

Auxiliary Memory

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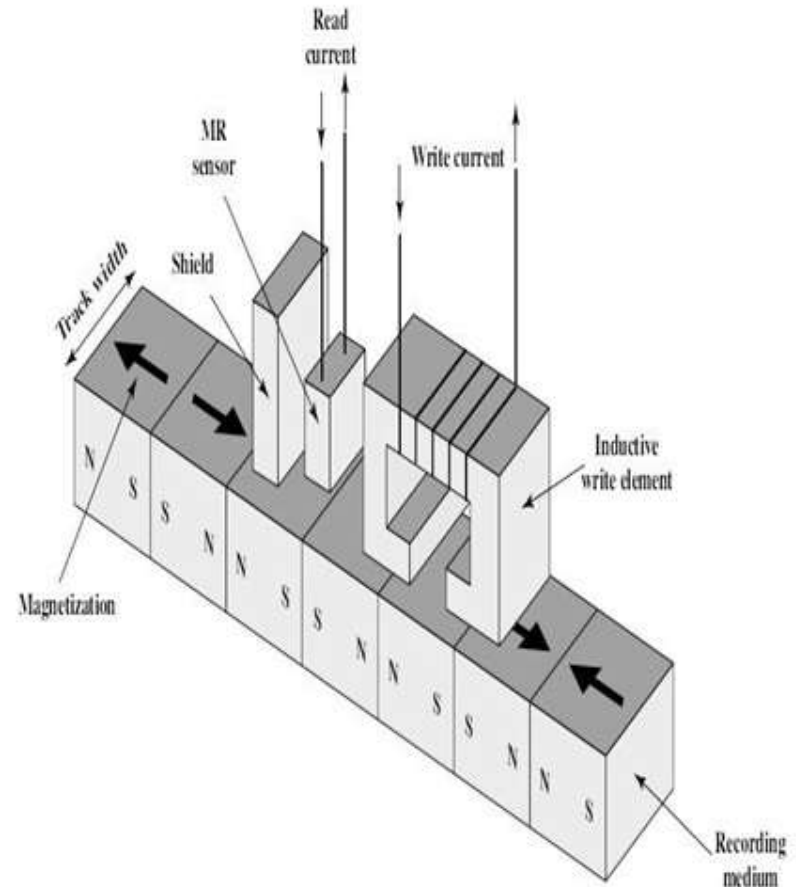
- What is auxiliary memory?
- Magnetic memory
 - Magnetic Disks: Hard Disks and Floppy Disks
 - Magnetic Tapes
- Optical disks
 - CD (Compact Disk) or CD-ROM
 - CD-R (CD Recordable)
 - CD-RW (CD-Read/Write)
 - DVD (Digital Versatile Disk)-ROM
 - DVD-R
 - DVD-RW

Auxiliary Memory

- Used to overcome the limitations of primary storage.
- Unlimited capacity because the cost per bit of storage is very low.
- Larger capacity than main memory.
- Used to store large volumes of data on a permanent basis.
- It is **Non-volatile** in nature.
- Also known as Secondary Memory.

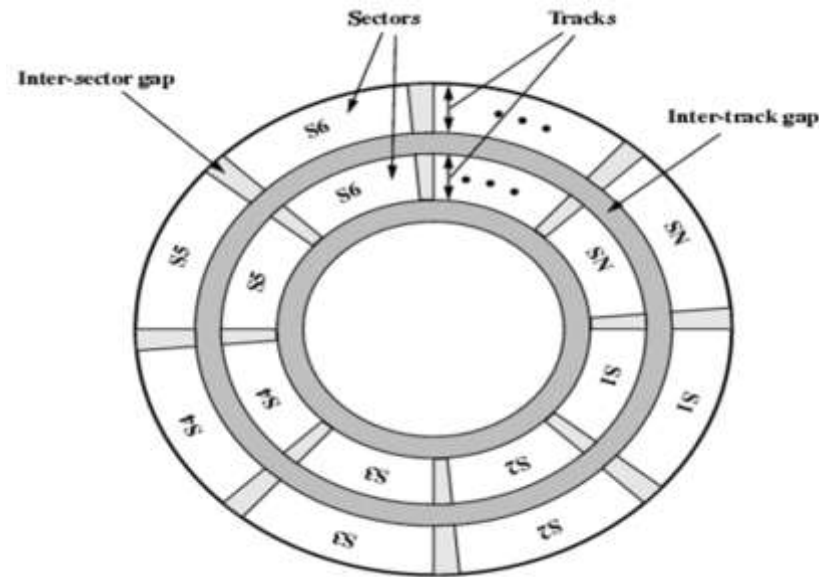
Magnetic Memory

- Permanent type memory.
- Data can store on the **magnetic coated surface** by applying electric pulses.
- Two techniques of data recording: **longitudinal** and **vertical**.
- **Magnetoresistive (MR) sensor** is used to read data.
- Older disks has single write/read head.



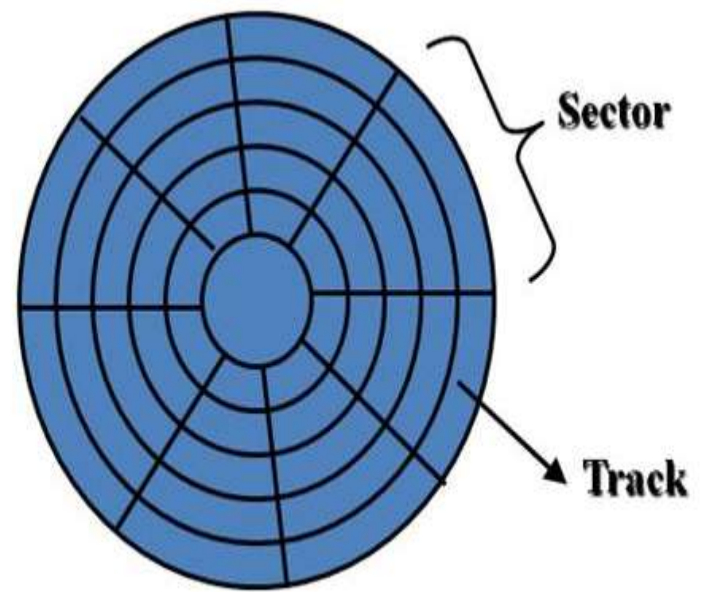
Magnetic Disks

- Read/Write data from/to its **surface** on **platters**.
- Surface divided into **tracks** and **sectors**.

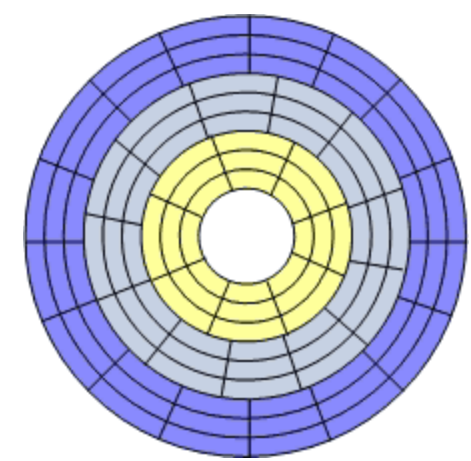


- Supports direct access mechanism.
- Has a **disk controller**.
- Has **read/write head**.

Tracks and Sectors



Constant angular velocity



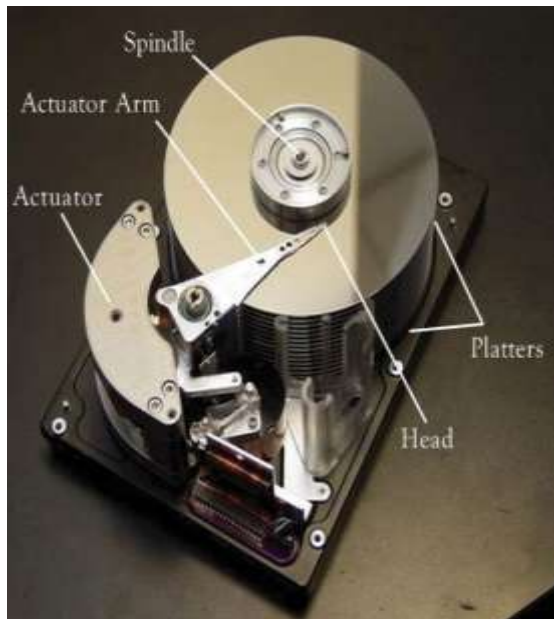
Multiple zones recording

Functions of Disk Controller

- To interface a disk system to the CPU.
- Disk drive selection, in case of multiple disks.
- Track and sector selection.
- To issue commands to the disk drive system to perform read/write operations.
- Error detection.

Types of Magnetic Disks

- Hard Disks



- Floppy Disks



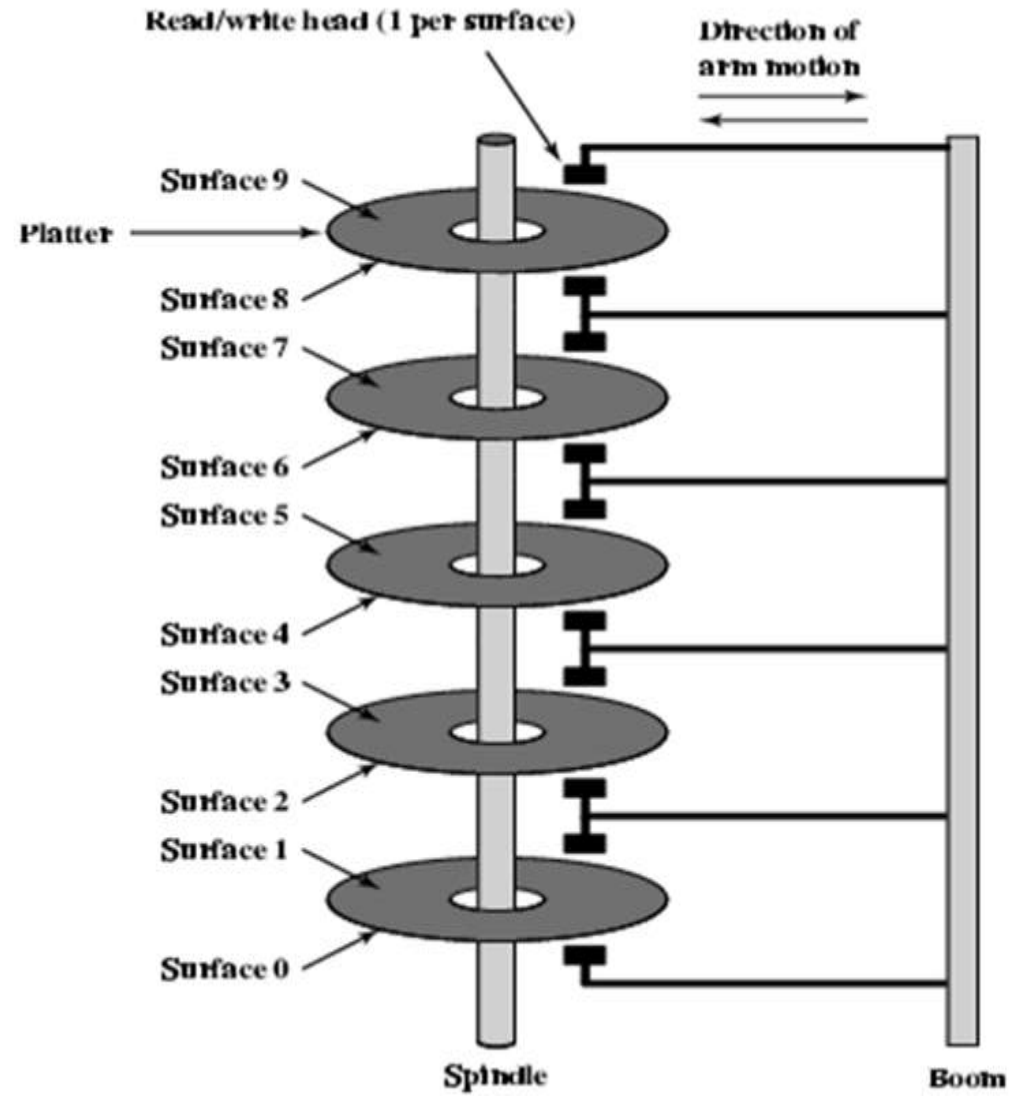
Hard Disks

- **On-line storage** devices.
- Used to store bulk (mass) amount of information.
- Made up of aluminium with a thin coating of magnetic material (iron oxide).
- Size **3.5 inch** used in desktop computers.
- Size **2.5 inch** used in portable computers.

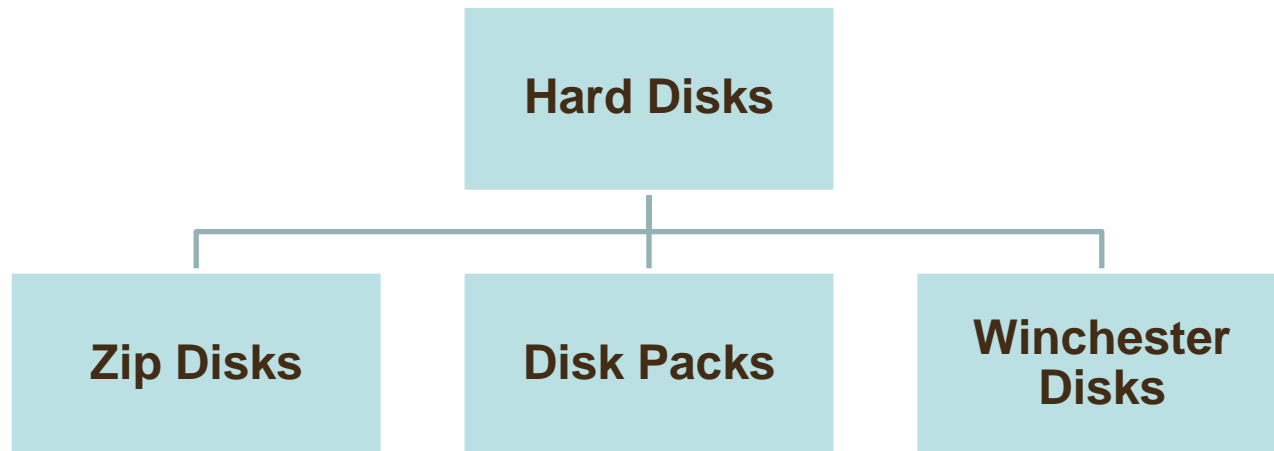
Storage Capacity of Hard Disks

Storage capacity = Number of recording surfaces X Number of tracks per surface X Number of sectors per track X Number of bytes per sector

Access Mechanism of Hard Disks



Types of Hard Disks



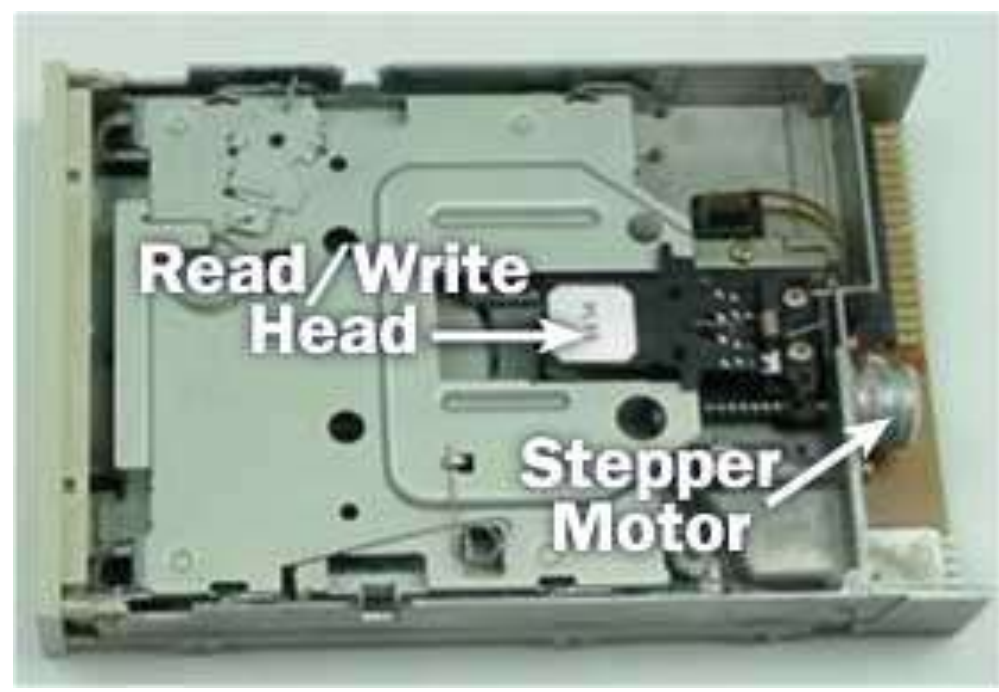
Floppy Disk

- Made up of plastic material (**Mylar**) coated with magnetic material (iron oxide or barium ferrite).
- Not a hard plate, very thin piece of flexible plastic.
- Also called **diskette**.
- It is **removable type** device and used as backup storage device.

Popular Floppy Disks

- $5\frac{1}{4}$ inch Diskette (Minifloppy)
 - Encased in square, flexible vinyl jacket.
 - 1.2 MB size.
- $3\frac{1}{2}$ inch Diskette (Microfloppy)
 - Encased in square, hard plastic jacket.
 - 1.44 MB size.

FDD (Floppy Disk Drive)



Magnetic Tapes

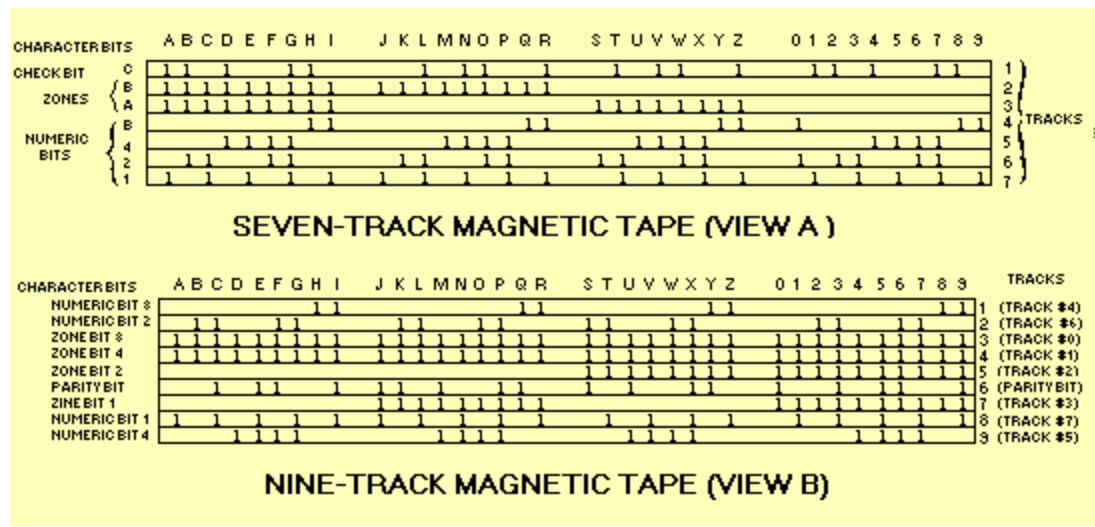
- Used as **backup** memory.
- **Sequential access** device.
- Made up of flexible **polyester** coated with magnetizable material (iron oxide or chromium oxide).
- Size varies from 3 mm to 12.7 mm.
- Available in reel, cartridge and cassette form.

Storage capacity of Magnetic Tapes

Storage capacity = Data recording density X Length.

Physical organization of data on Magnetic Tapes

- Tracks are parallel to tape length.
- Horizontal rows called tracks or channel.
- Vertical columns called frames.

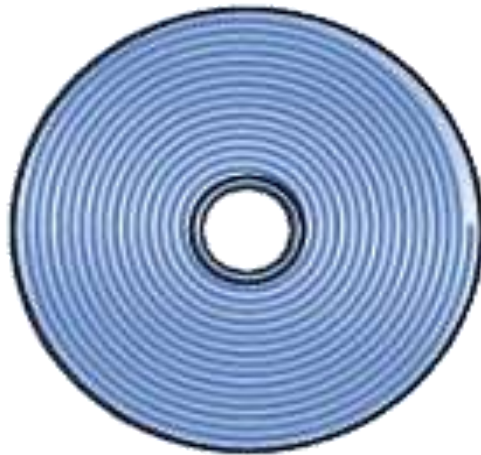


Optical Disks

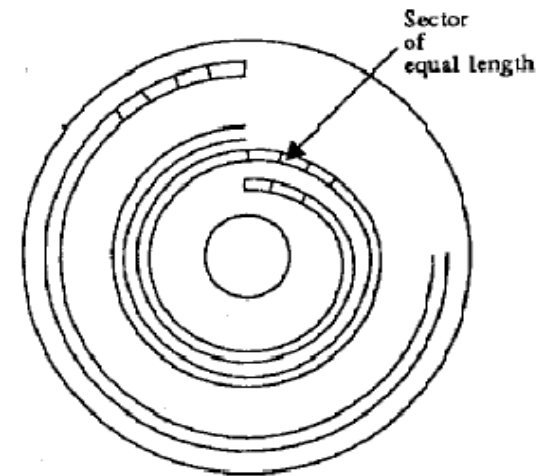
- Used for **backup** memory.
- Circular disk, coated with a thin metal or some other material that is **highly reflective**.
- Read/Write operation can perform using **laser beam**.
- Has **very high storing capacity**, compares to magnetic floppy disks.
- Direct access device.

Storage Organization of Optical Disks

- Has **one long spiral track**.
- Track divided into **equal length sectors**.



Track on disk

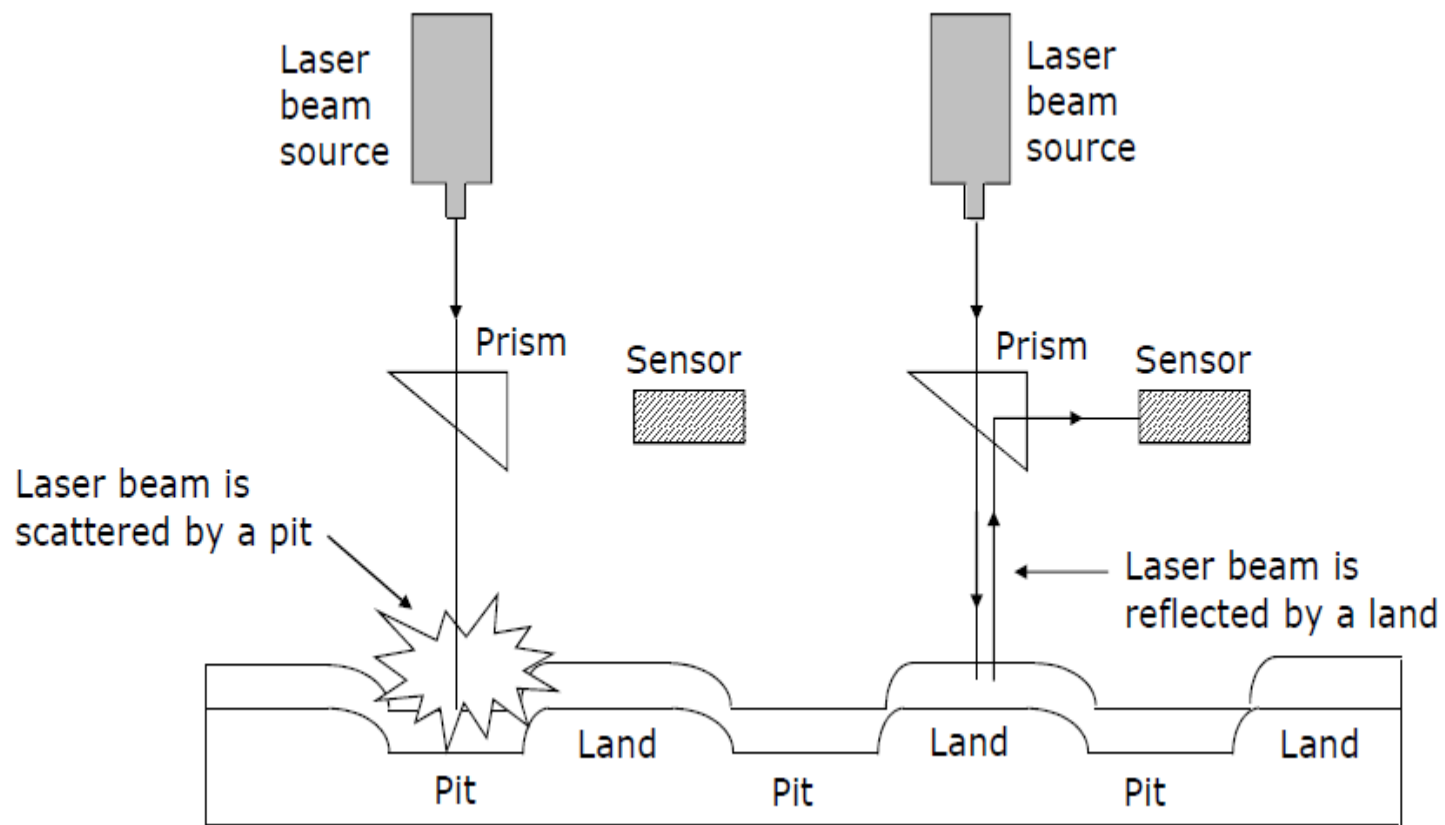


Sectors on disk

Storage Capacity of Optical Disks

Storage capacity = Number of sectors X Number of bytes per sector.

Access Mechanism on Optical Disks



Types of Optical Disks

- Compact Disk
 - CD-ROM
 - CD-R
 - CD-RW
- Digital Versatile Disk
 - DVD-ROM
 - DVD-R
 - DVD-RW

Queries?