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## OCW LAB REPORT -2

### How does hard disk works?

The hard disk contains a magnetic coating of spinning platter. Data stored in the hard disk is in binary code using 1's and 0's. The information is spread all over the magnetic layer of the disk. The information is read by the read heads that floats above the surface of the hard disk. When you save a document, it gets written somewhere "non-volatile" that keeps its state whether the system is on or off. To read the data back from the hard disk the head goes to the same spot notices the North and south spots flying by and so deduces the stored 0's and 1's.

A modern hard drive can store trillions of 0/1 bits per platter. The electronics control the read/write mechanism and the motor that spins the platters. The work rate of a hard disk is measured in two ways 1. Data rate 2. Seek rate. Data is stored on the surface of a platter in sectors and tracks.

### The following factors affect the performance of the hard disk :

1. Seek time
2. Spindle speed
3. Latency

### DIFFERENT COMPONENTS IN A HARD DRIVE AND THEIR USES:

1. PLATTER
2. THE SPINDLE
3. THE READ/ WRITE ARM
4. ACTUATOR
5. OTHER COMPONENTS

### **1. PLATTER:**

The platter are circular discs inside the hard drive where the 1's and 0's that make up your files are stored . Platters are made out of Aluminium ,glass or ceramic and have a magnetic surface in order to permanently store data. On larger hard drives , several platter are used to increase the overall capacity of drive . Data is stored on the platters in tracks , sectors and cylinders to keep organized and easier to find. In order to increase the amount of information the drive can store, most hard disks have multiple platters.

### **2. The Spindle:**

The spindle keeps the platter in position and rotates them as required . The revolutions per minute rating determines how fast data can be written to and read from the hard disk . A typical internal desktop drive runs at 7200 rpm though faster and slower speeds are available. The spindle keeps the platter at affixed distance apart from each other to enable the read and write arm to gain access.

### **3. The read / write Arm :**

The read and write arm controls the movement of the read and write heads, which do the actual reading and writing on the disk platters by converting the magnetic surface into an electric current. The arm makes the

heads are in the right position based on the data that needs to be accessed or written it's also known as the head arm or actuator arm . There is typically one read/write head for every platter side which floats 3 to 20 millionths of an inch above the platter surface.

#### **4. Actuator:**

The actuator is a small motor that takes instructions from the device's circuit board to control the movement of the read/ write arm and supervise the transfer of data to and from the platters. It's responsible for ensuring the read/write are in exactly the right place at all times .

#### **5. Other Components:**

As well as the casing on the outside of the hard disk that holds all of the components together, the front-end circuit board controls input and output signals in tandem with the ports at the end of the drive. No matter what the type of drive, it has one port for a power supply and one port for transferring data and instructions to and from the rest of the system.

### **Extra components in SATA Hard drive:**

#### **1. Connector:**

The outermost part of a hard drive consists of its connector ports. On SATA, or Serial Advanced Technology Attachment, hard drives, these include an electrical port to power the hard drive from the power supply unit inside the computer, a data port to transfer data between the hard drive and the motherboard, a jumper for configuring different drive operation modes, and in some cases an old-style Parallel ATA power connector as an alternative to the newer SATA standard.

#### **2. Logic Board:**

The logic board rests on the underside of the hard drive exterior and resembles a miniature version of a motherboard. The logic board controls the hard drive's operations. There are several large integrated circuits, or "chips," on the board. The big one is the controller chip, the brain of the hard drive. The smaller ones include a RAM chip as well as the motor driver chip, which handles the current necessary to operate the hard drive spindle motor.

### **3. Spindle Motor**

Sitting right next to the logic board is a round housing with connections leading back to the logic board. This is the casing around the spindle motor, which drives the rotation of the disks. Hard drive disks usually rotate at 5,400 or 7,200 RPM -- faster than a car engine -- though faster and slower versions also exist. A hard drive typically operates at temperatures between 100 and 200 degrees Fahrenheit, and requires a capable motor for operation.

