

COA

Chapter 06: | Physical Characteristics

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| AGENDA

- Physical Characteristics

| Physical Characteristics

- The major **characteristics** that differentiate among the various types of magnetic disks

Head Motion	Platters
Fixed head (one per track)	Single platter
Movable head (one per surface)	Multiple platter
Disk Portability	Head Mechanism
Nonremovable disk	Contact (floppy)
Removable disk	Fixed gap
	Aerodynamic gap (Winchester)
Sides	
Single sided	
Double sided	

| Fixed/Movable Head Disk

- **Fixed-head disk**
 - **One** read/write head **per track**
 - Heads mounted on fixed **rigid arm**
- **Movable-head disk**
 - **One** read/write head **per side**
 - Mounted on a **movable arm**

| Removable or Not

- **Removable disk**

- Can be removed from drive and replaced with another disk
- Provides unlimited storage capacity
- Easy data transfer between systems

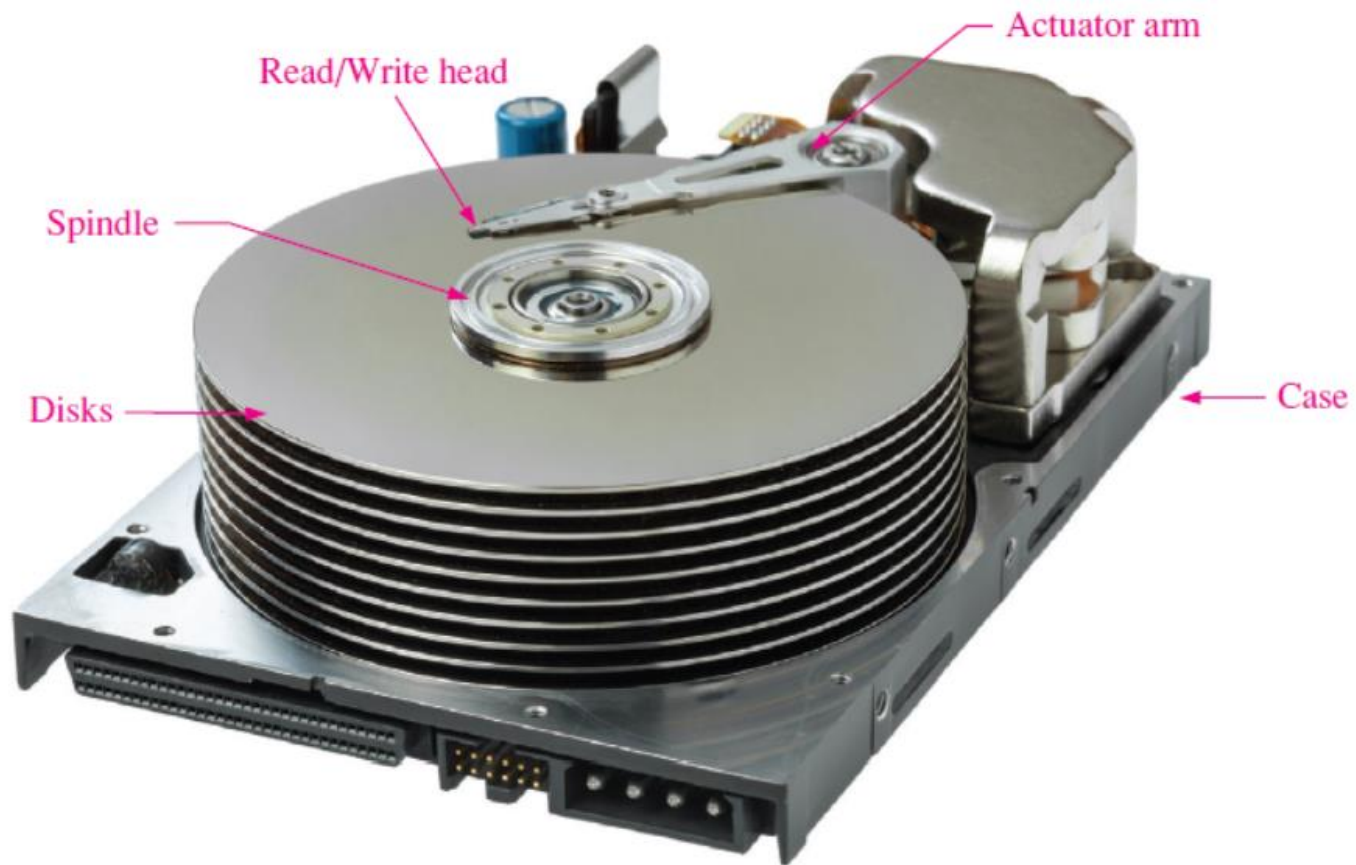
- **Nonremovable disk**

- Permanently mounted in the drive
- Hard disk

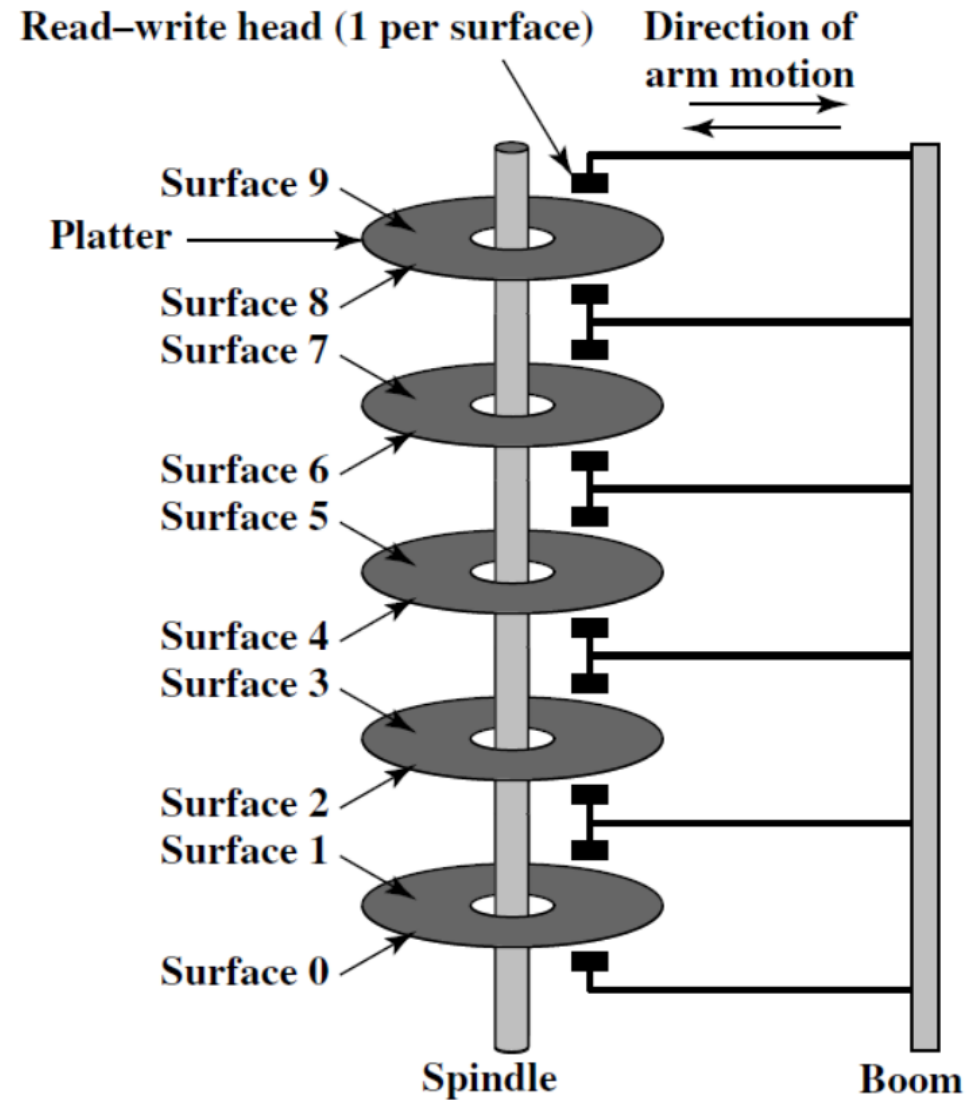
| Magnetizable Coating

- **Double Sided**
 - magnetizable coating is applied to both sides of the platter
- **Single Sided**
 - Some less expensive disk systems use single-sided disks

| Multiple Platter

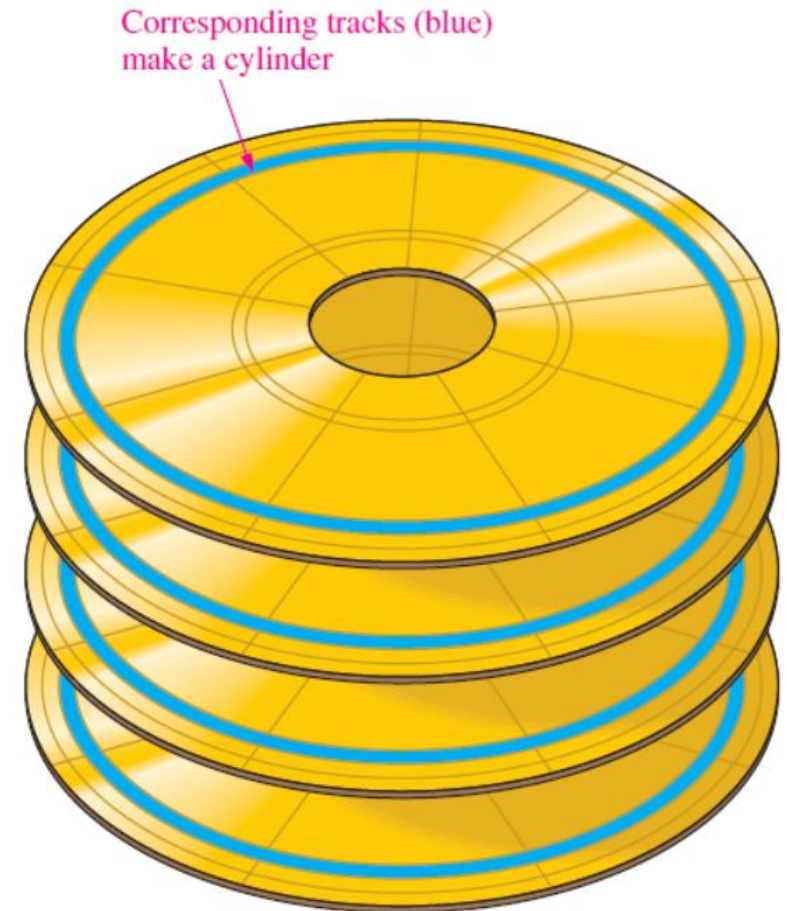


| Multiple Platter



| Cylinder

- The set of all the tracks in the same relative position on the platter is referred to as a **cylinder**



| Head Mechanism

- 1) Read-write head has been positioned a fixed distance above the platter, allowing an **air gap**
- 2) Head mechanism that actually comes into **physical contact** with the medium during a read or write operation
- 3) To push the technology further, the **Winchester** disk was developed

| Winchester disk

- The **head** must **generate or sense** an electromagnetic field of **sufficient** magnitude to write and read properly.
- The **narrower** the head is, the **closer it must be to the platter surface to function**. A narrower head means narrower tracks and therefore greater data density, which is desirable
- the **closer the head** is to the disk, the greater the **risk of error** from impurities or imperfections

| Winchester disk

- **Winchester heads** are used in **sealed** drive assemblies that are almost free of contaminants
- Designed to **operate closer** to the disk's surface than conventional rigid disk heads, thus allowing greater data density
- **head** is actually an **aerodynamic foil** that rests lightly on the platter's surface when the disk is motionless.

| Winchester disk

Characteristics	Seagate Barracuda ES.2	Seagate Barracuda 7200.10	Seagate Barracuda 7200.9	Seagate	Hitachi Micro- drive
Application	High-capacity server	High-performance desktop	Entry-level desktop	Laptop	Handheld devices
Capacity	1 TB	750 GB	160 GB	120 GB	8 GB
Minimum track-to-track seek time	0.8 ms	0.3 ms	1.0 ms	—	1.0 ms
Average seek time	8.5 ms	3.6 ms	9.5 ms	12.5 ms	12 ms
Spindle speed	7200 rpm	7200 rpm	7200	5400 rpm	3600 rpm
Average rotational delay	4.16 ms	4.16 ms	4.17 ms	5.6 ms	8.33 ms
Maximum transfer rate	3 GB/s	300 MB/s	300 MB/s	150 MB/s	10 MB/s
Bytes per sector	512	512	512	512	512
Tracks per cylinder (number of platter surfaces)	8	8	2	8	2

| Info Note

- The **device driver** and the computer's operating system can access **two tables** to keep track of files and file names
- **File Allocation Table (FAT)**
 - The FAT shows what is assigned to specific files and keeps a record of open sectors and bad sectors
- **Root Directory** which has file names, type of file, time and date of creation, starting cluster number, and other information about the file