

Data Storage



Data Storage

Writing/Reading:

Magnetic disks are the most common form of permanent data storage.



Data Storage

Writing/Reading:

The goal of a magnetic disk is to alter microscopically small areas of the disk surface so that some of the areas represent ones and zeros.



CompuTech

Data Storage

Writing/Reading:

Before a disk can be written to, the scheme of how the data will be written on the disk must be determined. The operating system will determine this scheme.



CompTech

Data Storage

Writing/Reading:

Making this scheme is called formatting. Formatting will essentially create a road map to where the data can be stored and organized.



CompuTech

Data Storage

Writing/Reading:

Formatting will divide the surface into sectors (pie slices) and tracks (concentric circles).



Data Storage

Writing/Reading:

Now we have a disk ready to store information. So how is that information actually written to the disk?



Data Storage

Writing/Reading:

The actual surface of the disk is a magnetic film that is covered with iron particles scattered in a random pattern. The surface is similar to audio and video tape surfaces.



CompuTech

Data Storage

Writing/Reading:

To write data, these iron particles have to be manipulated and organized.



Data Storage

Writing/Reading:

To organize the particles, electricity pulses through a coil of wire wrapped around an iron core in a drive's read/write head.



Data Storage

Writing/Reading:

The read/write head is suspended over the disk surface. Electricity turns the core into an electromagnet that can magnetize the particles on the surface.



CompTech

Data Storage

Writing/Reading:

So the core induces a magnetic field on the surface causing the positive poles of the iron particles on the surface, to orient themselves and face toward the negative part of the read/write head.



Data Storage

Writing/Reading:

After the head aligns one band of iron particles, it will align a second band right next to it. These two bands represent a bit.



CompTech

Data Storage

Writing/Reading:

To represent a "1" bit, after one band is oriented, the current in the head is reversed and the iron particles on the surface are now oriented in the opposite direction.



CompTech

Data Storage

Writing/Reading:

So the two bands have iron particles that are facing opposite directions. This creates a "1" .



Data Storage

Writing/Reading:

To create a "0", after one band is oriented, there is no change in the current and the next band orients the iron particles in the same direction.



CompuTech

Data Storage

Writing/Reading:

So now we have two bands that have iron particles facing in the same direction. This represents a "0".



Data Storage

Writing/Reading:

When a second bit is stored, the polarity of the new band is always opposite of the old band next to it. This indicates a beginning of a new bit.



CompTech

Data Storage

Writing/Reading:

To read data, no current is sent to the head as it passes over the surface. Instead, the opposite of the writing happens.



Data Storage

Writing/Reading:

The bands of magnetized iron particles on the surface create magnetic fields through which the read/write head passes.



Data Storage

Writing/Reading:

The movement of the head through these fields generates a current that travels in one direction or the other in the read/write head.



CompuTech

Data Storage

Writing/Reading:

The direction of the current depends on the polarity of the magnetic field of the bands.



Data Storage

Writing/Reading:

By sensing the changes in direction of the current, the computer can tell if the head is passing over a "1" bit or a "0" bit.



CompTech

References

How Computer Work: Millenium Edition

by: Ron White, 1999 QUE

