

Disk Structure

Disks come in two varieties, floppy and hard. Computers today use the 3-1/2" floppy, although some older systems might have 5-1/4" floppy drives for backwards compatibility. HD (high density) 3-1/2" floppy disks can hold 1.44MB (1,457,664 bytes) of data. DD (double density) can hold 720KB of data. HD 5-1/4" disks hold 1.2MB and DD disks hold 360KB's. You may notice that the status line of Windows Explorer reports that a newly formatted HD 3-1/2" floppy has 1.38MB of free space.

Each folder you create on a disk takes up 512 bytes of the disk's space. You can verify these numbers if you use Windows Explorer. After creating one new folder, right-click on the newly formatted floppy and select **P**roperties.

Disks are divided into sectors or 'allocation units'. Each allocation unit holds 512 bytes of data. Sectors are sub divisions of the data tracks. The number of sectors is dependant on the disk's density.

As data is written to the disk, the address of the data's location is written to the index. This index is in track zero. If data is not written to the disk in consecutive sectors, (meaning fragmented) additional reads to the index are required. This slows down data retrieval. The locations on the disk are referred to as addresses.

The method the operating system used to store information is much like the process you would use to find a book in a library. If you didn't know the location of a book, you would start by going to the card catalog. Here you would find an index number for the book. Next stop is the shelf referenced by that number.

FAT16 - FAT32. The index area is called the FAT or File Allocation Table. FAT16 is the default storage method used by floppy disks and hard disks. FAT32 can be used by the Windows operating system on hard drives only. FAT32 allows you to store more information on the disk but there is a price to pay. MSDOS and Windows NT cannot read FAT32 stored data. The entire drive must be defined as FAT16 or FAT32. If you have multiple drives or your hard drive is partitioned, each drive can be structured individually.

NTFS: Is the default file structure for Windows XP and Windows NT. Since NTFS format is not available or readable by Windows 95/98, it is not covered in this manual.

Windows allows you to have a maximum of 26 storage devices on your system. Each device is referenced by a letter A: through Z:. A: and B: are reserved for floppies. C: is always the first hard drive.

As the need for additional storage arises, hard drives can be added to most computers. The computer's case generally allows space for 2 to 4 hard drives. Each new hard drive is assigned alphabetical letter. The IDE drives are controlled by an I/O (input/output) controller. The controller groups the drives as primary and secondary. Each of these

groups is further divided into master and slave. Each IDE CDROM installed in the computer is allocated one of the four possible positions. SCSI controllers can extend the number of hard drives which can be added to the system, but the computer's case is limited to 2 or 4 devices. USB ports can be used to attach external CDROM drives, thereby freeing IDE slots.

Partitioning is the process of dividing a hard drive's space into smaller sections. Some older BIOS's and operating systems like MSDOS could not 'read' hard drives larger than 1.2GB. Windows NT has trouble reading drives larger than 8 GB. Today, hard drives are available with storage capacities which exceed these limits. (Very old DOS was limited to 502/540MB.)

FDISK is the Windows utility used for dividing the hard drive into smaller sections. New hard drives must be FDISKed before they can be used. They also must be formatted. Although you can change a drive's partition size after it contains data, it is definitely not recommended. If a partition is reduced in size, all data in the reduced area will be lost. Increasing a partition's size is usually not a problem.

Partition Magic, distributed by Power Quest, is a utility which can safely help you repartition drive sizes when the disk already contains data.

Installing new drives

The physical installation of the drive is beyond the scope of this book.

You might need two additional items to install a new drive. The first is a ribbon (data) cable which has two drive connectors and the second is a power plug 'Y' adapter.

Each drive added to the system needs to have a jumper, located on the drive, set the jumper to master or slave. One drive in a primary or secondary position is jumpered as master the other (if present) is jumpered as 'slave'.

Once the drive is installed and the computer is turned on, the BIOS should detect the new hardware and send you to the 'Setup' procedure. Since BIOS versions differ, you will have to follow the instructions provided by the manufacturer. Most newer BIOS's will correctly detect the new drive configuration. However, if this is not the case, you will have to supply some information to complete the configuration. This information is located on a label on the hard drive. You will need to know the 'cylinders', 'heads' and 'sectors'. Additional information such as 'pre comp' and 'landing zone' is generally not needed.

Floppy disk drives have two read/write heads. Hard drives are composed of several disks or 'platters'. Each platter requires its own read/write head. Like floppy disks, the hard disk's platters are further divided into tracks and sectors.