What's in Your Hard Drive: Here are the A, B, C's

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First, Some History

RAMAC from IBM

The first computer (actually a "tabulator") to use a hard drive

RAMAC- 1956

(**R**andom **A**ccess **M**ethod of **A**ccounting and **C**ontrol) The first hard disk computer. Introduced by IBM, All 50 of its 24" platters held a total of five million characters!

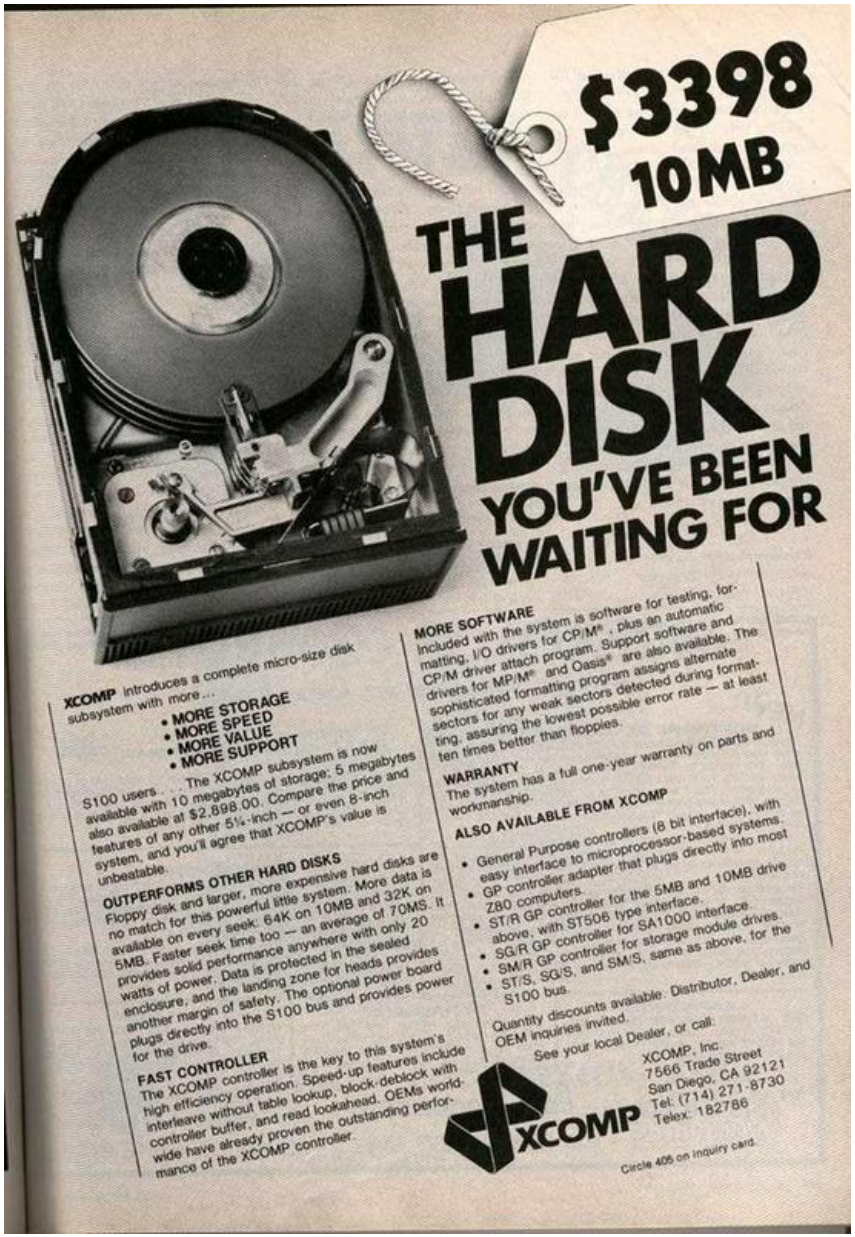
More Information:
http://www.answers.com/topic/ramac#ixzz1UImEzhQS

Moving to the early 1980s, we have the first commercially available desktop computers. Floppy drives only.

THEN, HARD DRIVES BECOME AVAILABLE- A MAJOR IMPROVEMENT!!!

Desktop Computer Hard Drive- Early 1980s

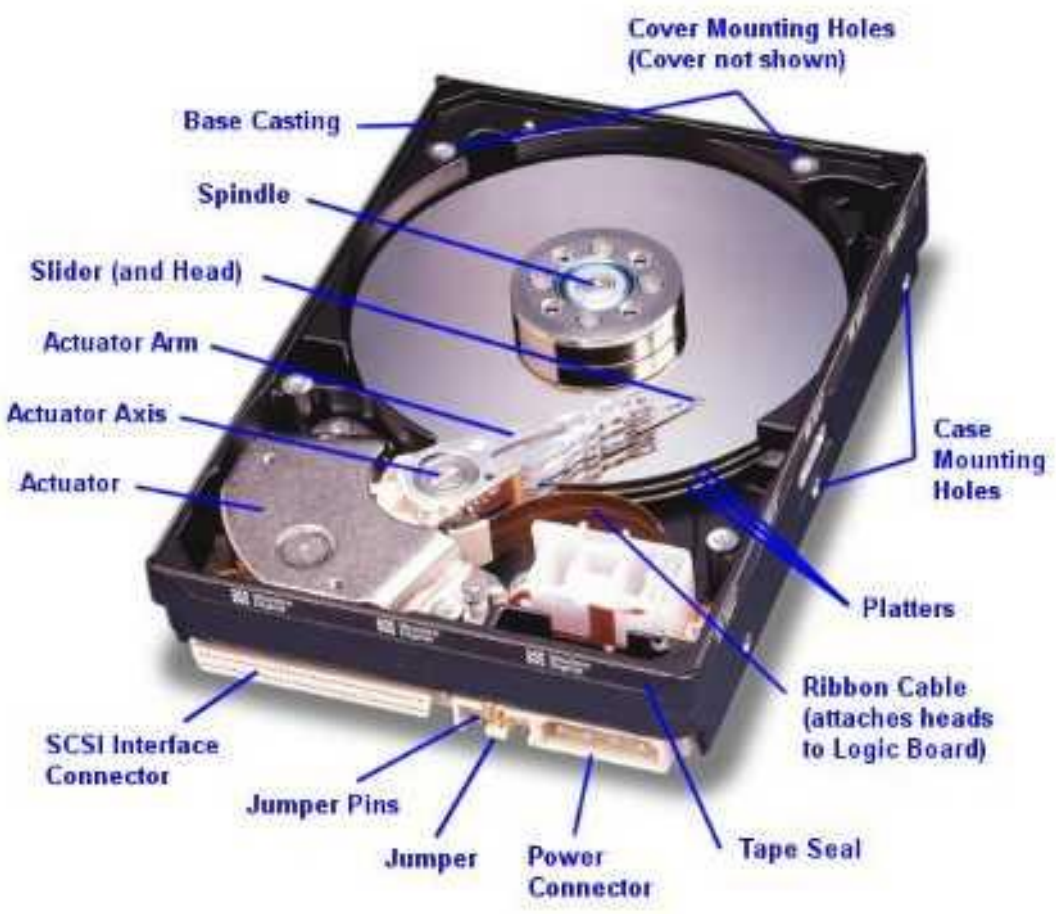
Such a bargain- and LOOK at that capacity!



So, what is a hard drive?

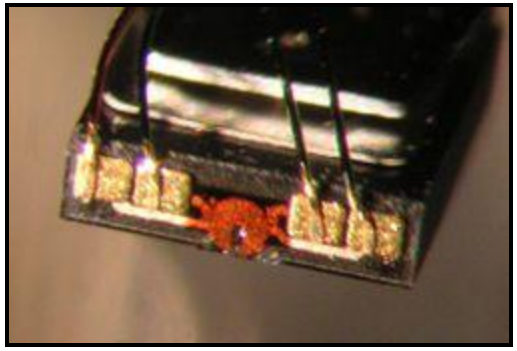
The hard disk drive (HDD) is a high-volume, disk-storage device with fixed, high-density, rigid media composed of relatively inflexible aluminum, glass platters, or disks. This inflexibility led to the name hard disk drive. In the past, the hard drive was typically not removable, which is why IBM has referred to hard drives as fixed disk drives.

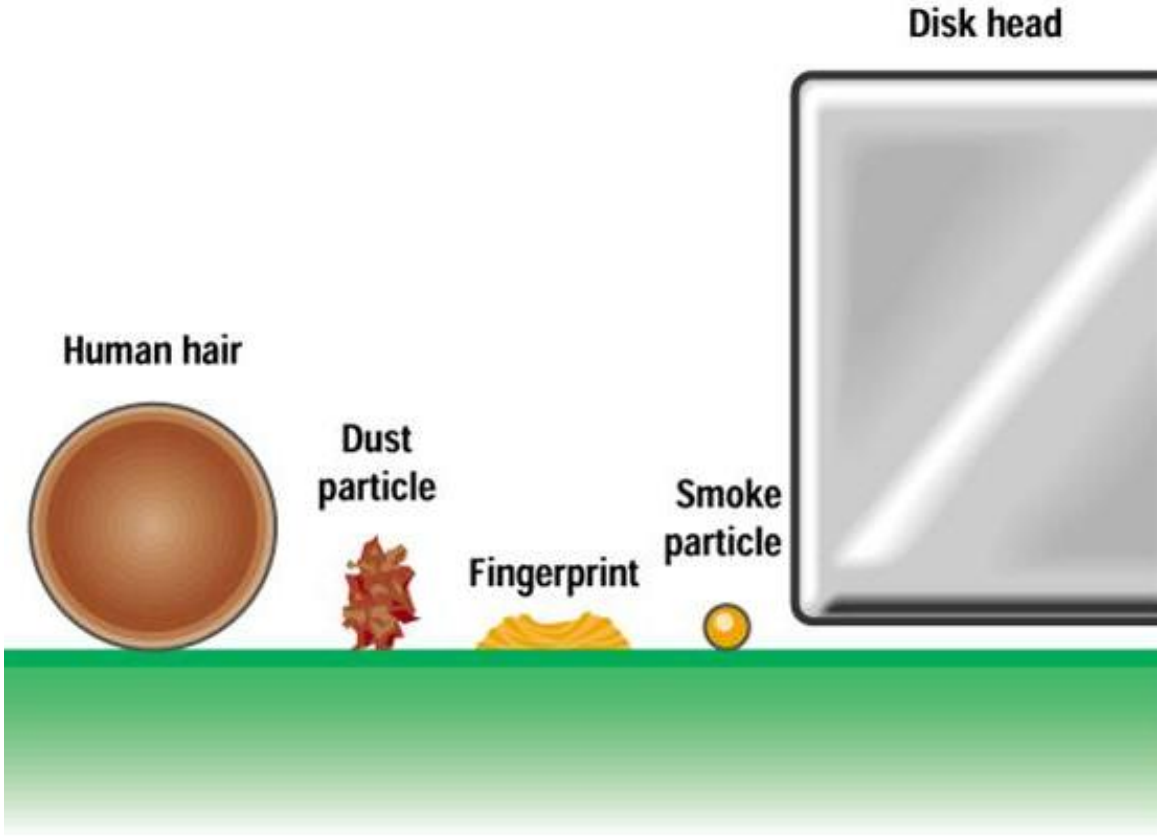
Hard Disk Drive Parts



Hard Drive Read Write “Head”

Hard Disk



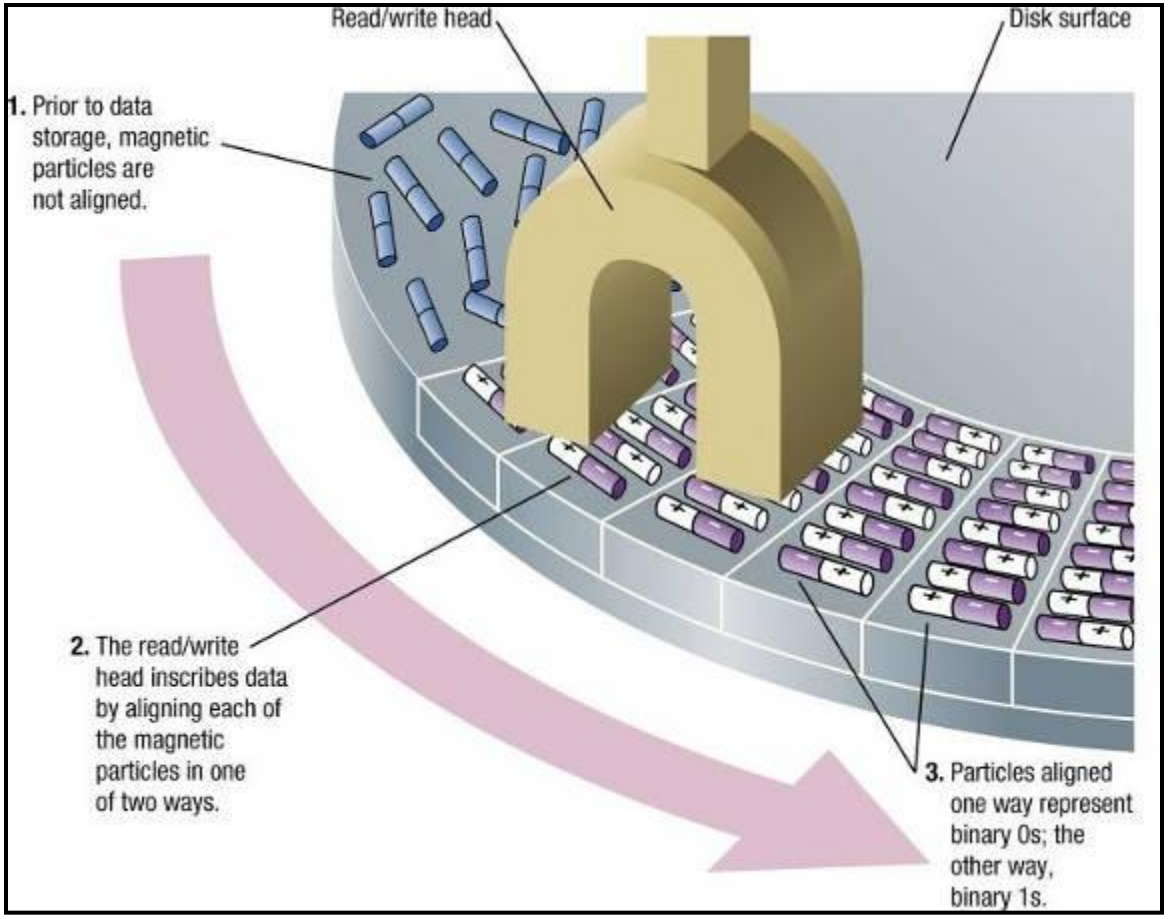


BAD things that can make a hard drive crash. The read/write head(s) ride on a cushion of air within tens of nanometers of the surface. This is why hard drives are sealed units.

Reading a Disk

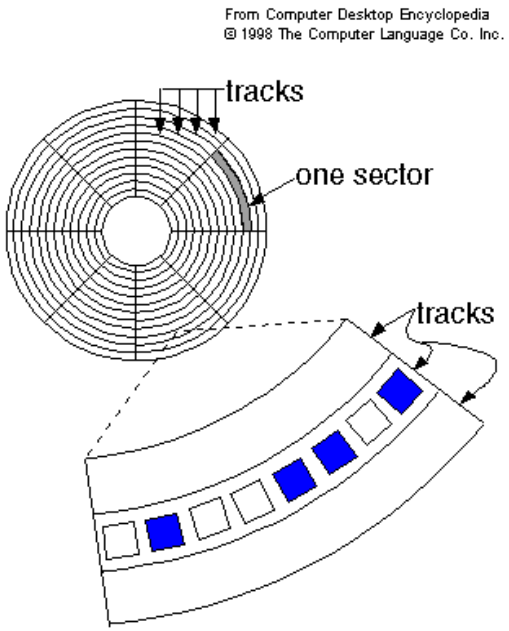
- Disks are read just like a record player
  - Data is stored on the disk
  - The disk spins
  - A head moves back and forth
  - Data is read and sent to the motherboard
- Data is stored magnetically as charged (on) or not charged (off)
- Video #1- hard drive operation. http://www.youtube.com/watch?v=t6wTZhsffEE&feature=related

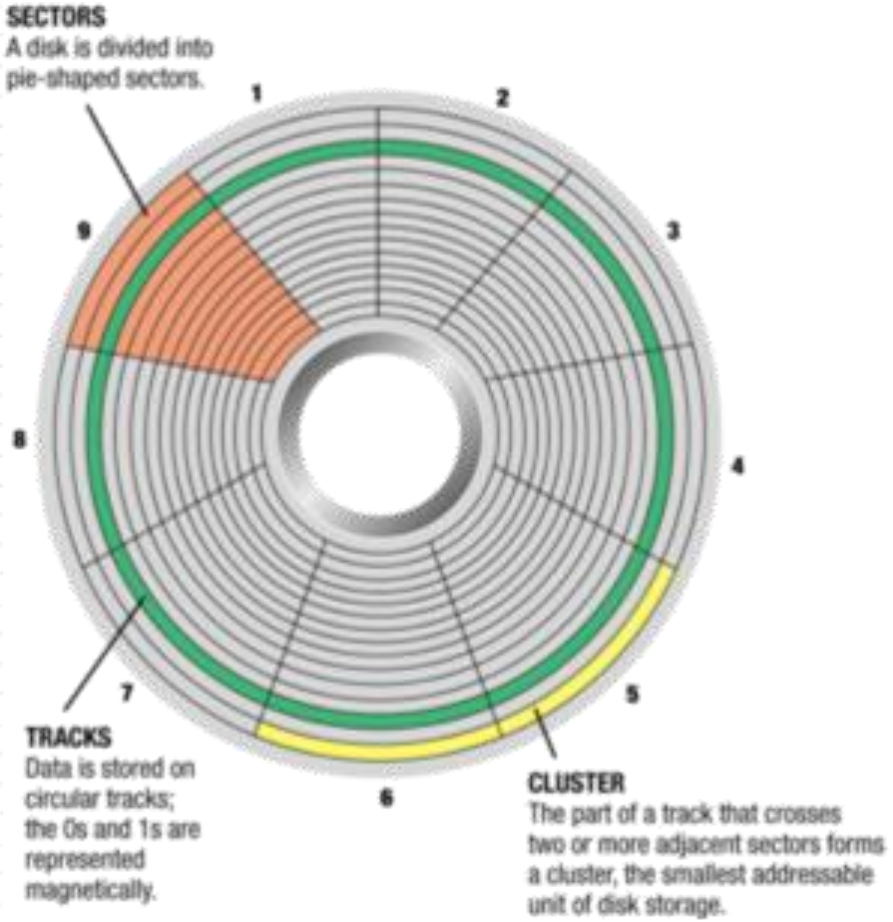
Reading a Disk



Storing Data on a Disk

- Tracks
- Sectors





Data Storage Terminology

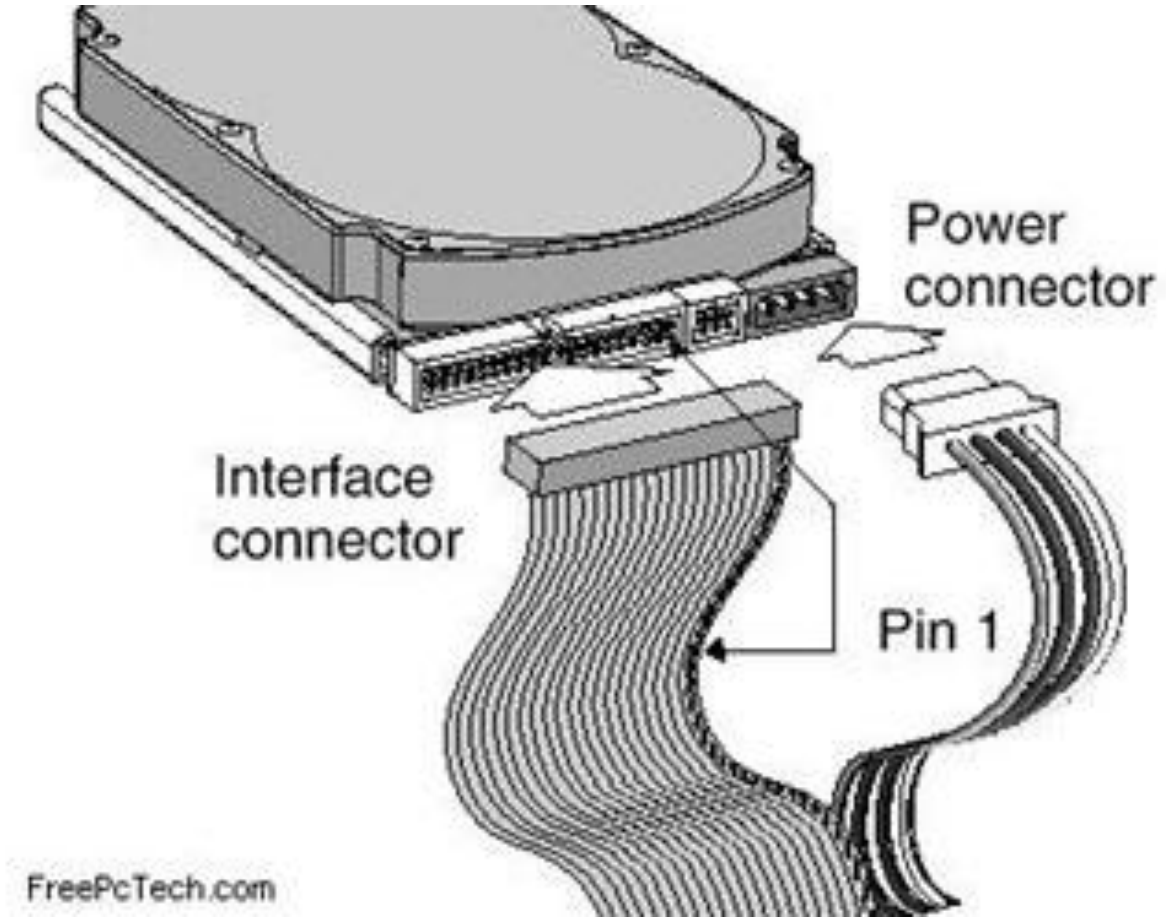
- Computer data- bits and bytes. A “bit” is one-eighth of a byte.
- Computers store information in “bytes”. One byte of information equals approximately 1 character
  - 1000 bytes = 1 kilobyte (kb)
  - 1000 kb = 1 megabyte (mb)
  - 1000 mb = 1 gigabyte (gb)
  - 1000 gb = 1 terabyte (tb)
- A one page typed letter $\cong$ 25 kb
- One average digital photo $\cong 1$ – 5 mb (1000-5000 kb)
- One mp3 format song $\cong$ 4 mb
- A DVD movie $\cong 4.7$ gb (4,700 mb)

Personal Computer Hard Drive Connectors

IDE- Integrated Drive Electronics

and

SATA- Serial Advanced Technology Attachment



IDE- Integrated Drive Electronics

Many computers still use this type of connector, but it has been replaced by SATA.

SATA uses a smaller and faster data cable connection (the red one).

What to look for when purchasing a new hard drive.

First, pick the correct interface for your computer- IDE or SATA?

READ THE MANUAL OR
CHECK YOUR MACHINE SPECS ONLINE!

Drive size- usually 3.5 inches for a desktop machine.

2.5 inches for a laptop

Rotational speed- faster is better

5400 rotations per minute (RPM) or 7200 RPM.

On some specialized drives up to 10,000 RPM- or faster.

Capacity- measured in gigabytes or terabytes.

Like Captain Kirk said in Star Trek, “Space, the Final Frontier.” Bigger is better, but check your manual! Some drives might be TOO big!

Data transfer speed

Gbps- gigabits per second. 3 Gbps or even 6Gbps on SATA.

IDE drives will have speeds up to 100 Mbps.

BUT- *what speed does your system use?*

Other specs that are important

Warranty- As much as three years, although some companies have gone to one year.

Buffer or Cache size- usually dependant on the size of the drive.

Other specifications

Seek time- how long it takes to find data. Expressed in milliseconds (ms).

Access time- how long it takes to get data. Also expressed in ms.

Noise reduction- might be important.

MTBF- mean time between failures; usually someone's made up fantasy.

How to install a SATA drive in 1 minute and twenty seconds.

Video #2

http://www.youtube.com/watch?v=9hgiCnzbXrs&feature=related

Some things you can do to extend the life of your hard drive.

Hard Drive Maintenance

- Run Disk Cleanup, Scandisk, and Drive Defragmentation at least monthly. These activities can be scheduled, and there are many free software tools to help you, not just what is in the Windows OS.
- Keep your computer away from heat, high humidity and vibration.
- Properly shut down your computer- don't just switch it off or unplug it!
- Consider purchase of a UPS (uninterruptible power supply).

REMEMBER- Hard drives are mechanical devices with amazing reliability. That is why they've been in use over 55 years. But they still wear out, and are subject to other disasters.

SO BACK UP YOUR FILES!

QUESTIONS?????