16-bit

Pertaining to hardware or software that handles data 16 bits at a time. 16-bit applications that run under Windows and that share a single memory space cannot be preemptively multitasked.

A 16-bit CPU has 16-bit internal registers, so it can manipulate data in groups of 16-bits. A 16-bit data bus allows data to travel between the different system components in groups of 16 bits. A 16-bit memory address bus allows a computer to directly access 64K of memory, because 64K is the maximum value representable by 16 bits.

16-bit software, such as the MS-DOS operating system and the applications written for it, references memory locations using 16-bit addresses. To access memory beyond 64K, the software must employ segmented memory addressing. Segment memory operations require additional system overhead, and slow down computer performance.

The more data a computer can manipulate at one time, the faster that computer will perform. A computer's speed can be limited by the slowest hardware or software component, or the one that can handle the least number of bits at a time. For example, even if 16-bit MS-DOS is run on a CPU capable of manipulating 32-bits at a time, the necessary segment memory operations will limit the speeds that can be achieved. Current versions of Windows are mostly a 32-bit operating system, so they can take better advantage of today's 32-bit CPUs.

16550 UART (Universal Asynchronous Receiver Transmitter)

A chip in PC computers that is used for serial communications. It replaces the older 8250A and 16450 UART chips found on many PCs.

The 16550 UART overcomes limitations of the older chips. It can buffer up to 16 characters before generating an interrupt (the older chips generate interrupts after every character). It also recovers more quickly from interrupts in order to continue processing.

This chip is a must addition for computers using external communications devices (usually a modem) that transmit data in excess of 9600 bits-per-second (bps) within Windows.

32-bit

Pertaining to hardware or software that handles data 32 bits at a time. 32-bit applications generally provide better performance and memory management than 16-bit applications.

A 32-bit CPU has 32-bit internal registers, so it can manipulate data in groups of 32-bits. A 32-bit data bus allows data to travel between the different system components in groups of 32 bits. A 32-bit memory address bus allows a computer to directly access over four gigabytes (four billion bytes) of memory, since the maximum value representable by 32 bits is about 4.3 billion.

Because 32-bit CPUs with 32-bit memory addressing can access so much memory directly, 32-bit operating systems, like current versions of Windows, need not employ the segmented memory addressing scheme that is necessary to allow 16-bit software to access memory above 64K. 32-bit software can instead use more straightforward linear memory addressing.

The more data a computer can manipulate at one time, the faster that computer will perform. A computer's speed can be limited by the slowest hardware or software component, or the one that can handle the least number of bits at a time. For example, even if 16-bit MS-DOS is run on a CPU capable of manipulating 32-bits at a time, the necessary segment memory operations will limit the speeds that can be achieved. Current versions of Windows are mostly a 32-bit operating system, so they can take better advantage of today's 32-bit CPUs.

8086

A 16-bit Intel CPU introduced in 1978. Whereas its 8-bit predecessor (the 8080) provided access to only 64K of RAM, the 8086 could access 1 MB of RAM. To maintain compatibility with programs designed for the 8080, the system addressed the memory as 16 memory "segments" of 64K each. This segmented memory addressing became the basis for memory addressing used by MS-DOS and all programs designed to run under MS-DOS. Windows can employ a special virtual mode to simulate an 8086 thus maintaining compatibility with programs written for MS-DOS.

The Intel 8088 CPU was a slightly modified version of the 8086 that was used in the original IBM PC.

8088

A 16-bit Intel CPU. The 8088 was identical to the 8086, except that it used an 8-bit data bus. (The 8086 used a 16-bit data bus.) Although it narrowed the data path, this design change made the 8088 compatible with the majority of support chips, disk drives, and peripherals then on the market. The 8088 was used in the original IBM PC.

80286

The 16-bit Intel CPU used in the IBM AT and compatible computers. The 80286 provided access to 16 MB of RAM in a new mode of operation it introduced, called protected mode; however, memory-management software was necessary to use all but the first megabyte of RAM. The 80286 could also run in real mode to maintain compatibility with software written for earlier processors.

80386

The first 32-bit Intel CPU.

80486 and Pentium (80586) processors use essentially the same architecture as the 80386.

The 80386 provides access to 4 GB of RAM and has three operating modes:

- protected
- virtual
- real

A20 handler

This is the device used by your computer to handle the A20 memory address line, which is the first extended memory address. HIMEM.SYS is the program that typically installs the A20 handler.

accelerator key

A key that may be pressed when a menu is displayed in order to execute one of the menu options.

The accelerator key is represented as an underlined character in the menu item name. If the menu item is on the menu bar, you must press the Alt key before pressing the accelerator key. Once a drop-down menu is displayed from the menu bar, you need only press the accelerator key to execute the menu option. For example, pressing Alt+F displays the File menu, and once that menu is displayed, simply pressing the "O" key corresponds to selecting the Open option with the mouse.

active window

The currently selected window, which appears on top of any other window. The active window can usually be distinguished from inactive windows by the distinctive color (blue, by default) or intensity of its title bar.

advanced RLL (ARLL)

A modified version of the run-length limited (RLL) method of encoding data on the surface of a magnetic disk. ARLL allows denser storage of data on the disk as well as faster transfer rates as compared to RLL.

ANSI character set

ANSI stands for the American National Standards Institute. Computers and computer programs using a common standard for data representation can exchange information. The ANSI character set specifies a standard set of values to represent alphanumeric and other characters. The ANSI character set includes the standard ASCII character set, which specifies those characters represented by values 0 through 127, plus an extended character set that specifies characters to be represented by values 128 through 255. The ANSI character set is used by Windows.

API (application programming interface)

A set of common functions and/or subroutines used to implement a particular feature. Microsoft has several APIs including the Windows API, Win32 API, OLE API, MAPI, and Telephony API.

application programming interface

application window

A window that provides a work area for an application.

archive attribute

This file attribute is used to identify files that have been changed since they were last backed up. The archive attribute bit is set to one in a file's directory entry when the file is modified in any way. The archive attribute bit is set back to zero by backup software after the file has been backed up.

ASCII

Acronym for American Standard Code for Information Interchange.

Computers and computer programs using a common standard for data representation can exchange information. ASCII is a standard that assigns numeric values to letters, numbers, punctuation marks, and other characters. The ASCII character set was developed for computers that used seven bits to represent characters, thus allowing 128 (two raised to the seventh power) different character values:

- Values 0 through 31 represent non-printing characters, such as backspace and carriage return, and are used as control codes. In some fonts, these values represent graphic symbols.
- Values from 32 through 127 represent the numbers 0 through 9, common punctuation marks, and the upper- and lowercase letters of the Roman alphabet.

PCs use eight bits to represent characters, allowing for 255 (two raised to the eighth power) character values. Because the ASCII standard does not define values from 128 to 255, various computer manufacturer's have defined their own "extended character sets" for these values. The ANSI character set defines standard characters for these values.

While Windows uses the ANSI character set for most operations, it uses a special 16-bit coding standard called Unicode for long filenames and a few other purposes.

assembly language

A low-level computer programming language in which each instruction corresponds to a single machine code instruction. Programs written in assembly language tend to run faster than those written in higher-level languages like C or BASIC. Because different types of CPUs recognize different sets of machine code instructions, assembly language programs written for one type of computer must be rewritten in order to run on a different type of computer.

asynchronous

Refers to an operation that proceeds independently of a timer. In asynchronous communications via modem, for example, the modems rely on each sending start and stop signals ("start bits" and "stop" bits) in order to know how to pace the exchange of data.

auto mount

When a disk is compressed, the files that it contains are condensed together and stored as a special hidden file called the "compressed volume." If the compressed volume is not mounted, it simply appears as a large hidden file on the host drive. When the compressed volume is mounted, it is recognized by the operating system as a compressed disk, and treated as a separate disk, independent of its host drive.

When the system is set to automatically mount compressed volumes, floppy disks that have been compressed will be automatically recognized and mounted when they are inserted to the disk drive.

AUTOEXEC.BAT

For Windows 95 and Windows 98: A batch file containing commands that are executed automatically when your computer starts up. The commands in AUTOEXEC.BAT usually set the path environment variable, determine the look of the DOS prompt, start TSRs, and execute other programs that should be run when the computer starts.

Although most computers running MS-DOS include this file, many of its functions have been built into current versions of Windows. The primary purpose of the AUTOEXEC.BAT file now is to load TSRs that will be available during DOS sessions. You can also use AUTOEXEC.BAT to set various environment variables used by DOS, such as the PROMPT and PATH variables.

Together with the CONFIG.SYS file, AUTOEXEC.BAT affects the environment used for all DOS VMs, and so for all DOS applications run under Windows. Current versions of Windows 9x processes the AUTOEXEC.BAT file (if any) during system startup.

background

A process "running in the background" receives a lower proportion of the CPU's processing time than a process "running in the foreground."

By default, an application running in the foreground is the primary task of the computer and receives a higher proportion of the CPU's processing time than other running applications. The background applications receive attention from the CPU mostly during lulls in the foreground task processing.

For Windows NT: You can change the relative processing attention given to foreground and background tasks by double-clicking System in the Windows NT Control Panel and adjusting the Application Performance slider control on the Performance tab.

For Windows 2000: You can change the relative processing attention given to foreground and background tasks by double-clicking System in the Windows NT Control Panel and then on the Advanced tab, clicking Performance Options.

basic input/output system

batch file

A text file containing one or more operating system commands. Batch files are either run automatically by the system (see AUTOEXEC.BAT) or run manually by typing their names at the MS-DOS command prompt. When the batch file is run, the commands are executed sequentially. Under MS-DOS, batch files have the file extension .BAT.

baud rate

Term used to describe the speed of data transmission, usually referring to a modem. It specifies the number of signal variations per second. Baud rate is commonly used as a synonym for bits-per-second, but this can be inaccurate. While one signal change can represent one bit of data, in today's high-speed communications one signal change usually encodes more than a single bit.

BBS (bulletin board system)

Any online service that allows messaging, electronic mail, and file transfer between computer users who usually connect to the system via modem.

benchmark

A test used to measure software or hardware performance.

bit

Binary, or two-state, digit. A bit uses the base 2 numbering system, which recognizes only two digits: 0 and 1. Because, at a fundamental level, most computers represent and manipulate data as binary numbers, a bit represents the smallest unit of information that a computer can processes.

When discussing bits individually, a bit value of 1 corresponds to the bit being in the "on" or "set" state. A bit value of 0 corresponds to the bit being in the "off," "unset," or "cleared" state.

BIOS (Basic Input/Output System)

A computer subsystem that stores routines to support the transfer of information between computer components, such as memory, disk drives, and the monitor. The system BIOS for PCs is stored in ROM, so is often called "ROM BIOS." In addition, many components include their own BIOSs.

Windows bypasses many of the stored BIOS routines, enabling these operations to take place in protected mode rather than in real mode. New BIOS standards are being devised to provide plug-and-play capabilities for hardware devices.

block

A group of consecutive bytes of data that is read from or written to a disk as a unit.

boot record

The first physical sector on a floppy disk or the first logical sector of a hard disk partition. It identifies the disk's architecture (sector size, cluster size, and so on). For bootable disks, it also contains the boot record program that loads the operating system. Also referred to as boot sector.

Every logical disk includes a boot record that stores the following information about a disk's logical and physical makeup:

- Number of bytes per sector
- Size of a cluster (number of sectors per cluster)
- Number of sectors on the disk
- Number of sectors per track
- Number of sides on the disk
- The media descriptor byte

For bootable disks, the boot record also contains the bootstrap loader, a program that loads the operating system.

The boot record is stored in a disk's boot sector.

boot sector

The boot sector stores the boot record. It is the first physical sector on a floppy disk, or the starting sector of a logical disk (a hard disk partition). The boot sector identifies the disk's architecture (sector size, cluster size, etc.). For bootable disks, it also contains a program that loads the operating system.

bootable disk

Any disk that contains the system files necessary to start your computer. While today's computers include a bootable hard disk that is normally used to start the machine, "bootable disk" usually refers to a floppy disk that can be used to start the machine if the hard disk has been damaged.

bootstrap loader

A small program included in the boot record of bootable disks that loads the operating system when the computer is started. The bootstrap loader is itself initially loaded into memory by a small program located in the system BIOS. The bootstrap loader in the master boot record of a hard disk with more than one partition indicates which partition contains the files used to start the operating system.

bulletin board system

burst extended data out dynamic random access memory (burst EDO DRAM)

DRAM that batches read or write cycles in bursts of four, which can give up to 100% better performance than EDO RAM. Burst EDO DRAM bus speeds range from 40MHz to 66MHz. Burst EDO DRAM was introduced in 1995.

bus

A system of electrical channels that connect different components of a computer, such as the CPU, input/output ports, and memory. Data is transferred from one component to another as electrical signals transmitted over a data bus. Data buses having more lines for data transfer are said to be "wider," and can accommodate more data at one time than "narrower" busses.

PCs also include a memory address bus (often called simply the "address bus that directs data to and from locations in the computer's memory. The size of the address bus limits the number of memory locations that can be accessed directly by the CPU.

button bar

A row of buttons immediately below an application's menu bar that lets you perform specific tasks, such as copying, moving, and deleting items, or displaying certain information.

byte

A sequence of eight bits. Usually a byte stores the data equivalent to a single character (letter, numeral, or other character). Systems or applications using the Unicode character set, however, require two bytes of data to represent a single character.

cache

A special memory subsystem within a computer that temporarily holds data or program instructions to improve overall computer performance. Most caches copy data from a standard computer memory (disk or RAM) to a type of memory that allows faster data access by the CPU. Some caches can hold data awaiting storage, freeing the CPU for other tasks, and writing that data only when the CPU is otherwise idle.

Disk caches are designed to compensate for the speed discrepancy between the very fast CPU and the much slower disk drives. Internal and external memory caches are designed to compensate for the speed discrepancy between the CPU and the slower RAM chips.

cache controller

A unit that controls the operation of a cache. The cache controllers for internal memory caches, external memory caches, and some disk caches use a combination of hardware circuitry and software. Other disk cache controllers (such as VCACHE, the Windows disk cache) use only software.

cache hit

When data requested by the CPU is available from a cache. Cache hits improve computer performance, because the CPU can access data quickly from a cache.

cache miss

When data requested by the CPU is unavailable from a cache, and must instead be retrieved from a disk or from RAM. Cache misses degrade computer performance from what it could otherwise be if the data were available from a cache.

CD-ROM

Acronym for compact disk read-only memory. Like magnetic disks, CD-ROMs are removable disks that store data. CD-ROMs, however, store data optically rather than magnetically, and are read using a laser beam. Once data has been recorded to a CD-ROM, it cannot be erased or rewritten. CD-ROMs are used primarily for distributing commercial software.

CD-ROMs consist of polished metallic disks with a clear plastic surface coating. Data is stored as minute pits and lands that affect how the laser beam is reflected from the disk surface. CD-ROMs can store more information than floppy disks, but it takes longer to read data from CD-ROMs. CD-ROM drives include photodetectors containing the optical and electrical components necessary to read the data.

CD-R

Stands for "compact disk-recordable." A device that uses laser technology to record data to a compact disk (CD). The data can then be read from the CD by any CD-ROM drive.

CD-ROM drive

A device that uses a laser beam, mirrors, and a photodetector to read data from CD-ROMs. Because CD-ROMs are a read-only data storage medium, the CD-ROM drive can read data from, but not write data to, a CD-ROM.

cascading menu

A menu that extends out from a menu item when that item is selected. Cascading menu items are identified by a right-pointing arrowhead following the menu item name.

central processing unit

CGA (color graphics adapter)

A type of video adapter board used in personal computers. In the evolution of PC video display standards, CGA was developed after the monochrome display adapter (MDA). CGA cards are capable of several video modes but have a limit of 4 colors for graphics and 16 colors for text.

chain

When parts of a single file are stored in non-contiguous clusters on a disk, the file allocation table (FAT) entries for each cluster (except the last) in the file point to the next sequential cluster storing the file's data. The file is said to be stored in a chain of clusters, and the FAT entries are said to form a FAT chain.

clock cycle

The smallest unit of time required for a computer to perform individual operations. For example, it takes one clock cycle for the CPU to transfer data between two of its registers. A clock cycle is also called a "CPU cycle" or a "clock tick."

cluster

The basic allocation unit of magnetic disks storage. Clusters (also known as allocation units) consist of one or more disk sectors. Because storage space is allocated based on clusters, even if a file (or part of a file) physically occupies only a portion of a cluster, that entire cluster will be allocated to the file, and will be considered used disk space. Since file sizes are only rarely exact multiples of the cluster size, the last cluster storing the file's data usually includes some empty space called "slack space" at the end. Clusters make it possible for the operating system to manage the files on a disk more effectively than it could if it had to work at the sector level.

comb

A hard disk drive component that holds several read/write heads, one for each platter surface (top and bottom). The entire comb assembly moves to position the heads for reading and writing data. The component resembles a hair comb because the vertically arranged heads all emanate from a single common support.

CMOS (complimentary metal oxide semiconductor)

A type of semiconductor designed to require very little power. Although CMOS-based memory is volatile, the stored information can be maintained by connecting the CMOS chip to a small power source, such as a battery.

PCs use CMOS memory chips to preserve basic data about system hardware. Information such as the number and types of disks, amount of RAM, and type of keyboard is stored in the PC's CMOS memory. This information appears on the computer's "setup screen" which can usually be displayed during startup. If the battery powering the CMOS memory fails, the information is lost, which can result in problems starting the computer.

color graphics adapter

combination box

A graphical interface component that combines the capabilities of a text box and a list box. It provides an entry field into which a user can type, like a text box, and a list of options from which to choose, like a list box.

command button

A rectangular button that carries out the action described by the text on the button. The two most common command buttons are OK (performs an action or acknowledges a warning or message) and Cancel (closes a dialog box without performing any action). Command buttons are sometimes referred to as "push buttons."

COMMAND.COM

For Windows 95, Windows 98 and Windows Me: The default command interpreter program for MS-DOS. It accepts commands typed from the keyboard and performs tasks such as loading other programs and directing the flow of information between programs and the CPU.

commit memory

Windows allocates memory for processes in two stages. In the first stage, a series of memory addresses is reserved for a process. The process may reserve more memory than it actually needs or uses at one time, just to maintain ownership of a contiguous block of addresses.

At any one time, the reserved memory addresses do not necessarily represent real space in either the physical memory (RAM) or on disk. In fact, a process can reserve more memory than is available on the system.

Before a memory address can be used by a process, the address must have a corresponding data storage location in actual memory (RAM or disk). Commit memory is memory that has been associated with a reserved address, and is therefore generally unavailable to other processes. Because it may be either in RAM or on disk (in the swap file), committed memory can exceed the RAM that is installed on the system.

complimentary metal-oxide semiconductor

compressed volume

Also called a "compressed volume file." The hidden file constituting a compressed disk. When a disk is compressed, its files are reduced in size and consolidated to a single compressed volume. The compressed volume is stored on the host drive.

compression

A technique of concentrating data such that the resulting data requires fewer bytes of computer storage. Compressed data can be stored in less physical space on a disk and transmitted more quickly between computers than the original, uncompressed data. Individual files or entire disks may be compressed by various types of utility software.

For Windows NT and Windows 2000: The NTFS file system includes its own built-in file compression utility. You can compress files, folders, or entire NTFS partitions.

CONFIG.SYS

For Windows 95 and Windows 98: A text file containing commands that configure a system's hardware and load device drivers automatically when the computer starts up. Many of the functions traditionally performed by this file have been built into current versions of Windows. The primary remaining purpose of the CONFIG.SYS file now is to load real-mode device drivers for which no virtual device driver counterparts are available.

Together with the AUTOEXEC.BAT file, CONFIG.SYS affects the environment used for all DOS VMs, and so for all MS-DOS applications run under Windows. Windows 9x processes the CONFIG.SYS file (if any) during system startup.

context menu

A menu that appears when you right-click an interface object, and that provides options and information specific to that object. The commands on the context menu vary, depending on the operations that can be performed on the currently selected object.

contiguous

Being physically adjacent to something; touching along one boundary.

Control menu

The menu that allows you to manipulate a window, dialog box, or icon. The Control menu is displayed when you click the Control-menu box or when you right-click on a minimized application's icon in the taskbar. Also called the "System menu."

conventional memory

For Windows 95, Windows 98 and Windows Me: The first 640K of RAM in a computer. The original IBM PC reserved conventional memory for the use of programs and the operating system; the remaining memory was reserved for system purposes. Any software that operates in real mode has access only to conventional memory and (with the aid of memory management software) upper memory.

cookie

The magnetically coated, flexible surface of a floppy disk that stores data. The cookie usually consists of a Mylar disk coated with iron oxide. For 3½ inch floppy disks the cookie is enclosed in a hard plastic shell. A 3½ floppy disk drive exposes the cookie for reading and writing by moving a spring-loaded shutter in the plastic case. For 5¼-inch floppy disks, the cookie is always exposed. The cookie of a floppy disk is analogous to the platters of a hard disk.

"Cookie" is also used to refer to a thin slice of silicon, also known as a "silicon wafer," used in the production of integrated circuits.

cooperative multitasking

A type of multitasking that relies on applications periodically surrendering ("yielding") the CPU back to the operating system. At that time, the operating system determines which other running application will be allowed access to the CPU next. Because an application maintains is allowed access to the CPU until that application yields, this multitasking technique requires that applications be designed carefully to prevent their monopolizing the CPU. Such monopolization would defeat the purpose of multitasking.

Windows uses preemptive multitasking for 32-bit applications and for MS-DOS applications running in a DOS VM. Windows uses cooperative multitasking for Windows 3.x applications in order to maintain compatibility with older Windows programs.

counter

For Windows NT and Windows 2000: Attributes of certain Windows NT object types that store variable values which can provide statistical information about an object. For example, the Memory object type includes a Cache Bytes counter that indicates the amount of memory currently reserved for the system's disk cache.

CPU (central processing unit)

The portion of a computer that performs computations, executes instructions and transfers information between all parts of the computer. Microcomputers such as PCs contain single-chip central processing units, called "microprocessors."

CPUID instruction

An assembly language instruction that provides information about the system CPU. The CPUID instruction causes the CPU to return information such as the CPU type, manufacturer, and special features that are present. Not all CPUs support this instruction.

cross-linked files

An error condition in which the FAT indicates that data from two different files occupies the same cluster on a disk. A cluster can contain data for only one file, so cross-linked files indicate an error in the disk's file structure. Norton Disk Doctor can determine the true owner of the data and correct this type of error.

cyclic redundancy check (CRC)

A method of ensuring data integrity, usually employed to check for errors when data is transmitted between computers. The computer originating the transmission calculates a single number based on the data being transmitted and appends that number to the end of the transmission. The receiving computer performs the same calculation on the data and compares the number it obtains with that appended to the data. If the numbers match, the transmission is considered successful; if the numbers do not match, the receiving computer requests that the data be retransmitted.

A CRC check is used in other situations where data integrity must be checked, as when compressed data is retrieved from storage devices.

cylinder

The set of corresponding tracks on a magnetic disk that lie the same distance from the disk's edge; taken together these tracks form a cylindrical shape. For a double-sided floppy disk, each cylinder consists of only two tracks, the corresponding tracks on the top and bottom of the floppy disk. For a hard disk, a cylinder usually includes several tracks, on each side of each disk platter.

daisy chain

default button

In a dialog box, the command button that is selected by default. It has a thicker border than the other command buttons. Pressing the Enter key while a dialog box is displayed is the same as clicking the default button.

defragment

To rearrange the way that files are organized on a disk such that the data comprising each file is stored to contiguous disk clusters. When files are fragmented, disk performance worsens.

descriptor

An area of RAM that stores information about a particular segment of memory. The enhanced capabilities of 286 and later CPUs running in protected mode derive largely from the use of descriptors. Descriptors are stored as entries in their own special area of RAM known as the "descriptor table." Selectors point to entries in the descriptor table.

device driver

A program that allows a computer to communicate with a device, such as a printer or modem.

Windows provides virtual device drivers which are protected mode drivers. These drivers can be loaded and unloaded dynamically as necessary. In earlier versions of Windows and in MS-DOS, device drivers needed to be loaded from the CONFIG.SYS file, and operated only in real mode.

dialog box

A special kind of window that either requests or provides information.

directory

directory tree

directory attribute

A file attribute identifying a directory entry that is a folder.

directory entry

The information stored in a disk's root directory or in a folder that describes a discrete entity (usually a file or folder) stored on the disk. The directory entry includes information such as the name, location, size, and special file attributes of the entity. Every file and folder has a corresponding directory entry on the disk. Files with long filenames may require more than one directory entry to accommodate the long name. Each logical disk may also include a directory entry to store the volume label for the disk.

direct-mapped caching

A caching technique whereby data from any location in RAM can be copied to only one corresponding location in the cache. An index to the memory addresses that are currently cached allows the CPU to locate and retrieve the cached data more quickly than if the data needed to be retrieved from RAM. The direct-mapped caching technique is most frequently used by external memory caches.

The information in any RAM memory location can be copied only to a single, specific location in this type of cache. Because there are far fewer memory locations in the cache than in the main RAM, several RAM locations must share the same potential cache location. Consequently, the chances that a particular piece of data is not available in the cache (because its only corresponding cache location is already occupied by data from another RAM location) are greater than when using a four-way set-associative cache, which allows data from any RAM location to be copied to one of four different cache locations.

disk cache

Type of cache that uses RAM to temporarily store data from a disk. Accessing data from a magnetic disk or CD-ROM is relatively slow as compared to accessing data in RAM. Disk caching software uses various methods to anticipate what data will be requested next from a disk, and pre-loads that data into RAM. When the data is needed it can be accessed much more quickly from the cache than it could be from the disk itself. Disk caches can provide anywhere from a two- to ten-fold increase in effective data access speed for a disk drive. Disk caches are implemented via software, and some include hardware controllers. Windows includes a software-only disk cache called VCACHE.

disk controller

Hardware component that acts as an electronic interpreter enabling the disk drives and CPU to communicate.

disk interleave

The physical arrangement of consecutively numbered sectors on a disk track. With some systems, performance can be improved by adjusting the disk interleave such that sequentially numbered sectors are not contiguous.

Data is usually written to sequentially numbered sectors of the disk. Older systems with slower CPUs may not be able to keep pace with the disk, so that by the time the CPU has processed data from one sector, the adjacent sector will have already passed the read/write head. If the adjacent sectors are numbered sequentially, the CPU must wait for another full rotation of the disk before reading the next data.

Adjusting the disk interleave so that the sectors are numbered non-sequentially can improve performance in these situations. Numbering contiguous disk sectors 1-4-7-2-5-8-3-6-9, for example, may improve performance by allowing the computer to read sectors 1, 2, and 3 during a single rotation of the disk. The net effect is to reduce disk latency.

Most newer computers have fast CPUs, advanced disk controllers, and high-speed hard disks that are already configured for optimum performance.

disk volume

display adapter

DLL (dynamic link library)

A Windows file containing executable code that can be shared by running applications. DLLs also enable applications to share other resources necessary to perform particular functions.

document window

A window that displays an application document, such as a spreadsheet or text file.

DOS memory

The first megabyte of computer memory, composed of conventional memory and upper memory.

DOS protected mode interface (DPMI)

A standard interface that enables MS-DOS applications to utilize the protected mode of 80286 and later CPUs. Using the DPMI standard, MS-DOS applications can use extended memory, rather than being confined to conventional memory only. DOS applications written to the DPMI specification can run under Windows; however, Windows makes some of the DPMI services unnecessary.

DOS virtual machine (DOS VM)

Type of virtual machine created by Windows for running MS-DOS applications, using the virtual mode of the Intel 80386 and later processors. Each MS-DOS application started under Windows runs in its own DOS virtual machine and is preemptively multitasked. Compare to System VM. DOS VMs are also known as "MS-DOS VMs."

drop-down combination box

A special type of combination box that "drops-down" its list of choices when you click its prompt button.

drop-down list box

A type of list box that "drops-down" its list of options when you click its prompt button. When an item is selected, the list closes back up.

dynamic random access memory (DRAM)

The type of semiconductor-based memory usually used for a computer's main RAM. DRAM chips incorporate capacitors that lose their charge over time, so they require the computer to continually rewrite or "refresh" the information they store. This is in contrast to SRAM chips which maintain their information without requiring refreshes. Both these types of RAM provide volatile data storage. DRAM chips are cheaper and store more information than SRAM chips, however accessing information in DRAM takes more time.

DRVSPACE.BIN

For Windows 95: MS-DOS driver used to support drives compressed using DriveSpace.

dynamic link library

email

Abbreviation for "electronic mail." Sending correspondence and information (including files) to another person who shares or has access to a common computer network.

EGA (enhanced graphics adapter)

A type of video adapter board used in personal computers. In the evolution of PC video display standards, EGA was developed after CGA . EGA cards are capable of several video modes but have a limit of 16 colors for graphics and text.

EISA (extended ISA)

Pronounced "ee-sa." A style of computer bus based on the ISA bus. It uses a 32-bit data path and has advanced features that are not available on ISA buses. ISA expansion cards can be plugged in to EISA bus connectors, but will not provide the advanced features of the EISA bus.

electronic mail

enhanced graphics adapter

environment variable

Environment variables store various global settings used by the operating system and other applications. These settings can be changed; environment variables store the current settings. Typical environment variables used by DOS include PROMPT (specifies how the DOS prompt will look), TEMP (specifies the folder to use for temporary program file storage), and PATH (specifies a list of folders through which the operating system will search to find an executable program that is entered on the command line).

To see your currently-defined environment variable settings, open a DOS window, and type SET at the command prompt.

electrically erasable programmable ROM (EEPROM)

A type of EPROM that can be erased and reprogrammed without removing it from the computer. EEPROMs provide nonvolatile memory. Computers that include EEPROM chips have special hardware to erase and rewrite the EEPROMs. Changing the information stored in this type of memory is slower than updating DRAM chips, so it is not suitable for use as a computer's main RAM.

enhanced IDE (EIDE)

A disk controller interface for connecting mass storage devices (such as large-capacity hard disk drives, CD-ROM drives, and tape drives) to a computer. EIDE is an improvement of the IDE interface.

enhanced RLL (ERLL)

A modified version of the run-length limited (RLL) method of encoding data on the surface of a magnetic disk. ERLL allows denser storage of data on the disk as well as faster transfer rates as compared to RLL. ERLL is used by some ESDI and SCSI disks.

enhanced system device interface (ESDI)

A disk controller interface that requires specialized hardware circuitry. A replacement for the ST-506/412 interface, ESDI has, in turn, been replaced by newer interfaces, primarily IDE, EIDE, and SCSI.

EPROM (erasable programmable read-only memory)

Pronounced "ee-prom." A type of PROM chip that can be reprogrammed after exposure to high intensity ultraviolet light erases its previous programming. EPROMs provide nonvolatile memory storage, however the chips themselves need to be physically removed from the computer in order to have their stored information erased before the information can be changed.

erasable programmable read-only memory

expanded memory

Technique developed to overcome the 640K memory barrier imposed on MS-DOS applications running in real mode. The standard interface defined for accessing expanded memory is called the Expanded Memory Specification (EMS). The EMS uses an area in the computer's upper memory to temporarily map memory locations beyond one megabyte. Making these memory locations appear to be within the first megabyte makes them accessible to these applications. Use of expanded memory requires special software called an expanded memory manager (EMM).

Computers using the 386 and later CPUs can use their extended memory to simulate expanded memory by using special expanded memory manager software such as EMM386.EXE.

expansion board

A circuit board (or "card" that plugs into a slot inside a computer to expand the computer's capabilities, for example, to support joysticks, sound, multimedia devices, or network connections. An expansion board is also known as an "adapter" or "adapter card."

extended data out random access memory (EDO RAM)

A newer, faster kind of DRAM, which holds the most recently requested data in a cache after it's released. EDO RAM can increase performance by up to 20%. Generally used with Intel's Triton chipset and Pentium processors, EDO RAM was introduced in 1995. EDO RAM bus speeds range up to 33MHz.

extended memory

All the RAM within a computer above the first megabyte. Extended memory is normally accessible only when a computer is operating in either protected mode or virtual mode.

The Extended Memory Specification (abbreviated as XMS) was developed by Lotus, Intel, Microsoft, and AST Research to define a standard software interface that allows real mode applications to use extended memory. Utilization of the XMS requires special software called an expanded memory manager (EMM).

See also conventional memory, upper memory, expanded memory.

external memory cache

A cache that serves as an intermediary between the very fast CPU and the slower DRAM chips of the computer's main RAM. External memory caches include fast SRAM chips, hardware circuitry, and controlling software. Because these caches are external to the CPU, they are slower than internal memory caches. Both external and internal memory caches store data that the CPU is most likely to request from RAM. These caches can supply data to the CPU more quickly than RAM can, thereby improving computer performance. An external memory cache is also called a "secondary," "level-two," or "L2" cache.

extended industry standard architecture

file allocation error

A mismatch between the file size as indicated by the file's directory entry and the file size as indicated by the number of clusters associated with the file in the FAT.

file allocation table (FAT)

In the FAT file system, the file allocation table is a table in the system area of the disk that identifies each cluster as free (available), belonging to a file, or bad (defective). Disks formatted for the FAT file system contain two copies of the file allocation table, in case one should become corrupted. The FAT structure is central to the way MS-DOS and Windows provide file input and output services. See also VFAT.

FAT32

FAT32 is a new, more robust, more flexible file system from Microsoft that supports very large hard drives and uses disk space more efficiently (especially on large disks).

The FAT file system was originally created to store data on floppy disks (FAT12), and was later changed to allow it to handle data on fixed disks such as hard disks (FAT16). However, the FAT16 file system cannot support today's extremely large hard disks (anything over 2 gigabytes in size) so FAT32 was created to support these larger hard drives (up to 2 terabytes) and to provide more efficient use of disk space.

On a FAT16 drive, space is allocated in clusters. That means that even if a file is smaller than a cluster, it still takes up a whole cluster, wasting any leftover space in the cluster. Or, suppose a file is large enough to fill 3-1/2 clusters —it will still be allocated four entire clusters. Since FAT32 drives use a smaller cluster size, typically FAT32 drives have less wasted space on the drive.

In addition, FAT32 systems can relocate the root directory and use the backup copy of the FAT instead of the default copy. Also, the boot record on FAT32 drives now backs up critical data, meaning that FAT32 drives are less likely to fail. Since the root directory on a FAT32 drive is just a cluster chain (instead of being a physical area on the disk), there are no limits to how large it can be or where it can be located on the drive.

FAT file system

File system originally designed for floppy disks and adopted by the MS-DOS operating system. The FAT file system is so named because it uses a file allocation table (FAT) to record the allocation status of every allocation unit cluster on the disk. The FAT file system does not support large disks or large files as efficiently as the newer NT file system (NTFS).

Windows NT and Windows 2000 can format hard disks for either the FAT file system NTFS; floppy disks can only be formatted for the FAT file system.

FAT

file attribute

File attributes describe certain characteristics of the data represented by a directory entry and determine how the operating system handles that data. Each file attribute is represented by a single bit of data stored with the directory entry. Since a bit can have only two states, on or off, the file attribute can indicate only whether the directory entry possesses the attribute or not. There are six available file attributes:

- archive
- directory
- hidden
- read-only
- system
- volume label

file server

A central disk storage device (or devices) connected to a network that provides network users access to shared applications and data files. See also local area network.

file extension

The optional suffix that follows the last period in a filename. Usually the file extension indicates the general file type, for example "TXT" might be used as the extension for a plain text file, and "DOC" might be used as the extension for a word processor document file. Under MS-DOS, the file extension was limited to 3 or fewer characters. Under current versions of Windows, the file extension can be up to 254 characters long, though most applications still append their own 3 character file extensions to maintain compatibility with older programs.

firmware

Software stored in nonvolatile memory. A computer's ROM BIOS is the most common example of firmware. Some portable computers and calculators allow users to add programs by plugging in ROM chips that store the software.

flash memory

A nonvolatile type of semiconductor memory developed by Intel. Like EEPROMs, flash memory is electronically erasable, so it can be reprogrammed without removing it from the computer. Because this type of memory must be erased in blocks, and cannot be altered one byte at a time, it is not suitable as a replacement for a computer's main RAM, however flash memory is often used in PC cards as a memory supplement for portable computers.

One example of the use of flash memory is for system BIOS. This type of BIOS flash BIOS can be updated via software, whereas older, ROM BIOS chips would have to be physically replaced in order to update the computer's BIOS.

floppy disk

One of several types of magnetic media used for storing data. Because the magnetic media is bonded to thin, flat disks of Mylar, floppy disks are flexible. This is in contrast to hard disks, which consist of a rigid material with a magnetic coating. The most popular floppy disk formats in use today are 3½ and 5¼-inch in diameter. Floppy disks are also known as "flexible disks" or "diskettes."

folder

On the disk, a folder consists of a list of directory entries describing files or other folders. Because folders may also contain other folders, they allow for a hierarchical organization of data. The master container of a disk is called the root directory and ultimately contains all the folders and files on the disk. Folders are represented in Windows and other graphical interfaces as icons resembling file folders.

folder tree

The organization of folders on a disk with respect to the disk's root directory. The root directory may contain files and folders. Each folder itself may contain files or other folders. This organizational structure forms a hierarchy of folders that is called the folder tree. Prior to Windows 95, the folder tree was called the "directory tree."

foreground

An application running in the foreground runs in the active window. This window is usually on top of other windows and has its title bar highlighted. By default, an application running in the foreground is the primary task of the computer and receives a higher proportion of the CPU's processing time than other running applications. The other running applications, which are considered to be running in the background, receive attention from the CPU mostly during lulls in the foreground task processing.

Under Windows NT, you can change the relative processing attention given to foreground and background tasks by clicking System in the Windows NT Control Panel and adjusting the Application Performance slider control on the Performance tab.

format

To prepare a magnetic disk (or other long-term data storage medium) for use. Formatting a disk involves creating the low-level formatting, disk partitions (for hard disks only), and high-level formatting.

four-way set-associative caching

A caching technique whereby data from any particular location in RAM can be copied to any of four locations in the cache. The cache is divided into four separate areas or "sets," each of which functions as an independent, direct-mapped cache.

Compared to direct-mapped caches, the four-way set-associative technique increases the chances that required data is available from the cache, while slightly slowing the movement of data into and out of the cache. Four-way set-associative caches are usually used for internal memory caches, where the slight delay in data movement is generally insignificant.

fragment

When the data that makes up a file is stored to non-contiguous locations across a disk, the file is said to be fragmented; each file fragment is a non-contiguous cluster containing a portion of the file. Fragmentation occurs during the normal processes of creating, modifying, copying, moving, and deleting files. Fragmented information takes longer to read from the disk than unfragmented information because it requires more movement from the disk drive's read/write head. Fragmentation can also impede recovery of deleted files. See also defragment.

gap

The minute space between a data storage area of a disk sector and the sector header. When writing data, the gap gives the read/write head time to switch from reading the sector header to writing in the data area. When reading data, the read/write head simply skips over the gap. See also inter-sector gap.

GDI (Graphics Device Interface)

For Windows 95, Windows 98 and Windows Me: Interface that supports Windows' graphical capabilities, including fonts, drawing primitives, and color management. Windows includes three main subsystems: the kernel, graphics device interface, and User resources.

GDI resources

For Windows 95 and Windows 98: Resources allocated to the Windows' graphics device interface (GDI). The GDI supports Windows' graphical capabilities, including fonts, drawing primitives, and color management. The Windows subsystem is made up of the kernel, GDI, and User components.

graphics card

An expansion card that supports graphical capabilities in a display device (such as a monitor). Graphics cards are also called "display adapters" or "video cards."

graphics device interface

graphics workstation

group box

Graphical element of dialog boxes that groups related components. A group box consists of a border and usually a title. Group boxes frequently contain check boxes and/or option buttons.

hard disk/hard drive

One of several types of magnetic media used for storing data. Unlike floppy disks, hard disks are non-flexible and non-removable. They hold much more data than floppy disks, and are the principle long-term data storage for most personal computers. Non-removable hard disks are also known as "fixed disks."

hidden attribute

A file attribute identifying a directory entry that is, by default, not included in listings. Hidden files and folders do not normally appear in Windows or in response to the DIR command at the DOS prompt. Optionally, you can instruct Windows to display hidden files and folders.

Directory entries that represent long filenames have their volume label, hidden, read-only, and system attributes set. This combination of file attributes is unique to long filenames.

high-level formatting

The process of preparing a logical disk for use by adding the data structures that the operating system uses to access the disk. This part of disk preparation creates the framework for the file organization on the disk. High-level formatting creates the boot record, FAT, and root directory. High-level formatting is also known as "logical" or "soft" formatting.

High-level formatting is one step in preparing a magnetic disk for use. It follows the physical formatting and disk partitioning (for hard disks).

high memory area (HMA)

The first 64K of extended memory. Using special memory management software, the high memory area can be used as conventional memory by some applications. MS-DOS versions 5.0 and higher support high memory by providing their own memory management software called HIMEM.SYS. These versions of DOS can place a portion of the operating system itself in the high memory area, freeing some conventional memory for use by other programs.

host drive

The host drive of a compressed disk is the uncompressed physical drive that holds it. The compressed disk is stored as a special hidden file (called a "compressed volume on the host drive. The host drive may contain other, non-compressed files as well as the compressed volume file.

When a disk is compressed, its host drive is assigned a separate drive letter. You can elect to have the host drive hidden from view when you create a compressed drive using DriveSpace. If hidden, the host drive will not appear in My Computer, Windows Explorer, and Open and Save As dialog boxes. The compressed disk will appear regardless of whether the host is hidden.

image

The Norton Utilities Image program creates a "snapshot" of a disk's critical file information (boot record, file allocation tables, and root information) and saves it to a special file called the disk's image. Other Norton Utilities programs can use this disk image to:

- Recover deleted files or directories
- Restore files and directories that are lost if you accidentally format or seriously damage a disk

Creating a disk image is called "imaging" the disk.

INI files

Any file whose name ends in a file extension of INI. INI files were used by many Windows 3.x applications (and by Windows 3.x itself) to store user preferences and other information used in program initialization. In Windows, the Windows Registry stores most of this information, and INI files are used mainly by older applications.

instance

For Windows NT and Windows 2000: When more than one example of a specific object type exists at one time, the object type is said to have multiple instances. For example, to allow more than one thread to run concurrently under Windows NT, the object manager creates and manages multiple thread objects. Each thread object is an independent instance of the thread object type.

INT 13h

A common BIOS interrupt that handles most sector level disk read and write operations to floppy and hard disks.

integrated drive electronics (IDE)

A disk controller interface that incorporates controller electronics with the drive hardware. The EIDE interface is a more recent improvement of the IDE interface.

IDE incorporates the operations formerly placed on the controller card directly into the drive. As a result, an IDE drive can use an IDE connector on the motherboard without requiring a bus slot. A computer needs an IDE adapter card only if the motherboard does not have a built-in connector. The IDE adapter card provides the physical connection through a bus slot and may also provide additional controller functionality. An IDE drive can access a maximum of only 528 MB of data. A newer interface standard, Enhanced IDE (EIDE), increases the capacity to 8.4 GB.

IDE drives larger than 504 MB may require special software, such as Ontrack's Disk Manager or Micro House's EZ-Drive, because many computers do not have a BIOS or controller that supports these large IDE drives.

inter-sector gap

A space between disk sectors. When writing data, this gap gives the read/write head time to switch from writing data to reading the next sector header. When reading data, the read/write head simply skips over the inter-sector gap. See also gap.

internal memory cache

A memory cache that is integrated within 486 and later model CPUs. Internal memory caches store data that the CPU is most likely to request from RAM. Internal caches can supply data to the CPU much more quickly than either RAM or external caches can, so an internal cache can improve computer performance significantly. An internal memory cache is also called a "primary," "level-one," or "L1" cache.

interrupt

A signal sent by a hardware device or by software that causes the CPU to stop what it is doing and execute special instructions determined by the signal.

IO.SYS

For Windows 95, Windows 98 and Windows Me: A system file that contains device drivers for the MS-DOS operating system. See also MSDOS.SYS.

IRQ (interrupt request line)

Hardware line over which devices such as input/output ports, the keyboard, and disk drives send requests for service (interrupts) to the CPU .

interrupt request line

ISA (Industry Standard Architecture)

Pronounced "eye-sa." A style of computer bus design that allows various devices to be added by plugging in an 8-bit or 16-bit card into an expansion slot. See also EISA.

industry standard architecture

key

land

A flat area between the light-dispersing pits on the reflective surface of a compact disk. CD-ROM drives focus a laser beam on a spinning CD-ROM, and measure the light reflected from the surface. Lands reflect the light back to the drive's photodetector, and are interpreted as bits with values of one; pits disperse the light and are interpreted as bits with values of zero.

latency

Like seek time, latency is a measurement of the read/write performance of a disk drive. Latency is the time it takes for a particular sector to pass under the read/write head of a disk after the head is positioned over the appropriate disk track. The maximum latency for a magnetic disk is the time it takes for a complete rotation of a disk; the average latency of a magnetic disk is half the time of a complete rotation, assuming the sectors are requested at random.

For a CD-ROM, the latency is the time it takes for a particular sector to pass under the laser beam after the photodetector is positioned an appropriate distance from the edge of the disk.

least-recently used (LRU)

A technique used to govern how stored information is discarded, for example, the information stored in a cache or the swap file. When no more storage space is available, the LRU technique dictates that the information that has not been used for the longest period of time be discarded and replaced with the most recently accessed program instructions or data.

linear memory addressing

A way of referencing computer memory locations such that each byte of physical memory is represented by a unique address value, and where the address values form a simple linear sequence. Linear addressing is more straightforward than segmented memory addressing; consequently it is easier to develop software for systems using linear memory addressing. Windows uses linear memory addressing when in protected mode.

list box

A graphical interface component that displays a list of options from which to choose. Unlike a drop-down list box, the items within a list box are always displayed. If the options extend beyond the visible portions of the list, scroll bars appear alongside the list and can be used to move the options up and down or side to side relative to the visible list window.

local area network (LAN)

A group of computers and other devices dispersed over a relatively limited area, and connected to one another over a communications link. Any device on the LAN can interact with any other connected device.

LANs usually include one computer known as the file server (or just "the server that is specialized to store commonly needed programs and data and respond quickly to requests from network users for this information.

LAN

logical disk

logical disk organization

How the operating system organizes the data stored on a disk. Because the data can be anywhere on the surface of the disk, the operating system must construct a bookkeeping system that allows it to keep track of where the data is. The operating system constructs directories and indexes describing what's occupied, what's free, and what parts should never be used due to physical damage. This type of disk information is called the logical format. The file allocation table used to organize the FAT file system and the master file table used to organize the NTFS file system are part of the logical disk organization. Compare to physical disk organization.

long filename (LFN)

MS-DOS (and Windows 3.x) imposed an "eight dot three" limit on file names, allowing, at most, an eight character filename plus a three character file extension separated by a period. Long filenames are a feature of Windows that allows filenames to be up to 255 characters long. In addition to allowing longer filenames, current versions of Windows support using characters that were previously illegal in filenames (plus sign, comma, semicolon, equals sign, and left and right square brackets) and long filenames reflect uppercase and lowercase letters. Long filenames use the Unicode character set.

'eight dot three' filename

lost cluster

An entry in the FAT indicating a cluster that contains current data but is is not being used by a file or folder.

low-level formatting

The process of preparing the surface of a magnetic disk or other long-term magnetic storage medium so that it can store data. Low-level formatting defines the tracks, sectors, and any other parameters necessary to delineate the data storage area of the disk. Low-level formatting is also known as "physical" or "hard" formatting.

Low-level formatting is the first step in preparing a disk for use. Most new hard disks available today are already low-level formatted when purchased. Low level formatting is followed by disk partitioning (for hard disks) and high-level formatting. Low-level formatting for floppy disks usually occurs in conjunction with high-level formatting.

magnetic disk

A disk that uses magnetic fields to store data. The most common types of magnetic disks are hard disks and floppy disks. Although there are other types of disks used for data storage, such as CD-ROMs, magnetic disks are the type most frequently referred to simply as "disks."

mail application programming interface

MAPI (mail application programming interface)

An API that supports email. It was developed by Microsoft, and implemented as a DLL.

Applications that recognize the presence of the MAPI DLL on your system allow you to send mail directly from them.

master boot record

The information contained in the first sector of a hard disk. The master boot record includes the disk's partition table and identifies the disk's active partition (the partition used to load the operating system). The master boot record is created during disk partitioning.

master file table (MFT)

For Windows NT and Windows 2000: Table used to organize the file storage on a disk formatted for the NT File System (NTFS). The MFT comprises a relational database of information about the files. The rows of the table corresond to individual files on the disk, and the columns correspond to attributes of the files. Directories are treated as files in this scheme, having a different set of attributes from a data file.

math coprocessor

A processor (distinct from the main CPU) that performs mathematical calculations using floating-point numbers. For personal computer systems using CPUs prior to Intel's i486DX or Motorola's 68040, adding a math coprocessor can dramatically increase the speeds of math and graphics functions. The i486DX, 68040, and subsequent CPU models incorporate the math coprocessor functions in the main CPU.

maximize

To enlarge a window to its maximum size. You can maximize a window by clicking the maximize button. (When the window is already maximized, there is no Maximize button; in its place is the Restore button.)

You can maximize a minimized window by right-clicking on its icon in the taskbar, and clicking Maximize on its Control menu.

MCI (media control interface)

A high-level interface enabling Windows applications to control multimedia devices, including playback and recording of audio and video.

media control interface

media descriptor byte

The byte of information within a disk's boot record that indicates the type of the disk. The media descriptor byte distinguishes between a hard disk and the various types of floppy disks, so might indicate, for example, that the disk is a 3½ inch floppy disk with a capacity of 1.44 megabytes. A media descriptor is also stored as the first byte of the FAT.

memory

Computer hardware that stores data and provides for the retrieval of that stored data. Generally, the term memory refers to random access memory (RAM), which is used to run applications and temporarily store data during program execution.

memory address

The unique identifier of a specific location within a computer's memory. The CPU performs memory read and write operations by specifying memory addresses.

memory map

A depiction of the way a computer's memory is organized. For example, the memory map for the megabyte of memory provided by the 8086 processor specifies that programs can access the first 640K of memory addresses and that the remaining memory is reserved for system use.

memory-resident program

menu

A list of options. Clicking an option in a menu performs an action.

menu bar

A graphical interface component that consists of a rectangular bar usually across the top of a window. The menu bar displays a horizontal list of menus from which the user may choose one to see its associated options.

message

The primary means by which applications, and the windows they create, communicate. Every time a button is clicked, for example, a message is sent to the application indicating that the button was clicked.

MIDI (musical instrument digital interface)

Pronounced "middy." A software and hardware standard that allows computers, music synthesizers, and musical instruments to exchange information.

musical instrument digital interface

minimize

To shrink a window to an icon in the taskbar. Applications are frequently minimized to cause a program to run in the background while you work on something else. You can minimize a window by clicking its Minimize button in the window's title bar. To restore a minimized application, click its button in the taskbar.

modified frequency modulation (MFM)

A largely outdated method of encoding data on the magnetic surface of a disk. Data bits are represented by changes in the frequency of an electrical signal generated in the disk's read/write head. MFM can store data twice as densely as its predecessor, frequency modulation (FM) encoding, but is not nearly as efficient as the more recent run-length limited (RLL), advanced RLL (ARLL), and enhanced RLL methods.

motherboard

The large, main circuit board inside a computer that attaches to all the other computer components (the CPU, memory chips, expansion boards, and so forth).

mount

To make a physical disk, volume, or tape drive accessible to a computer's file system.

MPC Level 2 (MPC2) specification

Specification defined by the Multimedia PC Working Group of the Software Publishers Association to describe a standard multimedia capability for personal computers.

Systems conforming to the MPC2 standard include:

- 25 MHz 486SX or higher microprocessor
- 4 megabytes of RAM (8 megabytes recommended)
- Video display resolution capable of VGA (640x480) resolution with 64K or more colors
- Doublespeed (2X) CD-ROM Drive, multi-session and Photo CD-ready, with an average seek time of 400 milliseconds or less
- 16-bit sound capable

MS-DOS

Acronym for Microsoft Disk Operating System. This is the operating system most commonly used on IBM and IBM-compatible PCs. MS-DOS was the operating system licensed by IBM for use with its first PCs, and has been the dominant PC operating system ever since. (IBM renamed the licensed version PC-DOS.) Natively, MS-DOS operates only in real mode, however DOS programs that conform to the DPMI specification can run in the protected mode of 80286 and later CPUs.

MSDOS.SYS

For Windows 95, Windows 98 and Windows Me: A system file that contains the kernel of the MS-DOS operating system. See also IO.SYS. On DOS and early versions of Windows this file was an active component of the operating system. On newer versions of Windows it is a configuration file.

multitasking

Sharing a CPU so that more than one program can run concurrently on a computer. Multitasking can give the appearance that multiple processes are occurring simultaneously. In fact, only computers with multiple CPUs and a supporting operating system (such as Windows NT, Windows 2000, UNIX, or OS/2) can run more than one program truly simultaneously. Single-CPU systems can simulate multiple processing through various multitasking techniques, two of which are preemptive and cooperative multitasking.

Windows uses preemptive multitasking for 32-bit applications and for MS-DOS applications running in DOS VMs. It uses cooperative multitasking for Windows 3.x (16-bit) applications to maintain compatibility with older Windows programs.

network

A group of computers and associated hardware that are connected together by communication lines or other means for the purpose of sharing information and hardware between users.

network interface card

network server

A computer that allows other computers on a network to access its files, and can provide them with centralized and shared services, including programs, storage, and communications.

NIC (network interface card)

A circuit board used to connect a computer to a local area network.

non-maskable interrupt (NMI)

Interrupt used to deal with catastrophic events immediately. It is tied directly to a special NMI pin on the CPU.

nonvolatile memory

Type of computer memory that does not require power to maintain its data. ROM, EPROM, EEPROM, and flash memory all provide nonvolatile memory.

NMI

NT file system (NTFS)

File system developed for the Windows NT operating system. NTFS supports large disks and files more efficiently than the FAT file system. NTFS adds many features that make it suitable for even high-end corporate file systems:

- Built-in data security
- Redundant data storage capabilities providing fault tolerance and data recoverability
- Data compression
- More efficient data storage and retrieval for large disks and files

object

A standard Windows NT and Windows 2000 data type representing a shareable system resource, such as a process, thread, file, section of memory, or physical device. Each type of resource is described by an object type. When the operating system needs to create an object to represent the resource, it creates an instance of the appropriate object type. Objects are created, named, and managed by Windows object manager component.

operating system

The "master control software" of a computer that allows the computer itself to operate. It is the first program to load into memory when the computer is started, and remains in memory as long as the computer is running. The operating system controls the computer's use and allocation of system resources such as processing time, memory, disk space, and peripheral devices such as printers and the monitor display. All applications must interact with the operating system to gain access to system resources, and all applications are limited by the operating system for which they are designed.

original equipment manufacturer (OEM)

Any company that manufactures hardware. The hardware subsequently may be modified, repackaged, and marketed by another company (called the value-added reseller or VAR).

paging file

paging

For Windows NT and Windows 2000: Windows allows every process 4 gigabytes of virtual address space (memory addresses that the process and its threads may use), however most computers have substantially less than 4 gigabytes of physical memory (RAM). When the available RAM is full, Windows makes more available by temporarily moving some data from RAM to disk. This data is said to be stored in virtual memory.

When a process or thread tries to access information that has been moved to disk, Windows moves the required data from the disk back into RAM. Because the data is moved between RAM and disk in chunks called "pages," this process is called "paging," and the special disk file used to temporarily hold the data is called a "paging file."

palette

The set of colors available for painting to the display.

park

To move the read/write heads of a hard disk drive to a safe location prior to system shutdown. Older hard disks required that the heads be explicitly parked using a special program. Contemporary hard disks park themselves automatically during system shutdown, and require no special head-parking software.

partition

A portion of hard disk that the operating system treats as a single unit. Disk partitions are usually identified by separate drive letters, and can be formatted for different file and operating systems.

Some operating systems, such as Windows NT and Windows 2000, can treat multiple partitions on different physical disk drives as a single disk volume (identified by a single drive letter). This can speed file access or increase the system's fault tolerance.

Every bootable hard disk includes one disk partition for any operating system it stores that may be used to start the computer. To allow the operating system to treat a single hard disk as multiple logical disks, the hard disk may have an "extended partition" that can be subdivided into a maximum of 23 additional logical disks.

The FDISK program (Disk Management in Windows NT and Windows 2000) prepares a hard disk for use by creating partitions and logical disks. Partitioning creates a master boot record and partition table for the hard disk. Floppy disks do not require partitioning.

When preparing a hard disk for use, partitioning follows the physical formatting, and precedes the high-level formatting.

partition table

Information contained within a physical disk's master boot record that defines one or more partitions to represent the physical disk to the operating system.

path

The location of a particular file or folder within the disk's folder tree. The full path of a file or folder starts from the root directory and names, in order, each folder from the root directory to the file, ending in the filename.

PATH is also the name of an operating system environment variable that lists a set of folders through which the operating system will search to find a required file that is not in the current folder. The order of folders in the PATH variable reflects the order in which the operating system will search.

PC card

A computer peripheral device, such as a modem, hard disk, or data storage device that is designed to fit a PC card slot, usually employed in portable computers. PC card devices have about the same length and width as a credit card, with various standard thicknesses. The PC Card interface standard was defined by the Personal Computer Memory Card International Association (PCMCIA), and PC cards were previously known as PCMCIA devices.

photodetector

The part of a CD-ROM drive that focuses a laser beam onto a CD-ROM surface, and converts the light that is reflected back into an electrical signal that can be interpreted by the computer. The photodetector contains a laser diode to produce the laser beam, mirrors and lenses to direct and focus the light, and the photodiode that converts the reflected light into electric signals.

pipeline

A synchronous or asynchronous sequence of stages that performs a processing task in an assembly-line fashion. Each stage takes input and creates output that is stored in an output buffer that is also the input buffer of the next stage, allowing all of the stages to work at the same time. This allows greater throughput than if each input had to pass through the whole sequence before the next input could enter. The drawbacks are greater latency and complexity, because the stages must be synchronized in such a way that various inputs are not interfering with each other.

A pipeline works at maximum efficiency only if it is filled and emptied at the same rate at which it can process. Many of today's CPUs are arranged as one or more pipelines.

pit

A microscopic hole created on the reflective surface of a CD-ROM when data is written to it. CD-ROM drives focus a laser beam on a spinning CD-ROM, and measure the light reflected from the surface. Pits disperse the light, and are interpreted as bits with values of zero; lands reflect the light back to the drive's photodetector, and are interpreted as bits with values of one.

platter

A rigid disk that serves as an individual component of a hard disk. Hard disks usually consist of several stacked platters. The platters are coated with magnetic media, allowing them to store data as localized changes in magnetic polarity.

Play (PnP)

An industry standard that allows computer peripherals to be automatically configured by an operating system. Plug and Play eliminates the need for manually changing jumpers and other hardware settings when installing hardware, and for restarting a computer after making a hardware change (for example, after inserting a PC Card or plugging a portable computer into a docking station). Plug-and-Play works best with a BIOS that can communicate up-to-date configuration information, and an operating system that supports Plug-and-Play hardware by dynamically maintaining system-wide configuration settings.

Windows 95, Windows 98, and Windows Me have built-in Plug-and-Play support. Windows stores current configuration information in the Registry, which gets updated whenever a configuration change occurs. Applications that support Plug-and-Play are notified by Windows whenever there is a change in the system configuration.

physical

In the context of disk structures, refers to what physically exists on the disk. Or may refer to an entire disk that is one physical unit. Compare to logical disk organization.

port

The portion of a computer or a hardware device through which data passes to get in to or out of the computer or device. Computers connect to devices such as printers, monitors, and modems through ports.

preemptive multitasking

A type of multitasking in which the operating system allocates the CPU's processing time to the various processes that are running on a computer. Preemptive multitasking does not rely on the threads themselves yielding the CPU, so prevents any one application from monopolizing the system. This is in contrast to cooperative multitasking.

Windows allocates CPU time in units called "time slices." It allocates time slices to threads based on the threads' relative priority; the priority depends on a number of factors. Threads are continually reprioritized by the operating system.

Windows uses preemptive multitasking for 32-bit applications and for MS-DOS applications running in a DOS VM. It uses cooperative multitasking for Windows 3.x (16-bit) applications in order to maintain compatibility with older Windows programs.

primary mouse button

The mouse button that is most often used to select options in a graphical interface.

In the standard, right-handed mouse button configuration, the primary mouse button is the left button. The mouse button configuration can be changed from the Windows Control Panel to better suit left-handed users. See also secondary mouse button.

primary window

The principal window in an application. "Primary" refers to the window's function in the application, and does not necessarily imply that it is the first or only window.

process

A program or a series of steps undertaken by a program to accomplish a specific task.

A process is the basic unit of resource allocation for a program. A process includes a program itself (the steps and data required to perform a task), the memory address space that the program can use to perform its task, and other system resources that the program requires. The operating system organizes tasks and allocates resources based on the processes that exist.

Every process includes at least one thread of execution, and to make the most efficient use of the system resources, most 32-bit processes include multiple threads that can be created and destroyed dynamically as the process runs.

programmable read-only memory

PROM (programmable read-only memory)

A type of ROM that can be programmed using special hardware. These chips are programmed separately from the chip manufacturing process. Once programmed, PROM chips cannot be reprogrammed, unlike EPROMs, EEPROMs, and flash memory.

prompt button

The small icon with a down-pointing arrow that appears to the right of a drop-down list box or drop-down combination box. When clicked, a list of choices in alphabetical or historical order appears to "drop down."

property sheet

A dialog box which allows you to configure an object's properties or options.

protected mode

An operating mode of Intel 286, 386, and later CPUs that provides support for multitasking and the use of memory beyond 1 MB.

When a CPU running in protected mode runs multiple programs simultaneously, each is protected from interfering with or being affected by the others. Under Windows, 32-bit applications each run in their own, private address spaces, whereas 16-bit applications share a single address space (as they do under Windows 3.x). MS-DOS applications each run in a DOS VM.

On a 286 CPU, protected mode provides access to 16 MB of addressable memory. On a 386, protected mode provides access to 4 GB of addressable memory. A CPU must also be running in protected mode to make use of virtual memory.

push button

RAM (random access memory)

The main, semiconductor-based memory that can be read from and written to by the microprocessor and other hardware devices. RAM comprises the computer's working memory and determines the size and number of programs that can be run at the same time, as well as the amount of data than can be processed instantly.

Unlike data stored on magnetic media (like hard disks) or PROMs, data in RAM memory is "volatile," meaning that the data stored in RAM is lost when the computer's power is turned off.

The memory is considered "random access" because the memory locations can be accessed directly rather than requiring sequential access. The CPU must load application programs and the data they need into RAM before they can perform any processing. RAM is often supplemented by virtual memory which increases the number of applications that can be run simultaneously.

For most PCs, the main RAM is provided by DRAM chips. PCs usually include an internal memory cache, located on the CPU itself, and an external memory cache, that uses SRAM chips, to speed memory access.

random access memory

read-only memory

read-ahead caching

A caching technique commonly used by disk caches to speed retrieval of information stored on disk. Using this technique, the controller attempts to predict the next data the CPU will request from the disk, and transfers that data into RAM in advance (usually while the CPU is otherwise idle). Cache hits result in better system performance, since retrieving data from RAM is much faster than reading it from disk. The Windows disk cache, called VCACHE, uses read-ahead caching.

read-only attribute

A file attribute that identifies a file that cannot be overwritten, deleted, or moved.

Directory entries that represent long filenames have their volume label, hidden, read-only, and system attributes set. This combination of attributes is unique to long filenames.

read/write head

A component of a magnetic disk that reads data from and writes data to the disk surface. Most of the floppy disk drives in use today have two read/write heads, one for the top surface of the disk and the other for the bottom. Hard disk drives have many read/write heads, typically one for each side of each platter.

As the disk spins, magnetic fields on its surface representing data bits pass under the read/write head. These fields generate minute electrical currents in the head that can be interpreted by the computer as binary data. To write data, the process is reversed, and a current is sent to the read/write heads. The current generates a magnetic field in the head which polarizes the magnetic particles on the disk surface in one of two ways to represent either binary zeros or ones.

real mode

An operating mode of Intel processors that enables programs written for the 8086 processor to run on 286, 386, and higher processors. Real mode can address only 1 MB of memory and the processor can run only one process at a time. It does not provide access to virtual memory and has no inherent memory protection feature that would be required for multitasking capabilities. MS-DOS is a real-mode operating system. See also protected mode.

register

An area of high-speed memory within a CPU used for temporary data storage. CPUs have several registers, each of which holds only a few bytes of data.

Registers can be divided into two general categories: data registers and address registers. Data registers hold data while arithmetic or logical operations are being performed on that data. Address registers hold the addresses of memory locations, and are used to direct data to and from RAM. Segment registers are a type of address register that point to a specific segment of memory in systems using segmented memory addressing..

registry

A Windows database that provides centralized storage of startup, configuration, and other information. The registry stores information about all installed hardware and any software that has been designed expressly for the Windows operating system. The registry is one of the components that enables Windows to support Plug and Play, and is organized into catagories called "registry keys."

The registry replaces many of the Windows 3.x functions previously provided by the AUTOEXEC.BAT, CONFIG.SYS, WIN.INI, and SYSTEM.INI files, and by individual applications' INI files These files may still exist in Windows to provide backward compatibility for any hardware or software needing them. The registry stores its information in two binary files: SYSTEM.DAT, which maintains up-to-date computer-related data, and USER.DAT, which can maintain multiple system configurations for different users or purposes.

registry key

Category of information stored in the Windows registry. Registry keys are the means used to index and organize the data stored in the registry. Because registry keys can hold other keys subkeys as well as data, the registry forms a hierarchical structure.

remap

To reassign memory addresses. For example, memory management software can remap device drivers from conventional memory into upper memory to free conventional memory for application use.

restore

To return a window to the size it was before it was maximized or minimized. You can restore a maximized window by clicking the Restore button. You can restore a minimized window (icon) by clicking Restore on its Control menu or in the window's title bar. (When the window is not maximized, there is no restore button; in its place is the Maximize button.)

You can restore a minimized application window by clicking on its button in the taskbar.

right-click

To click the right mouse button. By default, right-clicking while the mouse cursor is over an interface object displays a context menu containing options specific to that object. The mouse key assignments can be switched for left-handed computer users such that clicking the left mouse button displays the context menu.

ROM (read-only memory)

Semiconductor memory that can be read from but not written to. ROM chips may contain programming, data, or both. Two common types of read-only memory are PROM chips and CD-ROMs. ROM is generally a nonvolatile form of memory. Most system BIOS instructions are stored in ROM chips (ROM-BIOS), however Windows provides its own replacements for several of the ROM-BIOS routines.

root

The root directory is the foundation of a logical disk's file storage structure. The root directory contains directory entries for the top-level files and folders stored on the disk.

RS-232-C

An industry standard for serial communication connections. Specific lines (wires of the connection) and signal characteristics are used to control the serial transmission of data between devices.

run-length limited (RLL)

A method of storing data on a magnetic disk. Run length limited data encoding makes use of repeating patterns in the data to eliminate the necessity of storing data bit by bit. It is more efficient than the older MFM encoding technique because it stores more data per unit area on the disk surface. ARLL and ERLL are improvements to the RLL method.

scheduler

An operating system process that manages other processes (such as threads) and tasks.

scroll bar

A graphical interface component that allows you to move a document or list relative to the window displaying it. Scroll bars usually appear as vertical or horizontal bars at the sides and/or bottom of a window or list box.

The "scroll box" appears on the scroll bar and can be dragged with the mouse along the length of the bar to move the text within the window.

Scroll arrows appear at both ends of a scroll bar and can be clicked to scroll the text in small increments (usually one line of text). You can also click between the scroll box and the scroll arrows to move the text in larger increments (usually one page or one window's worth of text).

scroll box

SCSI (small computer system interface)

Pronounced "skuzzy." A type of standard interface used to connect computers to devices such as hard disks, printers, scanners, and CD-ROM drives. Most SCSI adapter cards require no knowledge of the type of devices connected to it. They require only that the devices comply to the SCSI standard. Up to seven SCSI devices can be connected together and then connected to a single SCSI port on the computer. Such a configuration is called a "daisy chain."

secondary mouse button

The less-used mouse button. A click of the secondary mouse button is known as right-clicking, and frequently displays a context menu.

In the standard, right-handed mouse button configuration, the secondary mouse button is the right button. The mouse button configuration can be changed from the Windows Control Panel to better suit left-handed users. See also primary mouse button.

secondary window

An application window that is sometimes smaller and often less functional than the primary window.

sector

An arc-shaped portion of the data storage area of a disk that is the smallest physical storage unit of the disk. Disk storage area is organized into:

- sides of the disk surface (top and bottom)

(A hard disk may have more than two sides if it consists of more than one platter.)

- tracks, which are arranged as concentric rings on the surface of magnetic disks. CD-ROMs have a single track, spiraling from the disk edge towards the center.
- sectors, which occupy arc-shaped portions of the tracks.

One sector of data storage occupies an arc-shaped portion of one of the disk tracks.

The operating system determines the size of each sector, which is 512 bytes for magnetic disks formatted for US versions of Windows.

sector header

The area at the beginning of a disk sector that identifies the sector to the operating system using a unique head, cylinder, and physical sector number. The header also indicates if the sector is usable and, if not, may indicate another sector to use in its place. The last portion of the sector header contains a CRC value. The sector header is separated from the sector's data-storage area by a small gap.

seek time

Like latency, seek time is a measurement of the read/write performance of a disk drive. For a magnetic disk drive, seek time is the amount of time it takes to move the read/write head from its current track to the track where data is to be read from or written to. For a CD-ROM drive, seek time is the amount of time it takes to position the laser beam over the portion of the CD's single spiraling track that contains the data to be read. Seek time is used to assess disk drive performance.

segmented memory addressing

A way of referencing computer memory locations that subdivides the total available memory into regions called "segments." Any byte of memory storage is referenced using a combination of the segment address and the byte location (offset) within the segment. Intel's 80x86 family of CPUs introduced a segmented architecture with a segment size of 64K in order to maintain compatibility with the 8080 CPU, an earlier model that could access only 64K memory locations.

Using segmented memory addressing has drawbacks when compared to more straightforward linear memory addressing. Segmented memory operations add overhead to the CPU resources, as segmented addresses need to be translated back into physical memory locations, and vice versa, during processing. Manipulating memory at the segment level also makes software development more complex and time consuming.

selector

For Windows 95, Windows 98 and Windows Me: The contents of a segment register when a CPU is running in protected mode. The selector identifies a descriptor table entry, which defines a particular segment of memory. The operating system uses selectors for memory management when running 16-bit applications. A limited number of selectors (8192) is available under Windows, and some applications use hundreds of them. As selectors are used, memory resources are consumed; when no selectors are available, the operating system generates an out of memory error. Memory management is different for 32-bit applications, and selectors are not a limiting factor.

separator line

A horizontal line that divides a menu into groups of related menu items.

serial communication

Transmission of data between computers or between computers and peripheral devices such that the data is sent as a sequential series of bits, one at a time, over a single line.

serial interface

The interface that imparts to a computer the capability of serial communication. The serial interface usually consists of expansion board that plugs in to the motherboard, and that includes a serial port.

serial port

A computer's input/output connection for serial communication. It is attached to the serial interface and is usually an RS-232-C type connector.

shadow RAM

Technique that can be used in PCs using Intel's 386 or later CPUs to copy the system's BIOS routines from ROM to an unused area in RAM (in the upper memory area). Subsequently, when the computer requires a BIOS service, it uses the routines from RAM. Because accessing information stored in RAM is faster than accessing information stored in the ROM BIOS, memory shadowing can improve system performance. Shadow RAM is also called "shadow ROM."

shutter

A metal (or hard plastic) piece that protects the cookie of a 3½-inch floppy disk.

shortcut key

A key combination that allows you to carry out a particular command from the keyboard, without using the mouse to choose a menu item. The shortcut key combination for menu items that have them is listed on the menu after the item name.

SIMM

Acronym for single inline memory module. A SIMM is a component onto which DRAM chips can be mounted.

slack

The operating system allocates (reserves) space for files in discrete chunks called clusters. Most files, however, occupy less physical space on the disk than the operating system has reserved. Slack is the excess space allocated for a file—leftover space in the last cluster of a file that remains unoccupied by file data. Once a cluster has been allocated to a particular file, it cannot be used for any other purpose, so the slack space is essentially wasted space.

The FAT32 file system uses smaller cluster sizes to help minimize disk slack space.

small computer system interface

ST-506/412

A disk controller interface standard developed by Seagate Technologies and used in early IBM PCs. This standard has been essentially replaced today by disk controllers using faster IDE, EIDE, and SCSI interfaces.

static random access memory (SRAM)

A type of semiconductor-based memory. Unlike the DRAM chips used for a PC's main RAM, SRAM chips can retain their stored information without being continuously "refreshed" by the computer. Accessing data in SRAM chips is five to ten times faster than accessing memory in DRAM chips, however SRAM chips can store less information and are more expensive to produce. Both types of RAM provide volatile memory. SRAM chips are used in portable computers and for external memory caches.

startup files

status bar

A graphical interface component that displays information about a process, function, or selected item. The status bar normally appears at the bottom of a window or dialog box.

stepping

Used to designate a minor revision in a CPU chip. Thus, a chip designated "Pentium, Stepping 5" is slightly updated from a chip designated "Pentium, Stepping 4."

super VGA

SVGA (super VGA)

A type of video adapter board used in personal computers. In the evolution of PC video display standards, SVGA was developed after VGA. SVGA cards add several higher resolutions than were possible with VGA cards.

swap file (paging file)

A hidden file that Windows uses as virtual memory. The swap file temporarily holds information from RAM in order to free RAM for use by other applications. The Windows 95, Windows 98 and Windows Me swap file is named WIN386.SWP.

Under Windows NT and Windows 2000, the swap file is called a "paging file," and is named PAGEFILE.SYS.

system area

Area of a disk that stores information used by the operating system for accessing the disk and the files stored on the disk. The system area of a disk contains the boot record, file allocation tables, and root information. The system area of most hard disks also includes a partition table.

system attribute

A file attribute identifying a system-related directory entry. Examples of files having the system attribute are IMAGE.IDX (a file belonging to the Image program of Norton Utilities) and IO.SYS (an operating system file). Examples of folders having the system attribute are the Windows RECYCLED and FONTS folders.

Directory entries that represent long filenames have their volume label, hidden, read-only, and system attributes set. This combination of attributes is unique to long filenames.

system cache

system files

The group of files used to start a computer and/or used to start and configure Windows. For Windows 95, Windows 98, and Windows Me, these files include:

- AUTOEXEC.BAT
- CONFIG.SYS
- WIN.INI
- SYSTEM.INI
- SYSTEM.DAT
- USER.DAT

These files are also known as "startup files."

system menu

system timer port

Hardware port that is used to communicate directly with the system timer (or system clock), and typically used to change timer interrupt rates.

System virtual machine (System VM)

The virtual machine within which Windows applications run. The System VM runs in protected mode. 32-bit Windows applications each have their own memory space within the System VM and are preemptively multitasked. 16-bit Windows applications share a single memory space within the System VM and are cooperatively multitasked. Compare to DOS VM.

SYSTEM.DAT

For Windows 95, Windows 98, and Windows Me: A file that contains system-related registry information which doesn't change from one user to the next. The primary system files containing registry information are SYSTEM.DAT and USER.DAT.

SYSTEM.INI

A Windows startup file that contains system-specific drivers and configuration information. Most of the information that was stored in SYSTEM.INI for Windows 3.x has been relocated to the Windows registry. SYSTEM.INI still exists, however, for compatibility with older applications, and for certain Windows startup processes.

text box

A graphical interface component consisting of a rectangular box into which you type one or more lines of information needed by the program. Text boxes are often empty, but may also contain text when they first appear.

thread

A that is part of a larger process or program. A process can have many threads; each thread shares the memory allocated to the parent process.

Threads share the address space and resources allocated to their parent process. Every process creates at least one thread, and most have more than one. Threads can be created and destroyed dynamically as necessary while their parent process runs.

Threads (not the entire process) are managed by the operating system, and are the basis for allocating CPU time in multitasking implementations. Windows 32-bit application can have many threads. Each thread of a 32-bit application shares the memory allocated to the parent process, and the threads are preemptively multitasked. 16-bit applications (Windows 3.x and MS-DOS applications) have only one thread each, and these threads are cooperatively multitasked.

timer interrupts

There are two interrupts relating to the system clock chip in a PC. They are INT 8h and INT 1Ch, known collectively as the timer interrupts. When software requires timer-related operations, it usually hooks onto INT 1Ch (widely considered the interrupt to hook for user operations) and occasionally INT 8h, which is not considered as wise a choice.

Some programs alter the rate at which these interrupts are generated by the system clock chip (default is 18.2 times a second). When they do, they are expected to maintain an emulation of the default rate. If they don't, the system time will no longer be kept correct and other operations (such as disk I/O) may fail.

title bar

The title bar appears at the top of the window or dialog box. it shows the name of the application running in the window, or the name of the dialog box. The title bar of windows and some dialog boxes also contains Control menu and the Minimize, Maximize, and Restore buttons. The title bar in the active window is generally a different color or intensity than the title bar in an inactive window.

toggle

verb: To change the state of a two-state object (such as a check box) using the same control or action.

noun: An object that can be switched between two states by using the same action (such as clicking on the object).

toolbar

A row of pictographic command buttons displayed in an application window, usually immediately under the window's menu bar. Toolbars provide quick mouse access to options or commands that are specific to the window or application.

track

Part of the physical format of a disk's surface. A disk's storage area is organized into:

- sides of the disk surface (top and bottom)

(A hard disk may have more than two sides if it consists of more than one platter.)

- tracks, which are arranged as concentric rings on the surface of magnetic disks. CD-ROMs have a single track, spiraling from the disk edge towards the center.
- sectors, which occupy arc-shaped portions of the tracks

transfer rate

The transfer rate specifies the number of bytes that can be read from a disk and placed into computer memory in a second. This measurement is used to assess disk drive performance.

TSR (terminate-and-stay-resident)

An MS-DOS program that is loaded into a computer's RAM and remains there, even when the program is not running. This allows quick access to the program when needed. TSRs are usually invoked by pressing a special combination of keys. An example of a TSR would be a program that displays a calendar during an MS-DOS session whenever a particular key combination is pressed.

TSRs are intended to be unobtrusive, and ideally they do not interfere with other applications. There can be conflicts however, if a TSR loads itself to a memory location that is already occupied by another application, causing one or both applications to fail. Windows applications and utilities can replace many TSRs that were used under MS-DOS.

TSRs do not work in Windows NT and Windows 2000.

terminate-and-stay-resident

UART

undo file

File created by Norton Disk Doctor before it makes repairs to your disk. The undo file allows Norton Disk Doctor to reverse the changes it makes, if necessary.

Unicode

The character set used by Windows NT, Windows 2000 and by long filenames in Windows 95, Windows 98 and Windows Me. The Unicode character set uses sixteen bits (two bytes) of data to represent a single character, thereby providing unique codes for 65,536 (two raised to the sixteenth power) characters. Because it affords a representation for so many different characters, Unicode provides standard codes for the characters used in most languages of the world, and still has room to represent additional graphical symbols.

MS-DOS and Windows 3.x used eight bits (one byte) to code one character, so they could represent only 256 (two raised to the eighth power) different characters. Windows 95, Windows 98, and Windows Me use the ANSI character set for operations other than long filenames.

Universal Naming Convention (UNC)

File naming convention devised to support computers linked by a network, where a file might not reside on the local machine. This naming scheme prefixes the path and filename by a double backslash (\\) and the name of the network file server that contains the file, rather than prefacing the path and filename with a drive letter.

Universal Asynchronous Receiver Transmitter

upper memory

The 384K of a computer's RAM that begins immediately above conventional memory and ends at 1 MB. This region of memory was reserved for system purposes in the original IBM PC; however, much of this area is unused. An 80386 or higher computer can use memory management software to copy information that is normally held in conventional memory into upper memory blocks, freeing conventional memory for use by applications that require it.

upper memory block (UMB)

For Windows 95, Windows 98 and Windows Me: The upper memory area consists of the RAM between 640K and 1 MB. An upper memory block is a portion of this upper memory area. Contiguous area of unused space within upper memory. Upper memory may include a number of UMBs.

On computers using 80836 processors and more advanced models, memory management software can copy information from the conventional memory area (the first 640k of RAM) into the upper memory blocks in order to free conventional RAM. Many older programs require free conventional memory in order to run.

UMB

USER resources

For Windows 95, Windows 98 and Windows Me: Space reserved in RAM for the Windows User module, which deals with window management issues. The User module is responsible for the creation and manipulation of windows, dialog boxes, buttons, and other graphical user interface components. Windows includes three main subsystems: the kernel, graphics device interface, and User resources.

USER.DAT

For Windows 95, Windows 98 and Windows Me: A file that contains user-related registry information. The primary system files containing registry information are USER.DAT and SYSTEM.DAT.

vendor-independent mail

VGA (video graphics array)

A type of video adapter board used in personal computers. In the evolution of PC video display standards, VGA was developed after EGA. VGA cards are capable of several video modes but have a limit of 256 colors for graphics and text.

VGA

video card

video RAM (VRAM)

Special type of DRAM that allows high speed direct memory access by video circuitry. This type of memory is more expensive than conventional DRAM chips.

VIM (vendor-independent mail)

API developed by Lotus and implemented as a DLL.

Applications that recognize the presence of a VIM DLL on your system allow you to send mail directly from them.

virtual device driver (VxD)

A 32-bit, protected mode module of computer code designed to manage a single resource, such as the display monitor. VxDs allow resources to be shared because they can be used by several, concurrently running threads. A few VxDs control software, but most control hardware. The term "VxD" is frequently used generically to refer to virtual device drivers.

A VxD enables applications to share hardware and software. Current versions of Windows handle VxDs dynamically, loading and unloading them in response to changing system conditions. The VxDs provided with Windows support many different disk, video, mouse, network, and other hardware devices. In addition, Windows 95, Windows 98 and Windows Me use VxDs for its virtual FAT (VFAT) system, CD-ROM file system, disk compression, disk caching, and many other functions.

VxD

virtual FAT (VFAT)

The Windows 95 and Windows 98 enhancement of the MS-DOS subsystem that handles file input/output operations. Like MS-DOS, VFAT uses the FAT structure; unlike MS-DOS, VFAT supports long filenames and operates mostly in protected mode.

virtual machine

An environment created in a computer by software that simulates a hardware device. In Windows, virtual machines simulate separate computers, each with their own support services, including memory resources, file system services, device drivers, and access to peripherals. Windows includes two basic types of virtual machine: the System VM, which is used for running Windows applications, and DOS VMs, one of which is created for every MS-DOS application that is run from Windows.

Under Windows, virtual machines are created by the virtual memory manager. One is created for Windows itself (the system virtual machine), one for 16-bit Windows applications, and one for each non-Windows application.

MS-DOS applications run in a virtual machine using the virtual 8086 mode. In this mode, the applications get copies of all real mode related data. This includes address space, the interrupt-vector table, and mappings to ROM BIOS, MS-DOS, TSRs, and device drivers.

virtual memory manager

virtual memory

A technique used to increase the amount of memory available to programs. Virtual memory uses space on the hard disk to simulate RAM. This space is called the swap or paging file.

Programs must be loaded from the disk to RAM before they can be run. The more RAM that is available, the more programs can be run simultaneously, and the larger the programs can be. Windows can move ("swap" or "page") program instructions and data between RAM and the hard disk as needed. By swapping unneeded data from RAM to disk, the operating system can free up RAM, and run more and larger programs than the computer's RAM would otherwise allow.

The space reserved on the disk for virtual memory can shrink and grow dynamically to meet the changing requirements of the system, so the potential size of the virtual memory can be larger than the current size of the swap or paging file.

Sometimes, "virtual memory" is used synonymously with "swap file" or "paging file." The term "virtual memory" has also been used to refer to the total working memory, including RAM plus available disk space, used by the operating system to run programs.

virtual mode

An operating mode of Intel processors that enables multiple MS-DOS programs to run simultaneously, as though each program were running on its own, separate machine. Virtual mode imitates real mode yet actually uses protected mode. Windows 95, Windows 98 and Windows Me use virtual mode to run MS-DOS applications. Virtual mode is also called "virtual 8086 mode" and "virtual real mode."

Virtual Memory Manager (VMM or VM manager)

For Windows 95, Windows 98, and Windows Me: Major component of the Windows operating system that controls virtual machines. The VMM provides over half of the services provided by the Windows operating system. These services deal with low-level operating system functions, such as memory management (including virtual memory), thread supervision and prioritization for multitasking, and hardware device management.

For Windows NT and Windows 2000: Windows allows every process 4 gigabytes of virtual address space (memory addresses that the process and its threads may use), however most computers have substantially less than 4 gigabytes of physical memory (RAM). When the available RAM is full, Windows makes more available to processes that need it by moving some data from RAM to disk. This process is controlled by NT's Virtual Memory (VM) Manager

When a process or thread tries to access information that has been moved to disk, the VM Manager moves the required data from the disk back into RAM. Because the data is moved between RAM and disk in chunks called "pages," this process is called "paging," and the special disk file used to temporarily hold the data is called a "paging file."

volatile memory

Type of computer memory that loses its data when it loses power. DRAM chips (the main RAM of PCs) and SRAM chips provide volatile memory.

volume (disk volume, logical disk)

A location used by the operating system to store data. Each volume has a unique label, frequently a drive letter, by which the volume is identified to the computer.

A volume may comprise a disk, a portion of a disk, portions of several disks, or a magnetic tape. A large hard disk can be partitioned such that the computer treats it as more than one discrete volume, even though the data resides on the same physical disk. This is frequently the case for the large drives shared by a network. Likewise, some operating system can combine several partitions of several disks as a single volume (identified by a single drive letter) to achieve enhanced performance or fault tolerance. Volumes are also known as "disk volumes" or "logical disks." Each volume contains its own independent boot record, root directory, and folder tree. The system includes at least one logical disk for every physical disk attached to the system.

volume label attribute

A file attribute that identifies a directory entry as storing the name of a logical disk. For example, you may divide a hard disk into two or more logical disks or volumes. While the computer will automatically assign these volumes drive letters, you may wish to assign them more descriptive volume labels to distinguish them.

Directory entries that represent long filenames have their volume label, hidden, read-only, and system attributes set. This combination of attributes is unique to long filenames. (When the volume label attribute is set to indicate a volume label, the system, hidden, and read-only attributes have no meaning, so are not set.)

wait state

A clock cycle during which the CPU is idle, to give slower components time to respond. Compared to the CPU, RAM is many times slower, and disk drives can be millions of times slower. To compensate for the speed differences among its various components, a "zero-wait-state" computer uses caches and other technologies to make the most efficient use of the CPU's time.

waveform

Refers to the way in which a wave's amplitude changes over time.

WIN.INI

A Windows startup file that contains system settings and application preferences. Most of the information that was stored in WIN.INI for Windows 3.x has been relocated to the Windows registry. WIN.INI still exists, however, for compatibility with older applications, and for certain Windows startup processes.

window

A graphical interface component that provides an area for display of data and user interaction with an application.

There are two major types of windows distinguished by their function in the application:

- Primary window
- The main window of the application in which most of the information is displayed. Primary windows are usually document windows
- Secondary windows
- The ancillary windows used by the application, they may be property sheets, dialog boxes, messages, or palettes.

window corner

Any of the four corner areas of a window's frame. By clicking on any window corner to select it, and then dragging the mouse, you can resize the window in two dimensions simultaneously.

window frame

The thin border that appears around a window. By clicking on the frame between the corners to select it, and then dragging the mouse, you can change a window's height or width. By clicking on the frame's corners, you can resize the window in two dimensions simultaneously.

Window menu

The menu that allows you to manipulate a window, dialog box, or taskbar button. You can display the Window menu three ways:

- click the icon at the left side of a window's title bar
- right-click anywhere on the window's title bar
- context click a minimized window's button in the Windows taskbar.

The Window menu was formerly called the Control or System menu.

workstation

A powerful, single-user computer, often running the UNIX operating system. Workstations are principally used for high-end graphics and computer-aided design applications. Also called "graphics workstations."

Recently, this term has been applied to any computer that is attached to a network and that is not the network server.

write-back caching

A caching technique used by some internal and external memory caches. Data waiting to be written to the computer's main RAM is held in a temporary storage area, and written to RAM only when the CPU is otherwise idle. This type of cache is used by the Pentium memory cache subsystem, and is more effective than write-through caching. Write-behind caching is analogous to write-back caching, but used for disk caching.

write-behind caching

A caching technique used by some disk caches. Data waiting to be written to disk is held temporarily in RAM, and written to the disk only when the CPU is otherwise idle. If the computer is turned off while data is still in the cache, before it has been written to the disk, the data is lost. The Windows 95, Windows 98 and Windows Me disk cache, called VCACHE, uses write-behind caching (also known as deferred-write caching). Write-back caching is analogous to write-behind caching, but is used for internal and external memory caches.

write-through caching

A caching technique whereby data is written to the cache at the same time it is written to the disk (in the case of a disk cache) or RAM (in the case of an internal or external memory cache). If the data is needed while it still resides in the cache, it can be retrieved much more quickly than it could be from either the disk or from RAM. This caching technique is simpler and safer than write-behind or write-back caching, however the performance improvements are not as great, since data writes are not held for idle CPU time.

boot virus

A virus that infects the boot record program on both hard and floppy disks and/or the master boot record program on hard disks. A boot virus loads into memory before DOS, taking control of your computer and infecting any floppy disks that you access. A boot virus may prevent your computer from starting up at all from an infected disk.

infected file

A file that contains a virus.

multipartite virus

Viruses that affect both programs and boot files, and can spread from one type of file to another.

polymorphic virus

A type of virus that changes its telltale code segments so that it "looks" different from one infected file to another, thus making detection more difficult.

program virus

A virus that infects executable program files, which often have one of these file extensions: .COM, .EXE, .OVL, .DRV, .SYS, .BIN. Program viruses can stay in memory even after a program is executed, until you turn off your computer.

stealth virus

A virus that actively seeks to conceal itself from discovery or defends itself against attempts to analyze or remove it.

Trojan horse

A program that promises to be something useful or interesting (like a game), but covertly may damage or erase files on your computer while you are running it. Trojan horses are not viruses.

virus definitions files

Virus definitions files contain information about known viruses. This information allows Norton products to recognize and repair virus infections. Because new viruses are discovered and described all the time, it's important to keep your virus definitions files current.

Symantec makes new virus definitions files available periodically. You can use Symantec's LiveUpdate technology to download new virus definitions automatically when they become available. They can also be downloaded from many computer bulletin boards, electronically transferred from Symantec's FTP or World Wide Web sites, or mailed to you directly from Symantec Corporation.

virus

A self-replicating program, written intentionally to alter the way your computer operates without your knowledge or permission. Computer viruses are designed to attach themselves to other program files, and become activated when those programs are run. While active, a virus replicates by copying itself to other programs on any available disk.

dock

Docking Norton System Doctor causes it to adhere to one of the edges of the Windows desktop, much like the Windows taskbar. When docked, Norton System Doctor can be dragged to any of the four edges of the desktop.

- To conserve desktop space, you can also have Norton System Doctor auto-hide when it is docked.

auto hide

Auto hide reclaims desktop space by reducing Norton System Doctor to a thin gray line when it is docked. When you place the mouse pointer on this line, Norton System Doctor expands to reveal the sensors. Move the mouse pointer away, and Norton System Doctor collapses back to the thin line.

- Norton System Doctor and the Windows taskbar cannot both be set to auto hide along the same edge of the screen.

custom configuration

A Norton System Doctor custom configuration stores a particular sensor layout (the types of sensors in the Norton System Doctor window and the order in which they occur). You can create and save any number of custom configurations for different monitoring tasks. You can switch Norton System Doctor to a different configuration at any time.

- A Norton System Doctor custom configuration is different from a Norton System Doctor display scheme.

display scheme

A Norton System Doctor display scheme stores a set of sensor dimensions, colors, fonts, and the image to be used for the sensor background display. You can create any number of display schemes and switch between them at any time.

- A Norton System Doctor display scheme is different from a Norton System Doctor custom configuration.

SMART drive

Self-Monitoring, Analysis, and Reporting Technology (SMART) is built in to newer hard drives. It allows these drives to monitor their own operation and predict most drive hardware failures before they occur.

The Disk SMART sensor of Norton System Doctor can warn you of imminent disk problems, allowing you to back up your files and replace or repair your drive before losing valuable data.

Self-Monitoring and Reporting Technology

wildcards

Wildcard characters can be used in text strings to represent other characters. Generally, the ? wildcard represents a single character, and the * wildcard represents any number of characters. Thus, `myfile.n??` represents `myfile.n01`, `myfile.new`, etc., and `myfile.*` represents any filename beginning with `myfile.`.

IDE

EIDE

ERLL

heuristic

When applied to computer programs, implies algorithms that apply "rules of thumb" to solve complex problems quickly. While heuristics may not always yield the most optimal solutions, they are frequently used to address issues that require "fuzzy logic," rather than those where problems and answers are clearly defined.

macro virus

Computer viruses that infect document files, such as word processor documents and spreadsheet worksheets. Generally, macro viruses are executed when the document file is opened, saved, or closed, and spread to other document files. Macro viruses were first noted in Microsoft Word files that included templates containing macros written in WordBasic. Macro viruses have now been created that employ Microsoft's Visual Basic, and that infect the newer Microsoft Office applications.

Norton AntiVirus protects against all types of computer viruses including macro viruses. It includes advanced Bloodhound heuristic technology to detect even new and unknown macro viruses.