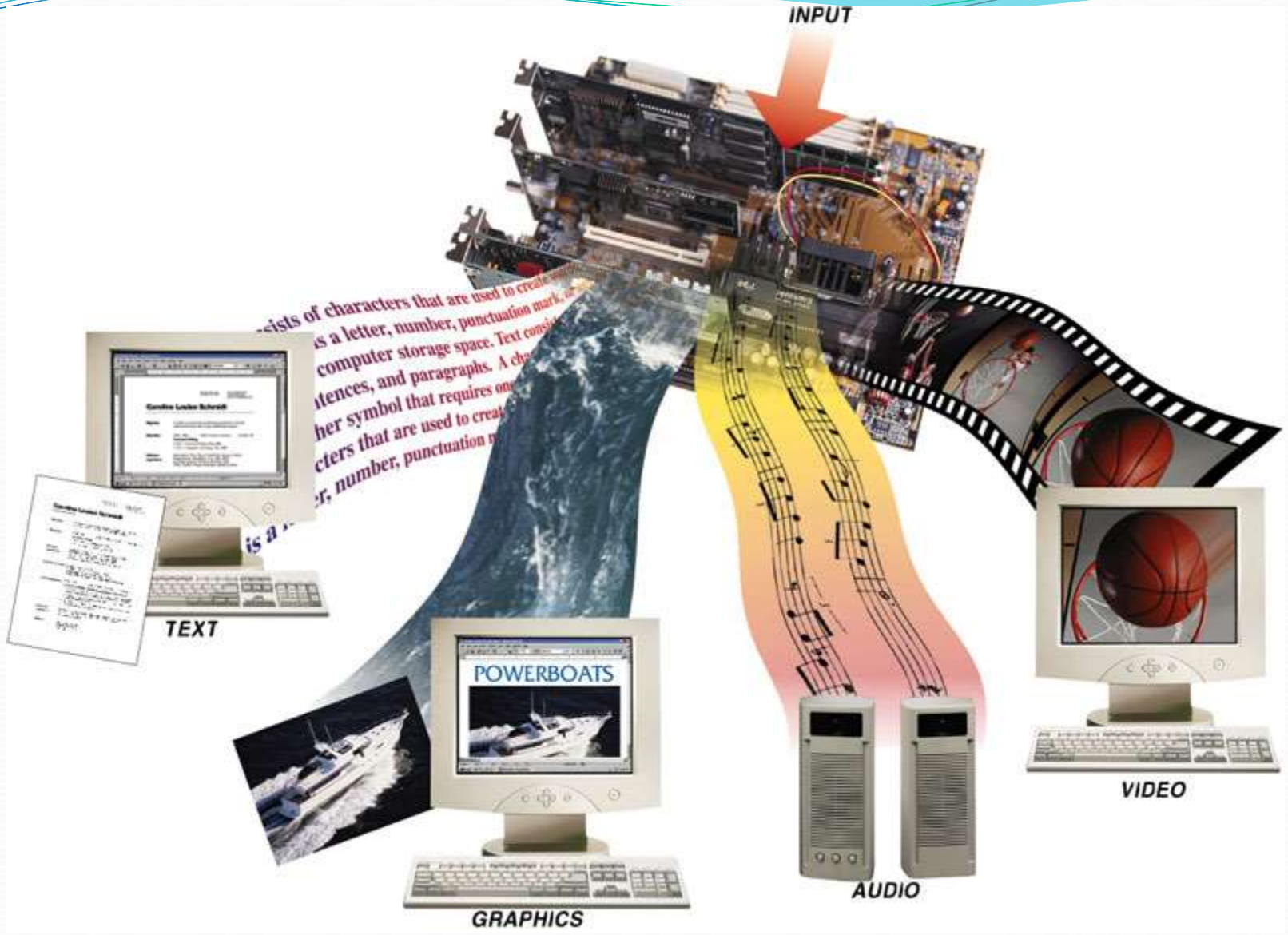
Chapter 3

Output Devices

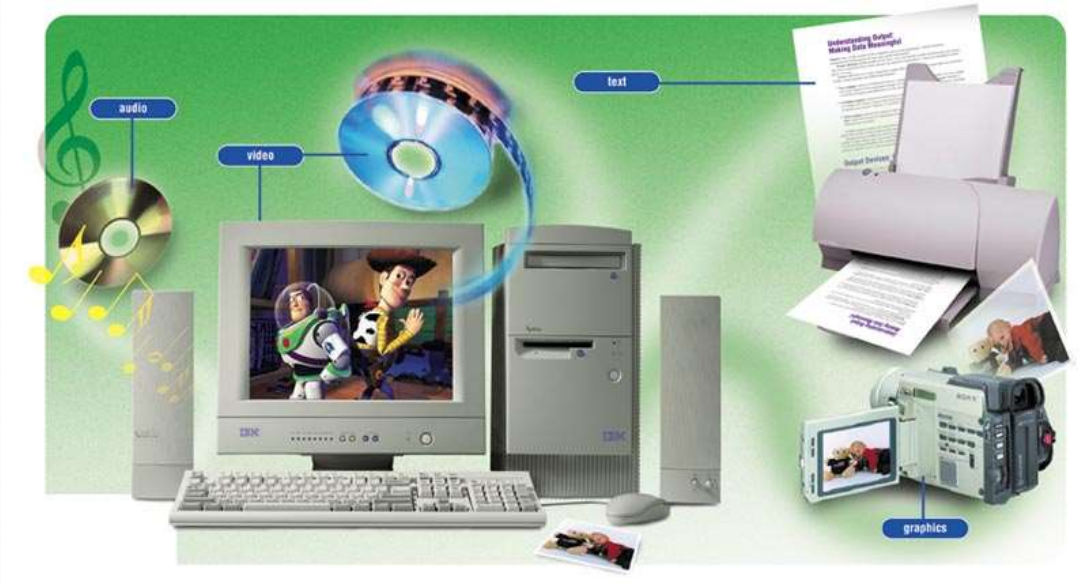
What is Output?

- Processed data or information
- Types of output
  - Text
  - Graphics
  - Audio & video
- Output devices
  - Monitors
  - Printers




INPUT
TEXT
POWERBOATS
GRAPHICS
AUDIO
VIDEO

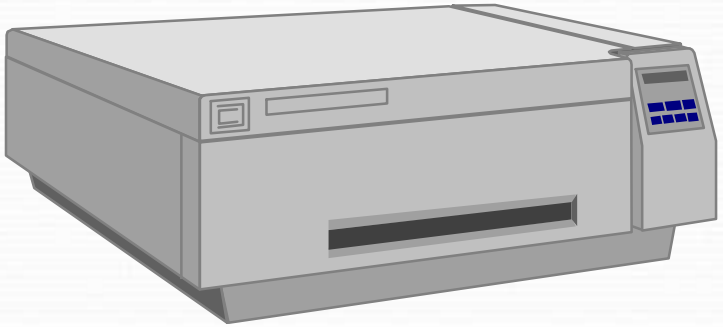
Output Devices: Engaging our Senses

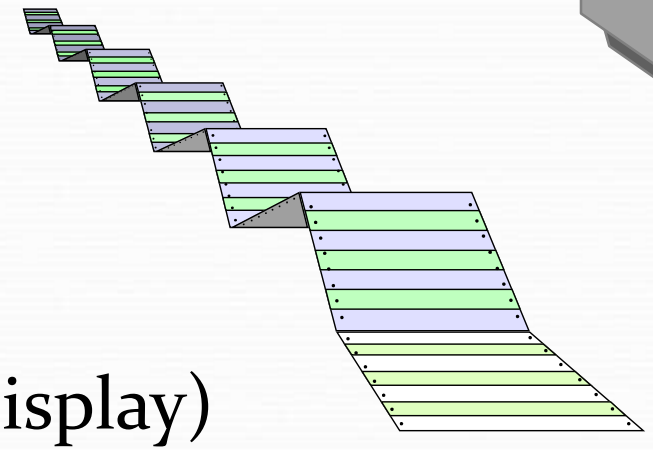


- Output devices are peripheral devices that enable us to view or hear the computer's processed data.
  - **Visual output** – Text, graphics, and video
  - **Audio output** – Sounds, music, and synthesized speech

Hard Copy vs. Soft Copy Output

- Hard Copy (Paper Output)





- Soft Copy
  (Monitor Display)

Output Devices

- Any computer component capable of conveying information to a user
- **Output devices** convert machine readable information into people-readable form.
- The output devices most commonly used with microcomputers are:
  - ⇨ Monitors
  - ⇨ Printers
  - ⇨ Plotters
  - ⇨ Voice-Output Devices

Monitor's

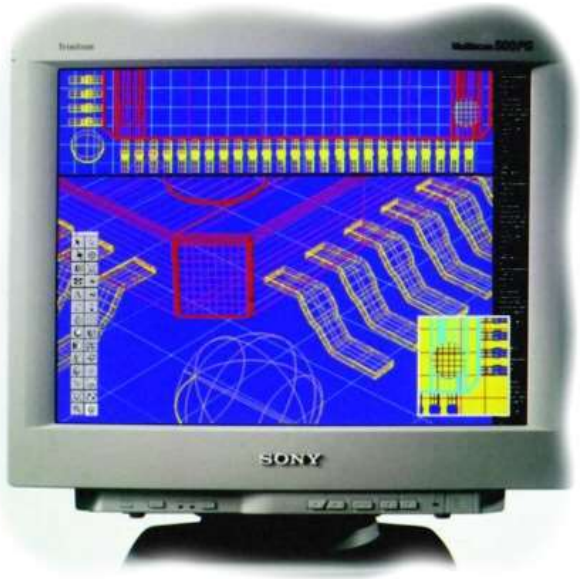
CRT

LCD

- A monitor is a peripheral device which displays computer output on a screen.
- Screen output is referred to as **soft copy**.
- Types of monitors:
  - Cathode-ray tube (CRT)
  - Liquid Crystal Display (LCD or flat-panel)

Monitors

- cathode ray tube (CRT)
- liquid crystal display (LCD)



Desktop computers use a CRT

Laptop color LCD display

Monitors

- Images are represented on monitors by individual dots or “picture elements” called **pixels**.

- A **pixel** is the **smallest unit** on the screen that **can be turned on and off** or made different shades.

Pixels

Monitors *(Continued)*

- The density of the dots determine the **screen resolution** which is the clarity of the images on the screen.
- The greater the number of dots on the screen, the better the resolution will be.
- Monitors are categorized according to screen resolution as either *high resolution or low resolution.*

Monitors *(Continued)*

- **PC/TV:** Available with the establishment of all-digital *high definition television (HDTV).* This enables people to freeze video sequences to create still images on digitized output or stored on laser disks.

- **ITV (Interactive TV)** provides video on demand, and interactive shopping.

Cathode-ray tube (CRT)

- Resemble televisions
- Use picture tube technology
- Less expensive than a LCD monitor
- Take up more desk space and use more energy than LCD monitors

Liquid Crystal Display (LCD)

- Cells between two transparent layers form images
- Used for notebook computers, PDAs, cellular phones, and personal computers
- More expensive than a CRT monitor
- Take up less desk space and use less energy than CRT monitors
- Types of LCD monitors:
  - Passive-matrix LCD
  - Active-matrix LCD
  - Gas plasma display

Flat-Panel Monitors

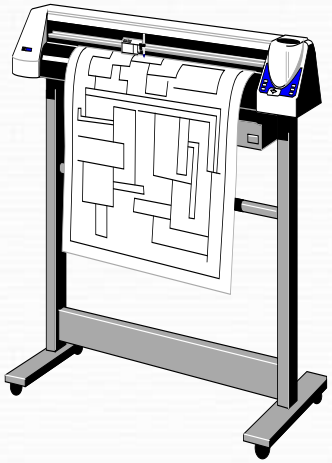
- **LCD** (Liquid Crystal Display)

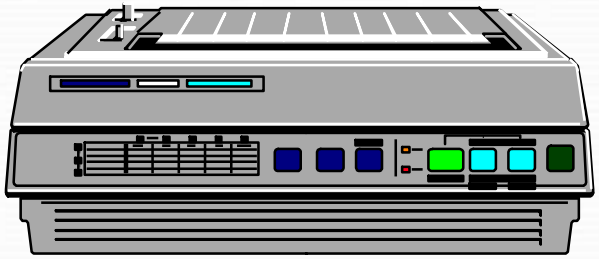
(Notebooks use LCD displays)

Output Devices
Engaging Our Senses

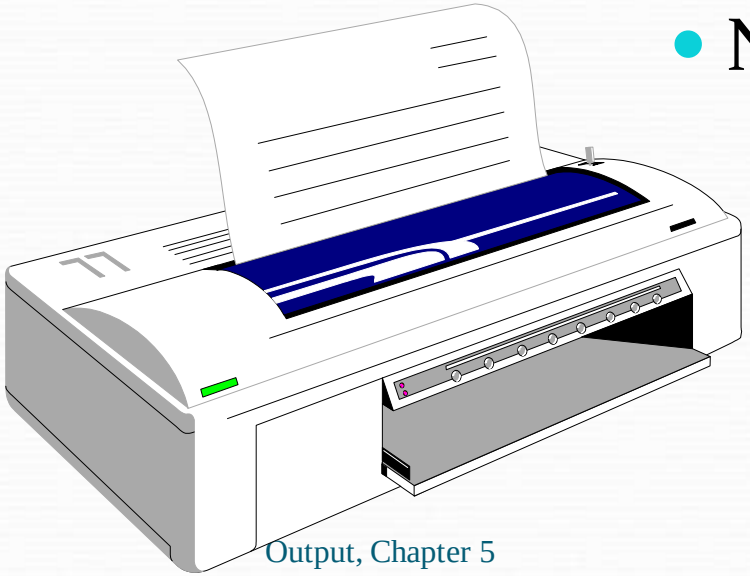
- **Video Adapters**
  - video RAM (VRAM)
  - video graphics adapter (VGA)
  - super VGA
  - refresh rate
  - flicker

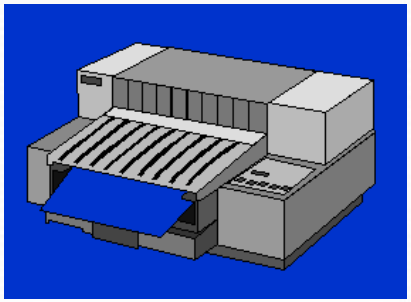
Output Devices





- Impact
  - Line printers
  - Character printers
  - Dot-matrix printers
- Non-impact
  - Laser printers
  - ➢Inkjet printers
    - ➢ Thermal
  - Plotters



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What is a Printer?

- ***"A printer is an external output device that takes data from a computer and generates output in the form of graphics / text on a paper".***

- Generally they are the external peripheral devices which are connected with the computers or laptops through a cable or wirelessly to receive input data and print them on the papers.

- It provide the result in hardcopy.


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Types of printer

- [1]Impact Printer. [2]Non-Impact Printer.
  - In impact printer by pressing a typeface against as linked ribbon which makes a mark on the paper.
  - The mostly common used impact printer is the Dot Matrix Printer.
  - Types of Impact Printer

I. **Dot-Matrix Printers**
II. **Daisy-wheel printers**
III. **Line printers**
IV. **Drum printer**
V. **Chain printers**
VI. **Band printers**

- [2]Non-Impact Printer.
  - Non-impact printers do not use a striking device to produce characters on the paper; and because these printers do not hammer against the paper they are much still. Following are some non-impacted printers.

  - Types of Impact Printer

I. **Ink-jet printers**
II. **Laser printers**
III. **Thermal printer**
IV. **Photo printer.**

Types of impact printer

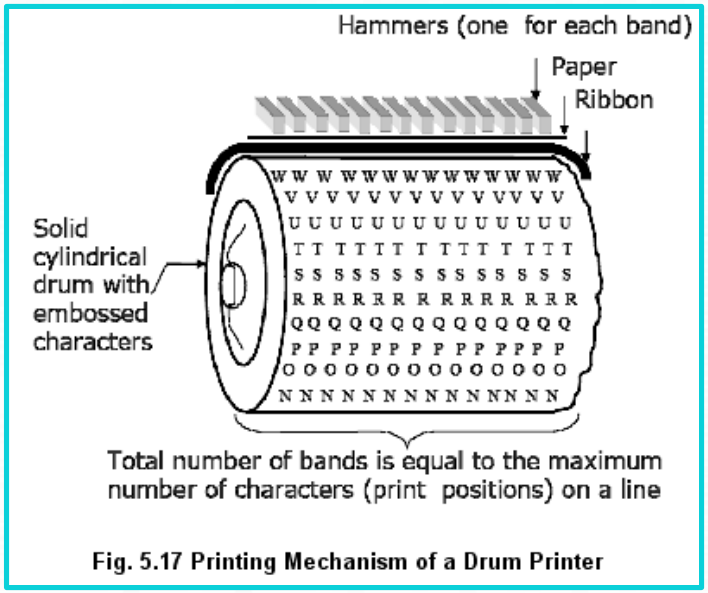
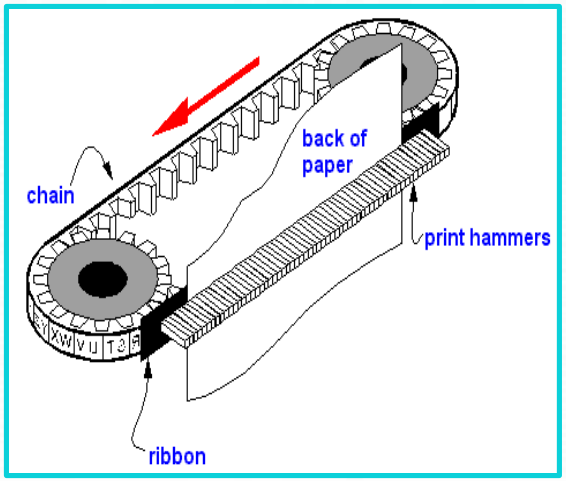


Fig. 5.17 Printing Mechanism of a Drum Printer

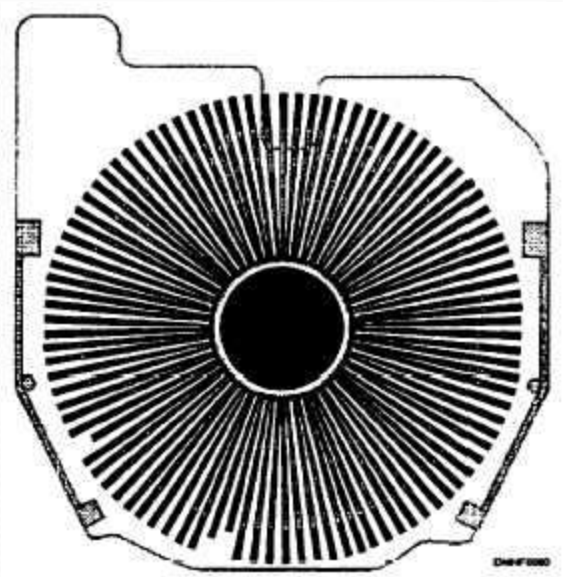


Types of impact printer

- **Dot-Matrix Printers**
  - The dot-matrix printer uses print heads containing from 9 to 24 pins. These pins produce patterns of dots on the paper to form the individual characters.
  - Only black color.

Daisy-wheel printers:

- In order to get the quality of type found on typewriters, a daisy-wheel impact printer can be used.
- It is called daisy-wheel printer because the print mechanism looks like a daisy; at the end of each “Petal” is a fully formed character which produces solid-line print.



Line printers

- In business where use amount of material are printed, the character-at-a-time printers are too slow; therefore, these users need line-at-a-time printers.
- the range of 1,200 to 6,000 lines per minute.

Drum printer

- A drum printer consists of a solid, cylindrical drum that has raised characters in bands on its surface. The number of print positions across the drum equals the number available on the page.
- the range of 300 to 2000 lines per minute.

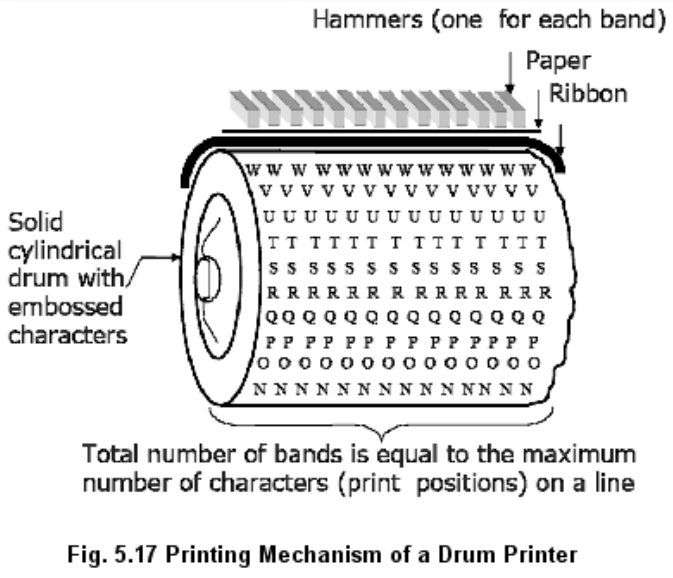
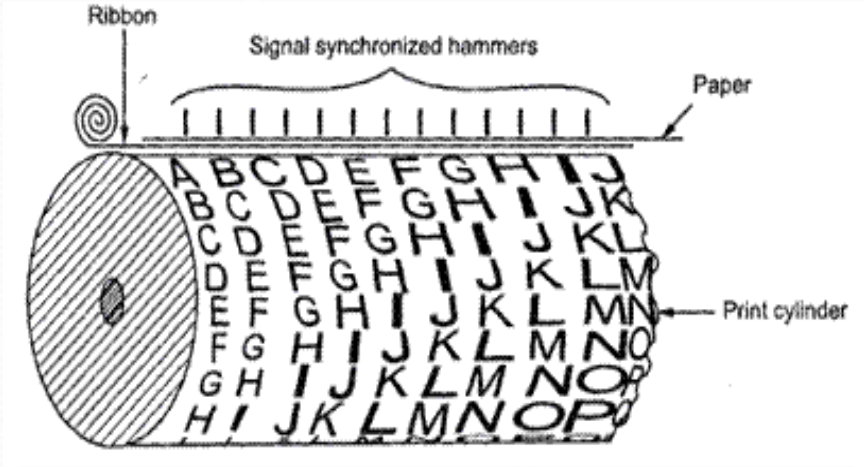
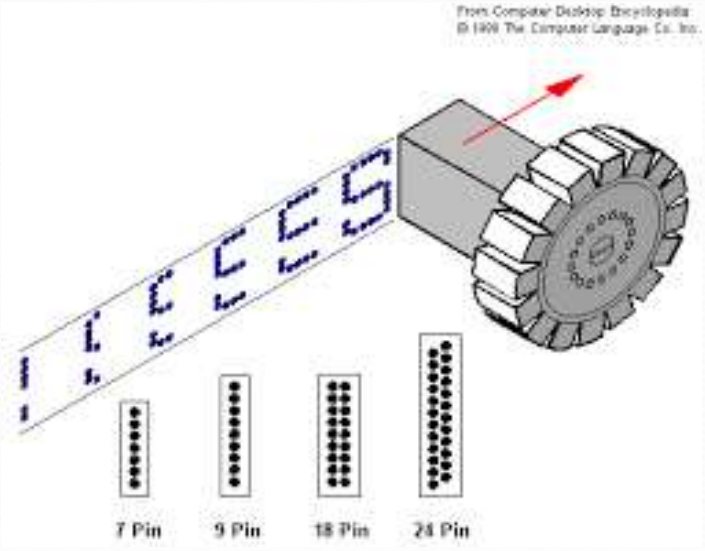


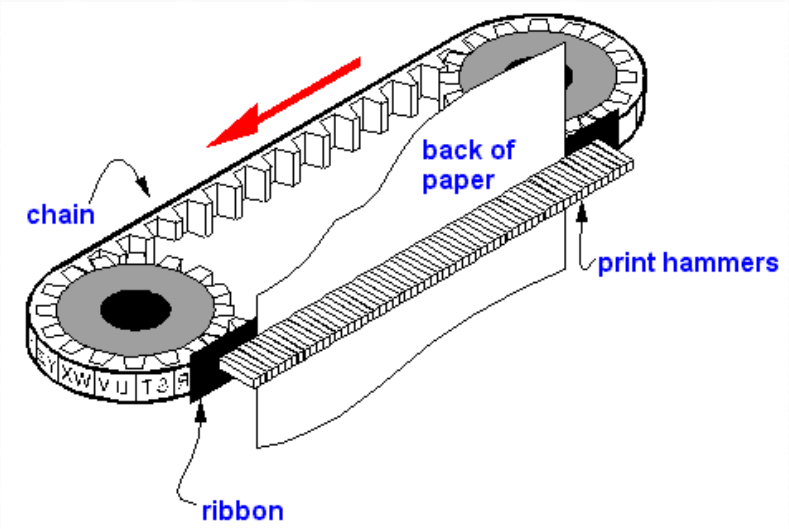
Fig. 5.17 Printing Mechanism of a Drum Printer



Chain printers

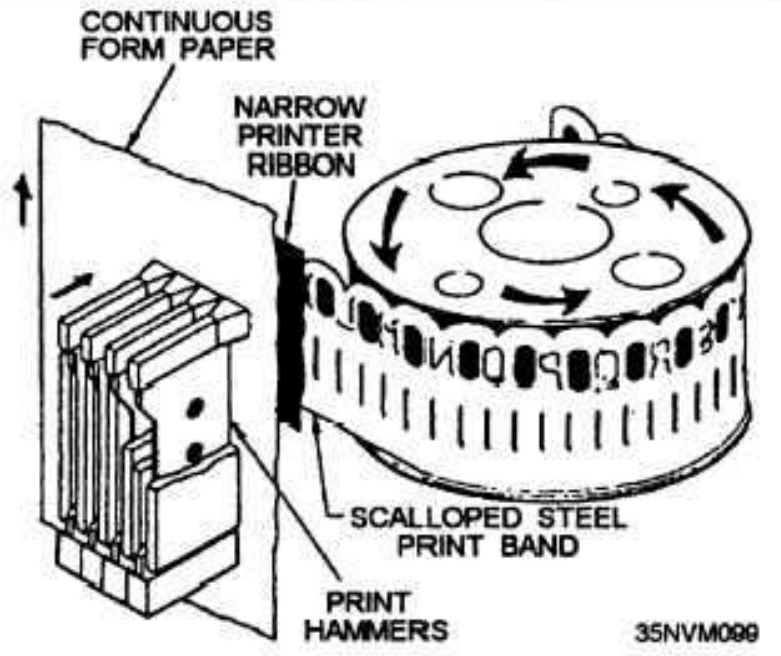
- A chain printer uses a chain of print characters wrapped around two pulleys. Like the drum printer, there is one hammer for each print position.
- chain printers range from 400 to 2500 characters per minute.





Band printers

- A band printer operates similar to chain printer except it uses a band instead of a chain and has fewer hammers. Band printer has a steel band divided into five sections of 48 characters each.



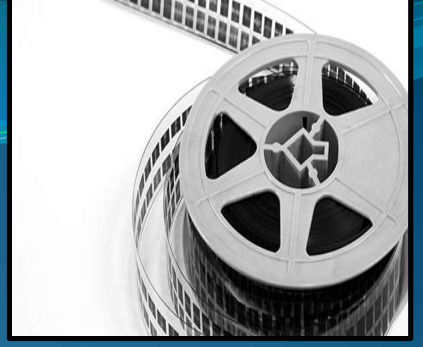
Non-impact printers

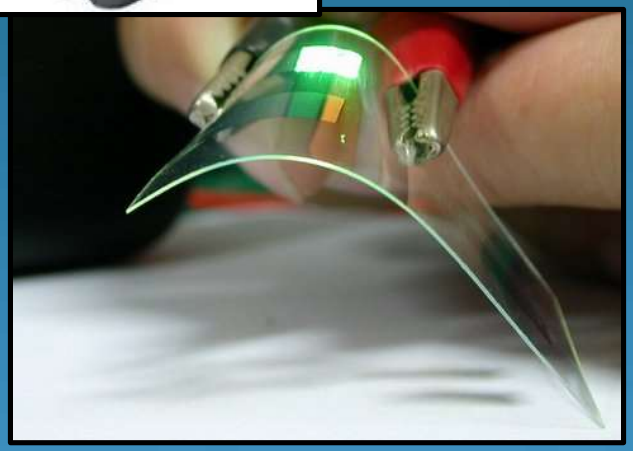
Non-impact printers Ink-jet printers:

- Ink-jet printers work in the same fashion as dot-matrix printers in the form images or characters with little dots
- Ink-jet printers work in the same fashion as dot-matrix printers in the form images or characters with little dots.
- Various colors of ink can also be used.

Laser printers

- A laser printer works like a photocopy machine.
- Laser printers produce images on paper by directing a laser beam at a mirror which bounces the beam onto a drum. The drum has a special coating on it to which toner (an ink powder) sticks.
- print approximately 21,000 lines per minute, or 437 pages per minute if each page contains 48 lines





other devices

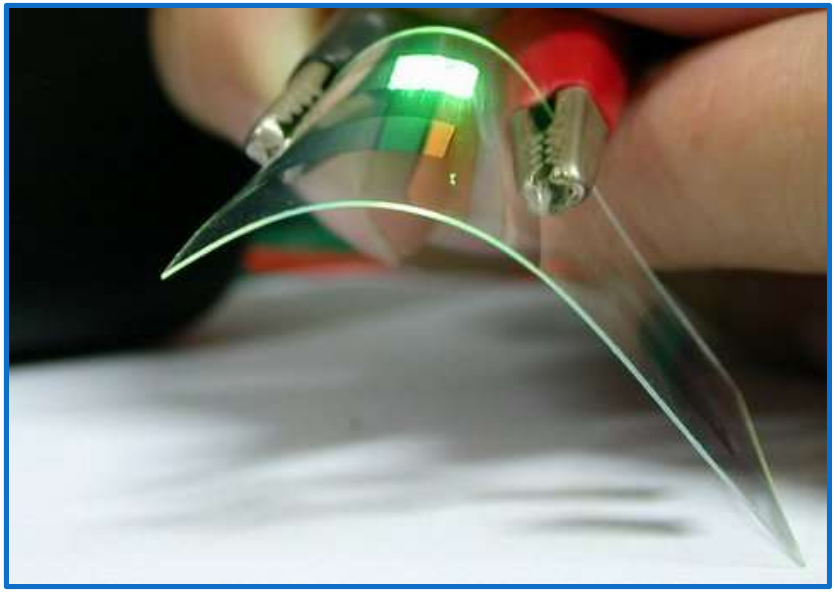
Fascimile (fax)

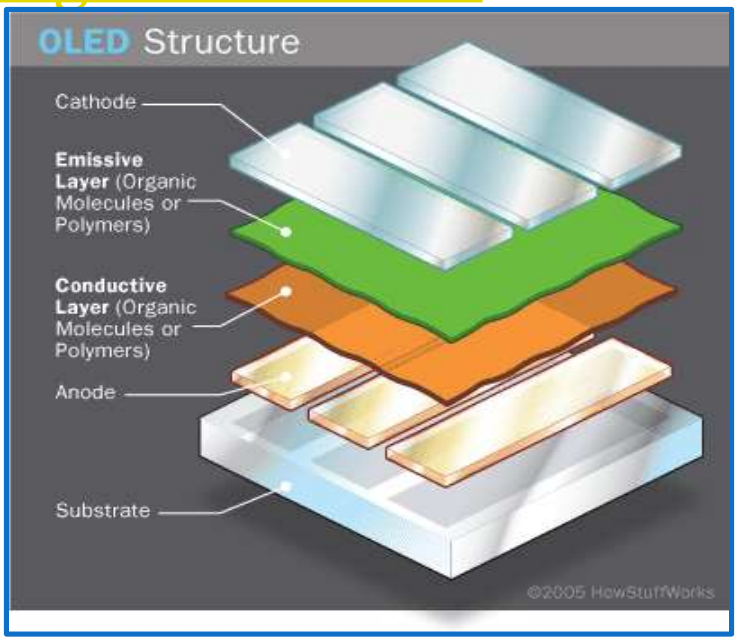
- Fax technology is the transmission of text and graphic data between two location via telephone lines.

- A FAX is an electronically transmitted document, text , images.

Oled (organic **light-emitting** diode)

- An organic light-emitting diode (**OLED**) is a light-emitting diode (LED) in which the emissive (letter) electronic layer is a film of organic compound that emits light in response to an electric current.
- OLEDs are used to create digital displays in devices such as television screens, computer monitors, portable systems such as mobile phones, handheld game consoles .



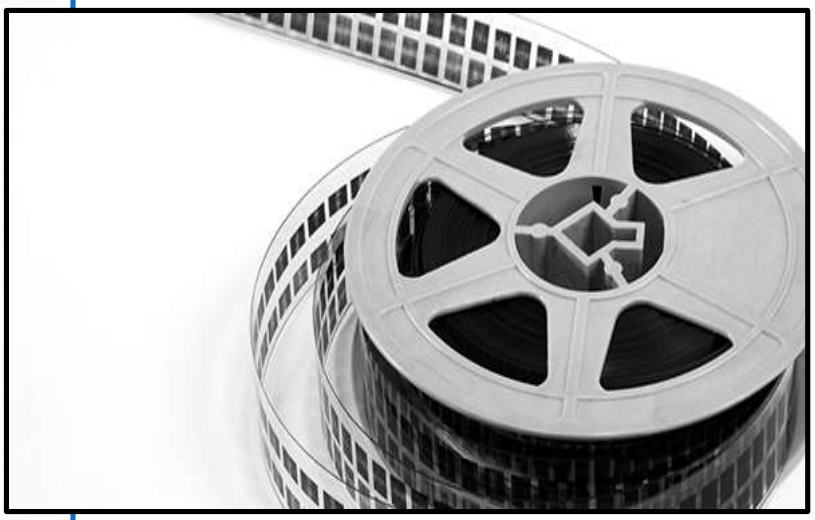


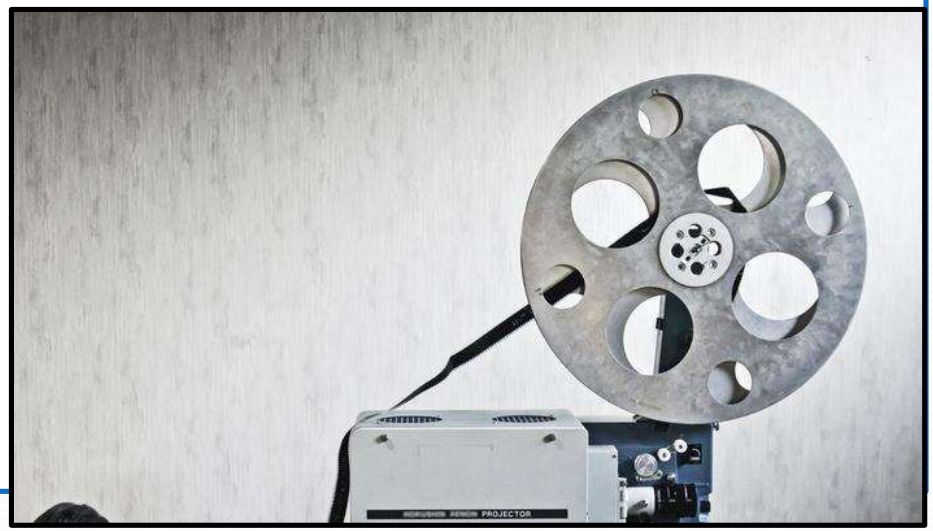
headphone

- **Earphones**, **Headphones** are a hardware device that either plugs into your computer (line out) or your speakers to privately listen to audio without disturbing anyone else.
- The picture is an example of a USB headset from Logitech with a microphone and a popular solution for computer gaming.

COM(computer output microfilm)

- **Computer output microfilm is the product of copying information from electronic media onto microfilm.**
- COM technology, with a history that dates back to the first patent for microphotography in 1839.





Google glass

- The Google Glass operating system is based on a version of Android, and it can run apps called Glassware that are optimized for the device.
- The glasses have built-in Wi-Fi and Bluetooth connectivity and a camera for taking photographs and videos.
- Google Glass is a wearable, voice-controlled Android device that resembles a pair of eyeglasses and displays information directly in the user's field of vision.

Thank you

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