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## Hairline Rule

*See*

Printing Terms

## Halftone

Halftone is the term used to describe any use of a screen of dots or lines to print a continuous tone of gray or color. Halftone screens are necessary because of the mechanical limitations of a printing press in reproducing continuous tones.

Continuous tones imply a more or less smooth gradation of tonal values in gray or color. For example, in the most common continuous tone image, a photograph, tones of gray or color are blended smoothly throughout the image with no discernible pattern or texture. Printing devices of any kind other than photographic must print the tones of gray or color as small, discrete units of ink, toner, or dye. In a halftone, these units are represented by dots or lines. The halftone dots themselves may be round, elliptical, or square. Lines may be specified instead of dots to create a screen of evenly spaced lines that run horizontally, vertically, or at any angle. Any printed area that contains a tonal value of gray or color is considered a halftone, even if it has no variations in tone. Such solid areas of halftone are often called tint screens and are used in backgrounds. Solid (100 percent value) black or color does not require a halftone screen. The purpose of a halftone

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is to create an optical illusion of continuous tone. The size of the dots themselves determines the quality of this illusion. The following figure shows a blend of tonal value from black to white that is created by halftone dots small enough to create a convincing illusion of continuous tone.

Halftones may be created photographically or digitally. A halftone created with a camera is often called a *photomechanical halftone*. A halftone created by a computer is called a **digital halftone**. Some photomechanical halftones are still made, but digital halftones are increasingly common and may already account for the majority of halftones made in some areas.

A photomechanical halftone is made either by photographing the continuous-tone image through a grid pattern on glass screen with a camera or by exposing the image through a contact screen containing variable density dots. In both cases, the halftone image is recorded on film. The film is used to make contact prints or printing plates. A digital halftone is made when computer instructions are processed by a digital output device such as **laser printer** or an **imagesetter**. The output device creates halftone dots by grouping minute laser-generated spots (also called dots) into a matrix.

Digital halftones can be rendered on a computer display monitor, but there is no point in doing so, as halftones are strictly a function of output and have no real relevance to digital display. Display images look best remaining in pixels. The pixels will be converted to halftone dots during the output process.

Photomechanical and digital halftones are similar in that they are composed

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of evenly spaced dots. The spacing of the dots is always constant and is measured as lines per inch (lpi). This is called the screen frequency or line screen ruling of the halftone. More halftone dots per linear inch results in a more convincing illusion of continuous tone. Paper quality and the type of printing device have the most bearing on screen frequency. For example, newspapers may use screen frequencies of 65 lpi, 85 lpi, or 100 lpi. Magazines, catalogs, and advertising materials may use 120 lpi, 133 lpi, or 150 lpi halftones. Higher screen frequencies may be used for premium and showcase printing. In halftones of photographs, wash drawings, watercolors, oil paintings, and so on, light areas contain smaller dots and dark areas contain larger dots. When halftones are enlarged, the different dot sizes are apparent.

*See Also*

Digital Halftones; Printing Terms

## Halftone Dot

*See*

Halftone

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## Halftone Screen

*See*  
Halftone

## Halftoning

*See*  
Printing Technology, PostScript Lasers, Halftoning

## Handheld Scanners

Handheld scanners are small, portable scanners: usually, they look like tiny vacuum cleaners. Handheld scanners were very popular at the beginning of the desktop publishing revolution, when flatbed scanners, and RAM and disk space were expensive; in the mid-90's, when flatbed scanners are cheap, and Macs can handle large scans fairly easily, handheld scanners are not as widely used.

Handheld scanners have a scanning area that's only a few inches wide. To use them, you move the scanner slowly over the image to be scanned. It's possible to scan large areas by making several passes with the scanner and compositing the scans together.

Handheld scanners are portable. In the PowerBook era, it's easy to take a

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scanner to the library and quickly digitize text and small pictures. They're inexpensive, but in the 90's, they're not substantially cheaper than inexpensive flatbed scanners.

It requires a steady hand to get a good scan with a handheld scanner: you must move the scanner's head across the page at a constant speed, or weird artifacts will appear in the scan. Although it's possible to composite several passes with a handheld scanner into one large image, it's usually a frustrating process.

## *See Also*

Drum Scanners; Flatbed Scanners; Office Scanners; Slide Scanners

# Handle

A handle is a variable that indirectly refers to a block of relocatable memory in an application's **heap**.

In the world of Macintosh programming, handles are one of the most important concepts to master. Handles are a strange beast and uniquely Macintosh. If you've programmed DOS or Windows and know the term handle in that context, forget it. Macintosh handles are entirely different.

In every application's heap, there is a special block of memory that contains a set of master **pointer**s. Each master pointer contains the memory address of a relocatable block in the heap. A handle is a pointer to one of these

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special master pointers.

Why would anyone bother with all this confusion? Handles enable blocks of data to be moved in memory without confusing the application that is using them. The following figure displays an application's heap before and after the heap has been *compacted* to maximize the size of free blocks.

Before the relocatable blocks are moved, the handle points to a master pointer that in turn points to a specific relocatable block. During compaction, the Memory Manger moves the relocatable block and updates the value in the master pointer, so that it now points to the new location of the block. The handle never changes, but it still points indirectly to the same block of memory. This gives the Memory Manager the freedom to rearrange blocks to optimize memory usage.

Handles are used extensively in Macintosh programming. Many **Toolbox** routines that allocate memory return a handle to the calling program. When your application reads a **resource** from a file, it is given a handle to the resource, not the resource data itself.

It's important to remember that handles only can be created by the Memory Manager. Not every variable that points indirectly to a block of data is a handle, only those that point by way of a master pointer.

## **See Also**

Heap; Pointer; Resource; Toolbox

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## Handwriting Recognition Systems

*See*

Pen/Handwriting Devices

## Hanging Indent

Hanging indents extend backward into the margin of the page, rather than forward into the first line of type. They're not used in ordinary correspondence, but may be a stylistic feature of a catalogue or brochure. Using a hanging indent plus a tab is also a good quick way to format a numbered or bulleted list. To create a hanging indent, use the paragraph dialog box as shown in figure H-1 CR, or drag the indent indicator on the document ruler backward to the place you want the line to begin.

## Hanging Punctuation

*See*

Printing Terms

## Happy Mac Icon

Each time you **start up** your Mac, the computer runs an internal diagnostic check of the hardware and **system**. If everything checks out okay, the Mac

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displays the Happy Mac icon, which looks like a small Macintosh with a smiley face.

## ***See Also***

Startup; System

## Hard Copy

Having no relation to the TV program by the same name, a hard copy is simply a printout as opposed to a file on a disk. Files can be sent by email, but hard copies must be sent by snail mail.

## Hard Disks

Like all computers, the Macintosh needs a place to permanently keep the work you perform, because everything you do on the computer itself disappears when you turn off the power. There are several ways to store information produced on the Macintosh. The most common vehicles are disks—both hard and floppy, although you can also store information on a remote computer that uses these media by linking to a network.

The Macintosh System and Finder perform their duties by getting and sending information back and forth between the computer and storage. The System gets information from a disk (called *reading*) and places information back on to a disk (called *writing*) by using peripheral devices called floppy



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and hard disk drives. Both types of drives use a pair of *read-write heads* that emit magnetism to change the charges in the iron-oxide coating representing data bits to write data to the disk.

The read-write heads recreate the magnetic fields from the platter to the head to read information from the disk. The following figure displays a simplified schematic of a disk drive mechanism.

Floppy disks are separate from the drives that run them. This is not so with hard drives. Your hard drive is the same thing as your hard disk; the words are synonymous. Hard disks are composed of iron-oxide coated aluminum (or other flexible metal) platters encased in a hard shell. The following figure illustrates the layout of a hard disk drive.

Hard disks consist of a rigid, usually non-removable series of round, flat platters placed one on top of each other. The read-write heads and their arms are lined up above and below each disk where they float a hair's breath above and below the platter. Unlike the floppy disk which spins only when a read or write operation is requested, hard disk platters are continuously spinning. Hard disk drive platters spin at an approximate rate of 3,600 revolutions per minute.

Hard disks also can hold more data in the same amount of space than a floppy because data is packed more tightly on the platter (due to the difference in the substrate—plastic in the floppy and aluminum or other flexible metal in the hard disk, and because the magnetic particles that coat this substrate are smaller). For this reason, as well as because the tightly packed data

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composition of the hard disk, the read-write arms do not have to travel as far along the platters to retrieve or replace the data; this also makes the hard disk perform more efficiently than a floppy disk.

Disks and drives are the tools by which the Macintosh gains information. Those tools are useless if they are not instructed in how to perform work in the Macintosh environment. The Macintosh teaches the disks how to behave during a process known as *initialization*.

## *See Also*

Floppy Disks; Hard Disks; Initialization

## Hard Disk Toolkit

Hard Disk Toolkit, by FWB Inc., (1555 Adams Drive, Menlo Park, California 94025. On the Web at <http://www.FWB.com>) is a suite of disk management utilities that enables you to initialize **hard disks** using FWB's drivers, create **disk partitions** , and host of other disk-related tasks.

You can use the Hard Disk Toolkit to password protect hard disks, and it has built-in data encryption for sensitive items that need maximum protection. It also contains a benchmark testing application to measure the performance of your hard disk against industry benchmarks (a standardized performance rating for software or hardware) for speed.

## *See Also*

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Disk Partitions; Hard Disk

## Hard Disk Upgrade

A hard disk upgrade can be defined as the replacement of your system's internal hard disk with a newer, faster, or more capacious hard disk.

*See Also*

Upgrade Paths

## Hard Space

*See*

Non-Breaking Space

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# HARDWARE

The unique aspect of the Macintosh is the deep integration of hardware with software. No other personal computer system is designed with such a symbiotic relationship. It is the capability of the processor chip, the operating system, and software to complement each other that give the Mac its performance edge in graphics applications, and its usability edge.

We are in the midst of a Macintosh revolution as this book is being written—the Mac is moving from a hardware-code-dependent system to one that is hardware-independent. This transition has taken the Mac in the last three years from a computer based on a chip architecture that was complicated and expensive to manufacture and maintain, because each iteration of the **Complex Instruction Set Computer (CISC)** created numerous ripples of updates for peripheral vendors, application vendors, and Apple itself; to a **Reduced Instruction Set Computer (RISC)** chip-based computer that was simpler to manufacturer, required less upkeep by software and peripheral vendors, and was thus cheaper to sell.

What we will see shortly is a common hardware platform design using common components that can run almost any operating system. The PowerPC

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(as the Apple/Motorola/IBM RISC chips came to be called) Platform (PPCP) and a native **PowerPC** Macintosh operating system is coming soon (Fall 1996) and newer, faster cabling systems, networking technologies, and peripherals will most likely follow.

## Conversation with Loni Hajagos

Loni Hajagos, pronounced *Hi-a-gosh*, markets FrameMaker Plus SGML software for creating large, text-intensive suites of documentation. Her product runs on the Mac, Windows, and UNIX platforms, and her users need to swap files back and forth as they move documents from one group to another, or from a parent company to a spin-off. Her engineers have to develop cross-platform code so the product works just the same way in each operating system, while allowing their idiosyncrasies.

**Maclopedia:** What was your first experience with a Mac?

**Loni:** I inherited a PowerBook from one of my coworkers. Until then I was a UNIX user. I started using it and after playing around with it for a while, the only problem I had was I couldn't figure out how to eject a floppy. Dragging the icon to the trash was not intuitive for me. But it was an epiphany! It was so friendly. I started using the PowerBook at home whenever I had work at home, or I'd take it on the road and while away the hours in the airplane, even though in the office I was still a UNIX user. One day I had to borrow a Windows notebook, and it was horrible. I just couldn't figure out how to use it, whereas the Mac user interface is so clean I never get lost in it. In Windows, I couldn't

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figure out where I was; it was thoroughly frustrating; to this day I have a prejudice against it as needlessly complicated. One of the biggest differences is that the Mac is so organic. It is thoroughly integrated from top to bottom, whereas Windows is a wrapper around DOS.

The Mac is the most pleasant computing platform I've ever dealt with. It's pretty cool when I can purchase any software and my nine-year-old can install it. A couple of weeks ago, I had the great good fortune of getting a Power Mac, and I had brought my son to work that day and he put it together, out of the box. By the time the guy from tech support came in to set it up, my son had put the system together and was exploring our internal network; he was busy downloading Mac software. Now he's not a hacker. So that's a pretty good testament!

And a few months ago we bought a CD-ROM drive for a Mac IIci and my husband—who has a lot more experience with the IBM PC—was fretting because I mail-ordered it, and how do I know it is going to work with the IIci, and how do you know it is the right cable? And I said, “Don't worry, it's a Mac; it'll work.” The thing came, my son plugged it, and it worked. On the PC, accessories are a roulette.

**Maclopedia:** How do your engineers feel about the Mac?

**Loni:** The Mac doesn't have a good reputation among developers; it's definitely a harder platform for programmers, and in our shop it gives us more trouble. We use Clear Case to manage our source code, for

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instance, and it doesn't work very well on the Mac. I suspect the Mac is not one of their primary markets. And the development tools are not as advanced as they are for Windows.

**Maclopedia:** Did the Mac architecture pose any problems when you were developing cross-platform?

**Loni:** In a few places. We had to change our approach to graphics importing and exporting filters because the basic structure for UNIX and Windows didn't work on the Mac. We're religious about cross-platform compatibility—we want to make everything work the same way and have the same code underneath, except for platform-specific conventions. But you have to face some re-architecting for the Mac.

**Maclopedia:** Was Apple helpful?

**Loni:** In general, the engineers have a better feeling about Apple than Microsoft as far as helping in our development. It's a more open relationship. Our engineers even helped debug some of the compilers for Apple.

**Maclopedia:** As a developer, what advice would you give Apple?

**Loni:** Play to their strength. They've been floundering not knowing where their market is. We did some stuff with Apple marketing last year, for instance; they were looking to get back their traditional focus on publishing, and they came up with a group to push on this. But it didn't go very far, which is a shame, because that is where they are

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the strongest.

And real multitasking—I mean, now they have a semblance of multitasking. They do an awfully good job of going from one thing to another seamlessly. For instance, when I have a number of documents open, it looks like they are all open simultaneously, making the users believe they can do more than one thing at once. But if I have a big document and I want to print it, I have to wait for it to spool. If the task takes a long time, then you just have to wait, whereas with UNIX you don't think twice—you just send it and get right back to your work. In publishing and graphic arts, you want to do some things in a lights-out fashion, like color separations, and batch printing. Real multitasking, or a box with two processors in it, would buy Apple an awful lot in this market.

Licensing the operating system more, too. I would like to see Apple get back to being healthy. It's a wonderful machine. I would be very sad to lose it.

**Maclopedia:** How do you like the Newton?

**Loni:** They put a lot of stock into Newton, but it didn't pan out the way they expected it to. As a hand-held notepad it is okay, but there are lots of others that do the same thing, so it is not unique anymore. And when they first brought it out, it was going to become a full-fledged personal computer that would do general purpose things like word processing, not just manage your schedule and keep track of business cards. I have



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a low-tech Day Runner, and I can put an entry into that faster than my friends with Newtons can.

**Maclopedia:** Do you see the rest of us using the Standard General Markup Language, incorporated in your product, anytime soon? As a standard, it's a way to get free of depending on any one vendor for software, and as a language, it lets you recycle information more easily than you can when the text is full of word processing or desktop publishing codes. But will anyone other than Boeing and the Department of Defense need it?

**Loni:** I see SGML going down to smaller- and medium-size companies now. We are selling product to second- and third-tier companies. For instance, we sold a good-sized order to John Deere, and shortly after that we got a call from one of their outsourcing people who handle the overflow documentation—it was a small company, so they ordered ten copies of FrameMaker+SGML to keep being a supplier. We see the same thing with Boeing's suppliers. SGML is percolating down, although I don't think it is ever going to get out of the corporate world and to businesses that have to handle a lot of text-intensive documents.

**Maclopedia:** How are your customers handling the conversion of old documents into SGML?

**Loni:** It can be very expensive and time consuming, and you have to think long and hard whether to convert old documentation and when to do it. If you don't touch a document for three years, you might just leave it

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on the shelf. Most customers ship their old documents off to a service bureau for conversion or hire a VAR or a systems integrator to work out the conversion for them.

**Maclopedia:** Now that Frame has been absorbed into Adobe, what can we expect as users?

**Loni:** You'll see Adobe integrated with Frame products much more tightly, so you could use Illustrator as the drawing package in a seamless fashion with FrameMaker and FrameMaker+SGML. There's lots of wonderful technology lying around Adobe, and our engineers are like kids in a candy store. We'll be integrating all that stuff!

So today we are in the midst of change from the **CISC Motorola 68000** family of processors to the **RISC PowerPC 60x** family of processors, and eventually in 1997, to an operating system code-named Copland that will run on the **PowerPC Platform** —yet each will still be a Mac.

You see this change by watching the names and model numbers of Macs proliferate and change: from Macintosh II to Centris to Quadra to **Power Macintosh**, and yet all of these models remain true to the Macintosh operating system. But what is a Mac?

- **A Macintosh is a hardware architecture and an operating system**—The MacOS, currently at System 7.5.3. The deeply dependent nature of the Mac's system which is currently part “firmware,” because it is hardwired on to read-only memory (**ROM**) chips, and part

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software based on its overlying operating system; to anthropomorphize, makes the computer very smart. It has true “**plug and play**” capabilities. Plug a device into a Mac port, install the proper driver software, and the Mac knows and manages the device, be it a **scanner** , a **fax/modem** , a **port switch** , a **hard drive** , a **CD-ROM drive**, ad infinitum.

- **A Macintosh is software that makes the computer easy to learn and use** —the development of a sophisticated graphical user interface (GUI) You control the Macintosh by pointing and clicking the button of a mouse, which in turn guides the cursor (called the pointer) to click buttons or icons on-screen. The action becomes very intuitive, because the icons or picture on-screen are very representational of their purposes, be it desktop printer, trash can, document, or folder.
- **The Macintosh is a highly flexible business system** —The new PCI-based Power Macs use standard Intel-based expansion cards to increase the performance of graphics rendering via accelerators, increase the number of colors the monitor can display via video cards, and so forth.
- **The Macintosh is a family of computers with models to fit many marketing niches.** The **desktop models** feature flexible modular designs so that you can add exactly those components that you require to perform your job—be it electronic publisher, real-time

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video production, graphics designer, or number cruncher. The **consumer models**, called **Performas**, are less configurable, but more bundled to fit the home and home office uses for which they were put together. The **education models** feature components most likely to be used in schools in packaging that is easy to support and maintain. The **workgroup servers** are “souped-up” Macs with extra storage and fast communications buses for use as Web servers, network managers, or workgroup machines. The **portable Macs** come in two flavors, **PowerBooks** which are full-featured, light-weight laptop computers and the **PowerBooks Duos** which require a docking component to add ports or drives as needed.

Over the years, the Apple Macintosh has developed a set of components that together makes a Mac a “Mac.” These elements are not unique to the Macintosh architecture, but as a whole create the Macintosh experience.

**Hardware, Apple Desktop Bus (ADB)** The ADB connects the keyboard and the mouse to your Mac. It can also be used to connect other input devices, such as pointing devices, joysticks, graphics tablets, or a second keyboard. Up to 27 ADB devices can coexist on an ADB port. Many higher-end Macs have two ADB ports.

**Cache** Macs support various ways to increase the performance of the computer. One method is to store data or instructions used often in a special area of volatile memory called *cache*. System 7 provides an adjustable **disk cache**. This cache is separate from the internal processor cache that exists

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on every Mac's processor. Power Macs, in addition, offer more processor cache on the MotherBoard called **Level-2 Cache**. These caches range in size from 256K to 1MB. Level-2 Cache is added using one of the **processor direct slots (PDS)**. Other cache cards can be added to **NuBus** and **PCI** expansion slots to further increase performance.

**Hardware, CD-ROM Drives** **Internal CD-ROM drives** have become a standard feature on all desktop and low-end Macs. The speed of their drive mechanisms ranges from double- to quadruple-speed (called by Apple the 300i and 600i, respectively) depending upon the Mac model (with newer Macs having the faster drive). These drives support audio CDs, Kodak PhotoCDs, Macintosh formatted CD-ROMs, and some DOS data CDs formatted for Macs.

**Hardware, CPU** The CPU or **central processing unit** is the engine that drives the Mac. The Mac uses one of two types of processors: **Motorola 680x0 family** (the 68000, 68020, 68030, and 68040 chips) or the Apple/IBM/Motorola **PowerPC chips** (the 601, 603, 603e, 604, and 604e chips). The PowerPC chips provides performance that is two to four times faster than the same software created for 68K Mac computers. Macs can also run other operating systems concurrently with the MacOS. You can install software that emulates DOS and MS-Windows (including Windows 95 and Windows 3.1) or install an Intel processor DaughterBoard on the Mac logic board that adds a 486 SX or DX chip set that can run DOS and the different flavors of Windows.

**Hardware, Ethernet** **Ethernet** is a fast networking protocol developed by

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Xerox and has become a standard for most business and educational organizations. Ethernet supports both local and wide area networks and provides a gateway to the Internet. Apple has supported Ethernet since the Mac II with Ethernet network cards. Most modern Macs provide built-in coaxial and 10Base-T ports that support Apple's **EtherTalk** implementation of the Ethernet protocol. Macs also support their own file sharing protocol called **AppleTalk** that enables you to build small, decentralized or client/server-based networks using telephone wiring. AppleTalk runs on **LocalTalk** physical wiring to provide networking for up to 32 Mac devices (be they printers, modems, or desktop machines).

**Hardware, Floppy Drives** All modern Macs, except the PowerBook Duos, contain an internal 1.4MB floppy disk drive, also called a **SuperDrive** . These disk drives can read 1.4MB, 800K, and 400K formatted disks. System 7 provides PC Exchange system software that lets the drive also read DOS/Windows, OS/2, Apple II, and UNIX file formats.

**Hardware, Hard Drives** Without a hard drive there would be no place to store the voluminous data and instructions that comprise today's Mac operating system (System 7.5.3 is 17MB if fully installed) and application programs (MS Word is 26MB and WordPerfect is 27MB if fully installed). Gone are the days that you can fit the Mac operating system on a 400K floppy and your data on another floppy. For this reason, all Macs come with substantial storage space on an **internal hard disk drive** . The hard drive is actually several things: a power supply, the actual disks that store the information, **SCSI** in and out ports, and a SCSI ID counter.

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Most hard drives have two SCSI (Small Computer System Interface) 50-pin connectors, one for connecting the drive to the Mac and the other for continuing the connection to another SCSI device. The internal hard drive is always considered by the Mac to be SCSI ID number 0. You can connect another six devices daisy chained one to another from each SCSI port. The seventh number is reserved for the Mac's **motherboard**. Each SCSI device is given a unique number from 1 to 6 which is remembered by the SCSI ID counter. The software that drives the hard drive keeps track of the devices by their SCSI ID. Modern Macs provide hard drives that range in size from 230M to 2G.

**Hardware, Infrared (IR)** The desktop and PowerBook Macs contain infrared sensors and transceivers to all the transmission of data over the air waves between Macs within three feet of each other. **IR** is also used to replace the mouse as a pointing device, in the same fashion as you use a remote control device to change channels on a television. Macs with **TV tuners** also use IR to control the tuners. The Performa 630, 5200, and 6200 Macs and the PowerBook 190, 2300 Duo, and 5300 all have internal IR for **wireless communications** .

**Hardware, Microphones** The Macintosh is a full-scale multimedia computer. Most Macs come with a microphone or built-in microphone that can be used to send sounds into the Mac. The Mac can output the sounds to a variety of media, including floppy disks, CD-ROMs, or the Mac's built-in 16-bit stereo speakers. Power Macs and older AV Macs also permit text-to-speech and speech-to text via an architecture called **PlainTalk** and the **Digital**

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**Signal Processor** (DSP) chip (used on 68040 AV Macs but not required on Power Macs).

**Hardware, MIDI** Macintosh computers support the **Musical Instrument Digital Interface (MIDI)** standard for controlling musical instruments. When you attach specialized MIDI-based hardware to the Mac's serial port and/or microphone port, you can transform your Mac into a musical workstation for creating **digital audio** .

**Hardware, Connectivity** Macintoshes support most Hayes-compatible **modems** attached to the modem serial port. Modems come pre-installed on some Mac models, or can be operated externally. Some Performa Macs provide software that works with the modem to turn your Mac into a **voice mail system** or a **facsimile** system.

In 1994, with the AV Macs, Apple introduced GeoPort. **GeoPort** works with GeoPort-compatible serial ports with a hardware "pod" to provide modem, telephony, and other telecommunications features in a single package.

**Hardware, Expansion Slots** The Macintosh computers support three types of expansion cards, based on the bus slots used on that particular Mac model. **NuBus** slots were the earliest Macintosh architecture for upgrading the Mac with network, graphics accelerators, SCSI, data controllers, and processor accelerator cards. NuBus slots are limited by power and physical dimensions of the slot (either seven or 13-inch slots are available). Smaller footprint Macs, such as the Performa 6200, use a **processor direct slot (PDS)** that can accept a special "L-shaped" card to accommodate NuBus cards or PDS



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cards. The newest Power Macs have incorporated an Intel standard bus called **Peripheral Computer Interconnect (PCI)** in the place of the slower, more power-hungry NuBus architecture. PCI cards are smaller in size than NuBus slots. You can install Intel PCI upgrade cards if they supply Mac software drivers, opening the Mac up to a huge supply of upgrade options for video, networking, graphics acceleration, SCSI acceleration, and so forth.

StarGate sells a PCI to NuBus converter that allows you to install NuBus cards in PCI slots so that when you upgrade to a PCI Mac you do not lose the use of your old NuBus expansion cards.

PowerBooks include another Intel standard expansion option—the **PCMCIA** or PC card slot. This expansion slot accepts Type I or II PC cards, such as networking, modems, or hard drives.

The following table lays out a simple structure by which you can sort out which Mac fits your particular need.

## The Macintosh Family

### *Mac Type*

### *Model Names      Characteristics*

#### Desktop Models

Power Mac 6100, 7200, 7500, 8500, 9500  
Stand-alone computers that often include a CD-ROM drive and fax/modem. Monitor and keyboard sold separately.

#### Consumer Models

Performa 580, 630 family, 640 CD DOS

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Compatible, 5200 family, 61xx family, 62xx family, and 63xx family Performas are the same Macs as desktop models but packaged as total systems that include color display (except the 636), keyboard, mouse, and CD-ROM drive. Some models also provide either external or internal fax/modems. All Performas come bundled with extensive software and CD-ROM titles.

## Education Models

LC 580, LC 630 DOS Compatible, LC 6100/66 DOS Compatible, 5200/75 LC, and the 5300/100 LC Similar in configurations to the Performa models but lacking the bundled software.

## Portable Models

PowerBook 190s, PowerBook Duo 280c, Duo 2300, and various flavors of 5300 Light-weight laptop or dockable computers containing either a gray scale or color display and trackpad.

## Workgroup Servers

Power Mac 6150, 8150, and 9150 A “souped-up” Power Mac, often bundled with a CD-ROM drive, built-in Ethernet,

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Apple RAID software and other  
client/server software bundles, DAT  
drives.

***For More...***

*If you want to do this...*

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Find out about Macintosh models and their features

The Macintosh Family

Learn about Macintosh internal components

Circuits, Parts of the Macintosh

Learn about Printing and Printers

Printing

Learn about Monitors

Monitors

Learn about Mass Storage Devices

Online Storage, Background

Learn about multimedia speakers and AV systems on the Mac

Multimedia Speakers

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Learn about backup hardware

Backup Hardware Options

Find out about PowerBooks and Macintosh laptop options

Laptops and PowerBooks

Find out about scanners and image processing on the Mac

Scanners, Desktop

Find out about telecommunications, telephony, and communications options on the Mac

Modems, GeoPort, Online Services

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Check out Apple's Home page at <http://www.apple.com>

## Hardware and Software Errors

*See*

Software and Hardware Errors

## Hardware Handshaking

*See*

Flow Control, Modem Cables and Connections

## Harlan, Mark

*See*

Dogcow

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## Hash Animation Master

This software is dedicated to character modeling and organic objects. Although you can also form colder mechanical actors to populate and move in a scene, the purpose of the software is to fill the void present as far as 3D character animation goes. Global Preferences settings include Memory (virtual memory will be accessed if this setting is too low), Polygonal Output, Perspective from a Bird's Eye (zoom factor and camera setting, also controllable with the Control and Shift keys), and the maintenance of an Error Log (keeps a list of errors that occurred when operating the software).

**Modeling Tools** A Character Tool panel is one of the software's main hubs for modeling and design. Here, segments can be added to and deleted from a figure, rotated and scaled, ghosted for non-rendering, "skin" added and removed, the center of gravity reoriented, and the Attributes altered. Attributes include Color, Ambiance, Roughness, Specularity, Reflectivity, Transparency, Refraction, and Specular Color. Segments can have surface attributes or material (texture maps). The other main panel is the Character Info panel, where alterations to the character can be adjusted numerically. Other modeling features include adjustable pivot points of characters, full cut/copy/paste, extrusions, lathing, and rotating and flipping control points. An UNDO is included.

**Boolean Operations** Boolean cuts, subtracting parts of an object, are possible with the software.

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**Texture mapping** Materials are assigned to segments by first browsing the textures list, and selecting one of the members. A Materials Editor allows you to create materials from scratch. Materials can also be stretched to accommodate different sized surfaces.

**Lights** In Fast Mode, the position of the light source can be chosen from nine different positions via interactive buttons.

**Rendering** A render button on the speed bar (shaped like a filmstrip) allows you to render a scene to a file. You can also select to render only a bounded area. If an animation file is rendered, it will play back as soon as the rendering is finished for preview. A Render Settings dialog allows you to set File Name, the Render Mode, Stereo Options (in case you want to create stereo imagery that can be appreciated with 3D stereo glasses), Output Resolution, and Render Frame Range. FPS is also set here. Ping-Pong animation loops can also be set.

**Included Libraries** The software comes with a CD-ROM packed with objects and pre-configured animation that can be studied, altered, and rendered. In addition, a tutorial videotape shows some of the results professionals have achieved working with the software.

**Animation** Hash Animation software allows you to plan and activate three types of movements in your figures: Skeletal, Muscular, and Spline based. These can be used in combination to produce both believable and (when necessary) bizarre results. Keyframe tools allow you to cut, copy, paste, delete, insert and move to any keyframe in the list. The Skeletal Tool panel

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incorporates tools for Anchoring segments of the skeleton, resizing and rotating, setting the “Stride Length” (important if you don’t want your walking figures to seem like they’re sliding on ice as they move), and complete control over the acceleration and deceleration of skeletal parts. The Muscle Tool Panel allows you to control a selected muscle’s displayed splines, adjustment of pivot points, and the acceleration and deceleration of all assigned movements. The Spline Tool Panel controls the selected spline’s assignments, translations, bulging, bending, and acceleration-deceleration.

**Other Special Features** Setting the COG (Center Of Gravity) of an object is very important to the Hash Inverse Kinematic system incorporated into the software. This allows the animated figure to be animated in a believable fashion. Inverse Kinematics are a primary part of the software, allowing movements that behave as their real world counterparts. The most special feature is the software’s dedication to making character animation doable in the first place.

**File Load/Save Conventions** The Hash animation software allows you to model objects with spline patches, but exported objects are still converted to polygonal surfaces. These can be of three types: DXF, OBJ, and RIB (for Renderman). DXF produces very large files, OBJ is more efficient, and Renderman files actually include the capability of allowing for Bezier patches. Polygons per patch settings can be indicated to produce better objects, but at the expense of file size.



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## Havoc

*See*

Arcade-Style Games, First-Person Perspective Shooters, Network Games, Violence in Games

## Hayes AT Command Set

A set of dialing and connection commands recognized by Hayes and other **modems** commonly used to connect to the **Internet** or **commercial online services** such as **America Online** .

AT commands are used by communication software to dial or hang up a phone, or establish or terminate a connection to a remote device. The squeaking and clicking sounds commonly made by modems occur as a result of AT commands.

Because your computer may be communicating with any number of computers on the Internet, each with its own modem, it is suggested that your modem recognize the AT Command Set. Most telecom packages, especially those that use Apple's Communication Toolbox, automate the entry of AT commands, so you don't have to enter manual commands such as:

ATDT555-1212

*See Also*

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Asynchronous Data Transfers; AT Commands; Internet; Local Area Network; Modem; Packets; Parity

## Hayes-Compatible Modems

Modems which recognize and use the AT command set developed by Hayes are said to be Hayes-Compatible. Today, virtually all modems sold are Hayes compatible.

### *See Also*

AT Commands; Hayes AT Command Set; Modems

## Head Crash

If the drive heads that read and write data on your **hard disk** ever come in contact with the spinning platter it reads from and writes to, a head crash occurs. Although this type of crash is very rare, it is also very serious. Head crashes often result in the loss of all data on the hard disk, and it's not unusual for a serious head crash to damage the hard disk to the point that it has to be replaced, which can be very costly.

Head crashes generally occur if the hard drive is jarred, hit, or dropped, especially when the disk is turned on and the drive heads are not parked. This is why you're warned to never move a computer while it's running, and to take caution when moving a hard drive from location to location. If the

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hard disk was severely jarred, it could cause a head crash damaging both the data and the drive. Head crashes also can be caused by a speck of dust or dirt, cat hair, and any small airborne object getting between the platter and the read/write head.

To protect your hard disk from a head crash, follow a few simple rules:

- Never move your computer when it's running.
- Always choose Shut Down from the Special menu (which will park the read/write head to protect them).
- Always use care when moving your computer when it's turned off.

*See Also*

Hard Disk

## Heap

A section of an application's memory that is used for most of the application's dynamic memory allocation. Together with the **stack** and **globals**, this makes up an application's total memory partition.

When the system sets up your application's memory space, it creates space for global variables, allocates memory for the stack, and gives your application a tiny heap (see the following figure). In between this tiny heap and the stack is the rest of the memory assigned to your application. Your

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application must take over the heap using the **Toolbox** routine `MaxApplZone()`. This call causes the heap to grow until it reaches the bottom of the stack area.

Some or all of your application code might live inside your application heap. On a 68K Mac, you can separate your code into segments that automatically load into the heap when needed. On a Power Macintosh, your code loads into the application heap as one block and stays there. If virtual memory is on, the System keeps your application code in a separate virtual memory space, giving you more room in the application heap.

There really is no empty space inside the heap. The Memory Manager divides the heap into a series of blocks. Every byte of memory in the heap belongs to a block. There are three kinds of blocks: nonrelocatable, relocatable, and free. When your application is launched, the heap contains several small relocatable and nonrelocatable blocks and a few large free blocks. As the application runs, it creates other relocatable and nonrelocatable blocks.

Relocatable blocks are referenced using **handles**. The Memory Manager provides a routine to lock handles in memory, which keeps them from being moved. Locked handles are effectively the same as nonrelocatable blocks (until they are unlocked, that is). Nonrelocatable blocks are referenced using **pointers**.

The following figure shows the ideal placement of memory blocks. Locked relocatable blocks are at the top of the heap. Nonrelocatable blocks are low in the heap. The center of the heap consists of unlocked relocatable blocks and

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free blocks.

When the heap looks like this, the relocatable blocks can be moved to consolidate the free space into a single large block from which new blocks can be allocated.

The term *application heap* is used sometimes to mean an application's entire memory partition.

## ***See Also***

Handle; Pointer; Stack; System Heap

## **Hell: A Cyberpunk Thriller**

Although **Hell** features big name actors Dennis Hopper as Mr. Beautiful and Grace Jones as Solene Solux, it doesn't utilize full-motion video to the extent of games like **Daedalus Encounter** or **Wing Commander III**. Take 2 Interactive used polygonal animation with lots of angles and bulging movements. The overall effect makes **Hell** look like an avant-garde animated short or an MTV music video. The plot centers around a botched attempt on your life that propels you into a convoluted and deeply layered adventure.

Grace Jones is an American dictator who has made a business deal with Hellions, the top demon of course being Dennis Hopper. **Hell** is an adventure game of the best sort, aside from the graphics and fanfare. The story is intricate and the character interaction, although not quite as in-depth as

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**Return to Zork** , is still informative and realistic. Hell is the sort of game where everything that happens is a clue and nothing is irrelevant. Mystery lovers should find it a satisfying title.

*See Also*

Adventure Games; Hollywood Games Connection

## Hellcats Over the Pacific

*See*

A-10 Attack!

## Help Command

Many applications support a built-in help feature. A number of these applications enable you to access the help feature from the **Help menu** in the menu bar (the question mark icon on the far right of the menu bar). If the application you're using supports a built-in help feature, it may appear at the bottom of the **Help pull-down menu**. In other programs, Help can often be accessed by pressing the **Help key** on your keyboard, or if your application has a Window menu, Help can be accessed there as well. Still other applications put their Help menus at the top of the Apple menu. Consult your software's manual to find out if help is available and where the developer has placed it within the application.

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Many applications also support Apple's **Balloon help**, which is activated from the Help menu as well as by choosing Show Balloons. If your application supports Balloon help, you can drag your cursor over buttons or commands in your application and a small cartoon-like balloon appears with information on the item to which you're pointing.

To use an application's built-in help feature, follow these steps:

1. Choose Help from the Help menu (question mark icon) located in the far right side of the application's menu bar. If Help does not appear under this menu, try pressing the Help key on extended keyboards. If your application has a Window menu, look there as well for a Help window.
2. Each application has a slightly different Help engine, but the instructions for using Help are usually listed in the opening Help window.
3. Check at the top of the Apple menu, as some applications place their Help feature there. Many applications also support Apple Balloon Help, which is accessed through the Help menu. To access Balloon Help, choose Show Balloons under the Help menu. As you point at items in your application with your cursor, small cartoon-like balloons appear with explanations of the item you're pointing to with your cursor.
4. If you're running System 7.5 or higher, you can also look for Help in the Apple Guide, which is also accessed under the Help menu.

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## *See Also*

Balloon Help; Help Key; Help Menu; Pull-Down Menu

## Help Key

Many applications have a built-in help feature that you can access by pressing the **Help** key on extended keyboards. You can also access an application's help feature by selecting Help on the application's menus, usually found on the Window menu in an application or on the Apple menu when an application is open.

Application's have built-in help features to provide answers to the most commonly asked questions by users. By including a built-in help feature, the application enables users to continue to work within their application and get instant help, rather than having to dig up the original instruction manuals.

In System 7.5 and higher, the Help feature of applications is most commonly found under the Help menu in the upper-right corner of the application's menu bar. Also found under the Help menu in System 7.5 and higher, is the Apple Guide, Apple's interactive help feature that walks you through the steps of various features and commands.

## *See Also*

Apple Guide; Help; System 7.5



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## Helper Applications, Web

A *helper application* is configured with your **Web browser** to enable you perform tasks while still running the Web browser that are independent of the browser and require another program to run. The Web browser opens the helper application, runs the program, and then closes the application without interrupting your browser.

You use helper applications to view movies, play music and other sounds, use **Acrobat** reader to read PDF files, or compress and decompress files from the Web while still in your browser application. The movie (or sound file) plays in the window of the helper application, rather than in the browser window, and the helper application icon and menu items appear at the top of the Mac's screens.

One of the most frequent activities on the Web and Internet involves downloading and then using files or applications. In this case, you need a helper application to “uncompress” or “decode” another application. The nature of the Internet requires that the files you download are

1. Manageable in size.
2. Storable in different computer platforms.
3. Transferable by a variety of mail and other file transfer protocols.

The most common helper applications you are likely to use with your browser deal with these size and cross-platform constraints because they

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uncompress or unencode the files you've downloaded.

For example, when you download the helper application **RealAudio**, the file comes encoded in a format called **BinHex**. In this case you need a helper application such as BinHex 4.0 to decode RealAudio automatically after it is downloaded to your computer.

To play files that you've found on the Web, you first have to set up your preferences setting in your browser so that the browser knows what program to call. To do this, perform the following basic steps:

1. Find your Preferences or Options menu and open it.
2. Choose Helper Applications. You may have to search through the options in order to find the helper applications, as each browser labels these a little differently.
3. Choose to add a new application type. From Netscape, you click the New button. You have to enter four types of information for your browser: the **MIME type**, the subtype box, the extensions names, and the action to perform with the application. The following table lists these types and extensions for most of the common helper applications you'll use.

## Common Helper Applications' Settings

<i>Helper Purpose</i>	<i>Application Names</i>	<i>MIME Type</i>	<i>Action</i>
	<i>Subtype</i>	<i>Extension(s)</i>	
Read image Files	JPEGView	image gif; jpeg	g i f ;

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	jpeg	Use browser as a viewer
Listen to sounds	SoundApp; SoundMachine wav; x-aiff; x-snd; x-aiff au; aiff	audio x - wav; snd Launch program
Listen to sounds	RealAudio rau	audio x-pn-realaudio Launch program
Listen to sounds	MPEG Audio	audio mpeg mpeg Launch program
View PostScript files	PostScript .ps, .ai, and .eps	application postscript Launch program
Read cross-platform documents	Acrobat; Common Ground PDF	reader pdf; cmg Launch program
Play movies	ALLMIDI; QuickTime VR mid; qtm	application mid; qtm Launch program
Uncompress files	ZipIt zip, z, gz, tgz	application x-compressed Launch program
Compress files	uuUndo, UULite, and ShrinkWrap application	x-uun uun L a u n c h Program

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4. After you enter the information from the table, depending on your application, you have to browse your Mac to find the application and double-click it to associate it with these settings. Click the Browse button to do this now.
5. Pick your action; in almost all cases, it will be to Launch the application, but check the table to be sure.

The following table lists Web sites where you can find good helper applications for your Mac.

## Finding Helper Applications on the Web

<i>Application</i>	<i>Fee</i>	<i>Location</i>	<i>Notes</i>
Common Ground	n/a	<a href="http://bcastle.commonground.com/">http://bcastle.commonground.com/</a>	Reads standard cross-platform documents
DropStuff with Expander Enhancer	n/a	<a href="http://www.aladdinsys.com">http://www.aladdinsys.com</a>	Expands compressed files
uuUndo, UULite, and ShrinkWrap		<a href="http://wwwhost.ots.utexas.edu/mac/pub-mac-compression.html">http://wwwhost.ots.utexas.edu/mac/pub-mac-compression.html</a>	Compress files
JPEGView	\$15	<a href="http://www.med.cornell.edu/jpegview.ht">http://www.med.cornell.edu/jpegview.ht</a>	

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	ml Displays JPEG pictures
NIH Image	n/a <a href="http://wwwhost.ots.utexas.edu/mac/pub-mac-graphics.html">http://wwwhost.ots.utexas.edu/mac/pub-mac-graphics.html</a> Image editor
SoundApp	\$20 <a href="http://wwwhost.ots.utexas.edu/mac/pub-mac-sound.html">http://wwwhost.ots.utexas.edu/mac/pub-mac-sound.html</a> Audio player
Sound Machine	\$15 <a href="http://wwwhost.ots.utexas.edu/mac/pub-mac-sound.html">http://wwwhost.ots.utexas.edu/mac/pub-mac-sound.html</a> Audio player
MPEG/CD	\$15 <a href="http://www.electriciti.com/~bbal/">http://www.electriciti.com/~bbal/</a> Audio player (plays MPEGs)
MPEG Audio for PowerPC	n/a <a href="http://www.electriciti.com/~bbal/">http://www.electriciti.com/~bbal/</a> Audio player (plays MPEGs)
RealAudio	\$25 <a href="http://www.realaudio.com/dloadintro.html">http://www.realaudio.com/dloadintro.html</a> Audio player
ALLMIDI	\$25 <a href="ftp://sumex-aim.stanford.edu/info-mac/snd/util/">ftp://sumex-aim.stanford.edu/info-mac/snd/util/</a> Converts MIDI files to QuickTime

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QuickTime VR

\$50<http://qtvr.quicktime.apple.com/>  
Plays QuickTime movies and VR movies

Sparkle

n/a <ftp://sumex-aim.stanford.edu/info-mac/grf/util>  
Movie Player (plays MPEGs)

Acrobat reader

n/a  
<http://www.adobe.com/Software/Acrobat/Macintosh/ACROREAD.MAC.bin>  
Reads standard cross-platform documents

*See Also*

Internet, MIME Type, Web Browser, World Wide Web

## Heretic

*See*

Hexen: Beyond Heretic

## Hexadecimal

Hexadecimal is a number format frequently used by programmers. Unlike decimal numbers that are expressed in base-10, hexadecimal (or hex) numbers are expressed in base-16. Because Arabic numerals only exist for

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the digits 0-9, hexadecimal borrows the letters A-F to represent the values 11-15. In decimal numbers, each digit position has a value 10 times greater than the one to its immediate right. Similarly, each digit in a hexadecimal number has a value 16 times greater than the one to its right.

Hexadecimal is well suited to dealing with digitally stored numbers. Digital numbers are stored using the values zero and one (or on and off). They are base-2. Because 16 is a power of 2 ( $2^4 = 16$ ), digital numbers fit well into hexadecimal numbers. One byte of data, eight bits, can hold 256 possible values ( $2^8 = 256$ ); these values can be easily represented using two hexadecimal digits ( $16^2 = 256$ ).

## Hexen: Beyond Heretic

**Hexen: Beyond Heretic** incorporates new heights (or lows depending on how you feel about them) into the First Person Perspective Shooter family. Developed by GT Interactive and id, the folks responsible for *Wolfenstein 3D* and *Doom II*, **Hexen** adds in magic spells that allow you to do everything from flying to turning your opponents into pigs.

Just be warned: Pigs bite and you will have to blow them away if you want to really be rid of them. Also, if you are playing on a **network**, you can get turned into a pig by your human opponent. You will turn back into a human eventually, but pigs aren't much of a match for the wide assortment of

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weapons players get to choose from. Hexen's bizarre humor spoofs the more serious violence of previous id titles like Doom II and Wolfenstein 3-D, but that doesn't diminish the amount of destruction that you are capable of invoking as you play. Hexen rates right up there with the its fellow **First-Person Perspective Shooters** as a fun, but violent title.

*See Also*

Descent; Marathon; Violence in Games

## HFS

*See*

Hierarchical File System

## Hickey

*See*

Printing Terms

## Hidden Easter Eggs

A number of applications, utilities, and even Apple's system software often have hidden messages or hidden credits within the file placed their by the software programmers. Here's a list of some of the most popular Easter Eggs.



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- In the Finder, hold down the Option key while choosing About This Macintosh to see a graphic of a mountain range and scrolling credits of the programmers who developed various versions of the Finder. If you hold both the Option-Command keys while choosing "About this Macintosh" the same scene appears, but your cursor changes to a happy face with its tongue stuck out at you.
- In the Stickies Apple menu item, open a new sticky, type "Antler!", and press Return. The background of the note displays a large moose with antlers and a credit to the software company that developed it.
- In the Memory Control Panel, turn on Virtual Memory and hold down the Option key while selecting the pop-up menu of hard disks. The list of available disks is replaced by a list of the Virtual Memory development team, each with a submenu containing nicknames for the team members.
- In the Monitors Control Panel, click the version number and you get a pop-up menu with a list of the programmers with a smiley face at the top. Hold the Option key and click again, and the smiley face sticks its tongue out at you.
- If you turn on Balloon Help and drag your cursor over the QuickTime icon and QuickDraw 3D, the QuickTime icon's Balloon reads, "Time: N. A nonspatial continuum in which events occur in apparently irreversible succession from the past through the present to the future." Place the cursor on the QuickDraw 3D extension, and at the

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bottom of the help balloon you should see the message "Flatland no more. Come and follow us into the Third Dimension...."

Another Balloon Help Easter Egg is uncovered when you open the Date & Time Control Panel and point to the Daylight Savings Time check box. The Balloon tells you what it does, but at the bottom is the phrase, "Spring forward, Fall back!"

- In TeachText, hold the Option key and select About TeachText from the Apple menu.
- In System 7.5.2, if you type "secret about box" (without capitals or quotation marks) in Note Pad or Stickies, highlight the text, and drag the text to the desktop, you see a picture of Apple headquarters with a flag in the foreground and the logo "iguana iguana powersurgius" on the flag. By moving the mouse around, you can control the direction the flag is waving. After a while, the picture on the flag changes to something other than the iguana. If you decide you don't want to wait, hold down the letter P as you drag to the desktop and you will see a picture of the design team on the flag. If you hold down the letter Q, you'll see a pink flag with a message that says that QuickTime must be installed to see the images.

You can even make the flag break off, flutter toward the ground, and off the screen. The key is to "whip" the flag back and forth (by moving the mouse up and down on the right side of the screen) until you reach the right level of whipping action to break the flag off.

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- In the Color Control Panel, System 7 and higher, click and hold the highlighted sample text and one of the programmer's names appears. If you click and hold again, the other programmer's name appears.
- In the Map Control Panel, click the version number to see the programmer's name.

## *See Also*

Disk Cache; Hard Disk; Memory Control Panel

## Hidden Map Control Panel Features

The **Map Control Panel**, which seems simplistic and straightforward at first glance, has hidden features that add a significant amount of versatility. At its most basic, you click anywhere on the map of the world and it displays that location's current time, longitude, and latitude. You can also type the name of a city and click the Find button to have the control panel locate that exact spot on the map. The map finds most major cities and landmarks around the world, and if you type "Middle of Nowhere" it locates the exact spot.

To see all of the places in the Map's database, hold down the Option key while clicking the Find button (or pressing Return). If you continue all the way through the cycle to the beginning of the list (the letter A), it shows the name of each place it knows in that country's native language! Also, if you click and drag the arrow pointer to the edges of the map, it scrolls to reveal the rest of the planet.

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The Map's black-and-white map can be replaced with a full-color map that comes with your Macintosh. To find it, open your **Scrapbook**. The first image is a full-color relief map of the world. Copy it to the **Clipboard** and paste it into the Map Control Panel's window. (It's the same map, only in color.)

There are practical applications for the Map Control Panel as well. If you're traveling with a PowerBook, for example, you can reset the Map's home city to your intended destination, and the Mac's internal clock is reset to that new time zone. To reset the Map's home city, click the location of the new home city on the map and then click the Set button in the bottom-right corner of the control panel window.

You can also use this Map feature to tell the time difference between your current location and your intended destination. To find out the time difference, click the place on the map you are going, and then click the words Time Zone in your control panel window. Notice that they change to the words Time Differ. to show the time difference between the two cities. An "x" in the box to the right of the hour and minute boxes means you need to add those numbers to your local time. No "x" means you subtract those hours from your local time.

## ***See Also***

Clipboard; Map Control Panel; Scrapbook

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## Hidden Programs

When you are working in an application, it is the active application. Any other open applications are behind the active application. You can choose to **Hide** open applications by selecting Hide Others from the **Applications menu**. This leaves the programs open, but hides them from view. If you return to the **Finder**, you can ask that all your programs be hidden from view by choosing Hide Others as well.

### *See Also*

Applications Menu; Finder; Hide

## Hide Active Application Command

To hide the active application, select Hide Application from the **Application menu** on the right side of the menu bar. The actual name of the active application appears after the word "Hide" rather than the word "Application." It may read, for example, "Hide Microsoft Word." Invoking this command hides the current application, and takes you to the **Finder** unless it has been hidden. If this is true then you are taken to the next application listed in the Applications menu. Choosing Hide does not quit the application, it just hides the application from view, leaving it running in the background.

You can make the application active again by choosing it from the

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Applications menu. You can also select Show All from the Applications menu, and all windows are displayed.

To hide the active application, follow these steps:

1. Choose Hide *Application* (It reads Hide Microsoft Word, or whatever the program name is) from the Applications menu.
2. You return to the Finder, with the program still running but hidden from view.
3. To return to the application, select the Application's name from the Applications menu. If the icon for the application appears grayed, that means an application is hidden. You can activate that application by choosing it.

## *See Also*

Applications Menu; Finder; Hide Others Command

## Hide Others Command

When you are running multiple applications and want to see only the active application, you can use the Hide Others command found on the **Application menu**, as shown in the figure. Choosing Hide Others hides the other program's windows from view. Although these windows are hidden, they are still open and running and can be accessed any time by switching to another program through the Applications menu.

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You can also use the Hide Others command in the **Finder** to hide all your open application windows, leaving only the desktop in view. There's a shortcut you can use that hides others when you select a program or select the Finder from the Applications menu. To use the shortcut, just hold down the **Option key** while you select your application. When the program comes to front, all the other windows are hidden. Another option you have is the Show All command. This option reveals all open windows of active applications but does not make them active

To Hide Others, follow these steps:

1. Click and hold the Applications menu.
2. Select Hide Others. This hides any other open application that have documents or windows open.

To Show All, follow these steps:

1. At the Finder click and hold the Applications menu.
2. Select Show All. Any applications that have open windows become visible, but they do not be active.

**See Also**

Applications Menu; Finder; Hide Active; Option Key

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## Hierarchical File System (HFS)

The hierarchical file system (HFS) is an organizational tool that helps users keep track of their **files** using **folders** to keep files segregated. You can put a folder inside another folder without mixing the contents of the two—they remain separate, just like they do in a real file cabinet. The files that appear in your **hard drive's** main window, for example, are on one level. If you have folders on your hard drive, the items inside that folder are also on your hard drive, but for organizational purposes, they're kept separate.

To see how this works, open your main hard drive window and select **View by Name** on the **Views** menu . You'll see a hierarchical listing of the files and folders in your main window. Click the triangle beside any folder, and it expands to show you a hierarchical list of what's inside that folder. If there is a folder within that folder, you can click its triangle, and it displays the contents of that folder, which is separate from the contents of the first folder. That's HFS.

HFS helps users when they use the **Open** command from within an application. Without HFS, every file on your hard drive appears in one **scrolling** list. But because HFS was introduced by Apple in 1987, you see both files and folders when you choose the Open command from the **File** menu , but you won't see the contents of a folder until you open it because HFS keeps everything separated for you.

*See Also*



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File Menu; Files; Folders; Hard Drive; Open Dialog; Scrolling; View By Name; Views Menu

## Hierarchical View

If you're viewing a **window** in a List view (view by name, date, size, and so on), you can view the contents of any **folder** without opening it by using the hierarchical display. A triangle appears to the left of the folder's name indicating that it can be viewed hierarchically by **clicking** the triangle. The triangle then points downward, and the contents of the folder, including any **nested folders**, appear in the window as shown in the figure. This is called *expanding* the folder.

To view the contents of a folder in a list view, follow these steps:

1. Click the triangle to the left of the folder's name.
2. As the triangle points down, a list appears displaying the contents of the folder, including any nested folders.
3. To collapse the folder back to its original view, click the triangle.

### **See Also**

Clicking; Folders; Windows

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## Hi-Fi Color

*See*

High-Fidelity Color Printing

## High-Fidelity Color Printing

High-fidelity, or Hi-Fi, color printing is a method for maximizing the fidelity of printed colors to the colors of the original image. The small color gamut of standard **process color** printing can be extended to some degree by high-fidelity color printing. Using six or seven colors (including the four standard process colors), Hi-Fi printing produces brighter color appearance, improved color modulation, and cleaner reds, greens, and blues. Pantone has developed a high-fidelity color system called Hexachrome that combines six process inks: cyan, magenta, yellow, black, orange, and green. Other systems may use cyan, magenta, yellow, black, red, green, and blue. High-fidelity color printing may include more than just extra ink colors. It may also include the use of **stochastic screens**, premium papers, varnishes, and other special effects.

*See Also*

Color Gamut; Color Printing; Stochastic Screens

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## Highlight

Highlights define the intensity of reflections caused by bright lights. A highlight produces small areas that reflect light, and adjusting the highlight parameter adjusts the brightness of the highlight area. The Highlight parameter also can adjust the size of the highlight (in some 3D programs a separate parameter, **shininess** , adjusts the size of the highlight).

### *See Also*

Reflections; Rendering; Shaders; Texture Mapping

## Highlight Point

The highlight point in a **halftone** image is where the smallest halftone dot appears. Highlights in a halftone are the lightest areas in the image and may not even contain any dots. This is usually considered undesirable because the absence of dots can create a visual "hole" in the image. In scanning and color separating, the highlight point is one of the most important parameters. Assigning the highlight point in a scanning program involves selecting the point in the original image where halftone dots will begin to appear.

### *See Also*

Halftones; Image Scanning

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## High Sierra

A format for storing information on a **CD-ROM**, High Sierra is the original name given to the **ISO-9660** standard prior to its adoption. The terms are sometimes used interchangeably, although there are some very minor differences between High Sierra and ISO-9660 as it was finally adopted.

Apple provides both a High Sierra and an ISO-9660 extension for **Foreign File Access**, the System software that recognizes non-HFS (HFS is Apple's file system) CDs.

### *See Also*

CD-ROM; Foreign File Access; ISO-9660; HFS

## High Sierra File Access Extension

This extension enables **CD-ROMs** designed for platforms other than Macintosh (such as IBM compatibles) to be played on Macintosh CD-ROM players and vice-versa. High-Sierra refers to the name of the standard that was created to enable cross-platform use of CD-ROM discs; the High Sierra Standard.

### *See Also*

CD-ROM

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# MAC HISTORY

The Macintosh is a truly unique computer. Not only did it break new ground technologically, it also inspired a fanatical following unmatched by any other computer. Many Mac users are more zealous about their choice of computer than they are about anything else.

The unique Macintosh community culture grew out of the culture of Apple Computer and its history. From Apple's start in a garage in Silicon Valley, through the development of the Macintosh, and right up to today, Apple has always walked a different path than other computer companies.

Apple's founders were a great match: **Steve Wozniak**, the brilliant technology whiz and college dropout, and **Steve Jobs**, the enlightenment-seeking visionary (and college dropout). Unlike many companies with similar beginnings, Apple had leadership in a very different form almost from the beginning. A.C. **"Mike" Markkula**, who had made his fortune at Intel and Fairchild, brought a more seasoned outlook to the fledgling company. The company's first president, **Mike Scott**, had similar experience. This match of the zealous whiz kids and the seasoned professionals set Apple apart.

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## Conversation with Regis McKenna

Regis McKenna shaped the country's perception of Silicon Valley, and played a major role in shaping the original idea of Apple Computer, and then the Mac.

**Maclopedia:** Could we ask you how you see your role in getting Apple going?

**Regis:** I am not...a publicist or Apple PR person. I hate the word *publicize*. It was never my intention or objective to “publicize” Apple or the Mac—I wrote the marketing plan for the Mac and helped write the marketing plan for Apple.

New technologies cannot be “publicized.” There are no reference points. The more you promote a computer product without first developing the infrastructure—that is, their third-party software developers, distribution channels, early adopters (people who know what to do with a first time ever-thing called a personal computer)—the faster you go out of business. Without first educating the infrastructure of the industry, nothing would have happened. My firm did the infrastructure development. We were doing that for Apple long before the evangelists showed up.

Steve Jobs and Steve Wozniak came to my firm to ask for assistance, and they did that on the reference of Intel. So the first discussion was about putting together a business, to build a personal, well, at the time

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*hobby* computer, and then it became a hobby/personal computer, and that was not such a strange thing because having worked with Intel on the microprocessor, I had helped develop application notes at Intel around the whole idea of hobby computers. So in 1977, [a single board computer] wasn't such a strange idea. But they [Jobs and Wozniak] had a novel approach—providing a completely packaged computer. By that time, I had come to believe that anything was possible with technology.

The thing was that Woz had written his own version of what this next computer was going to look like, and I looked at it, and I said, "I am going to have to rewrite this in English," and he got upset, and I said, "If you want to talk to yourself and your friends, you shouldn't be here," and I ended the meeting. But Steve Jobs, who is still a very close friend, kept calling me back, and he was one of the few people who is responsible for the personal computer becoming a household item. He talked a lot about it being part of the education environment, so his vision was very strong, and he was a very relentless and driven person. So I sent them to Don Ballantine, who was a venture capitalist I had worked with before at National Semiconductor when he was VP of Marketing there, to talk about their idea and raise money. He brought in Mike Markkula to write the business plan (Mike had worked for him before), and I worked with Mike on the original business plan. We helped them set their strategies and later put together the first marketing plan and helped them manage that.

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**Maclopedia:** Okay, with that said, what was your first contact with the Mac like?

I first saw the Mac in a little rented room down on Stevens Creek Boulevard, not near the Apple facility at all, on a Sunday morning. Steve [Jobs] came over to my house and was telling about this thing he was developing, and they were beginning to breadboard it, so we sat around and talked about what it was capable of doing.

His vision was intuitive computing. You don't have to do anything; you just point and click. It was pull-down menus, real ease of use, taking the computer to the next level. He knew very well that the Apple II—although it was very far ahead because it put everything under one skin—was not enough to do serious computing, and in order to broaden the market, he had to create the automatic transmission. That was the Mac—automatic transmission.

This strange marriage has continued through much of Apple's history. While technical geniuses like **Bill Atkinson** and **Jef Raskin** were creating the products that would change the computer world forever, the seasoned marketer **John Sculley** was leading the company as a whole. At times, the rift between these groups caused serious trouble within Apple, but when things went right, these two factions could change the world.

The Macintosh has a fascinating history of its own. Started as a small project by a lone researcher, the Macintosh turned into the very heart of Apple's product line. Although the Mac borrowed from its predecessors—the Alto,



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developed by Xerox PARC , and Apple's own Lisa—it had a personality all its own. Ever since the incredible “1984” commercial that first put the Mac in the public eye, the Mac has been a computer “for the rest of us.”

“The rest of us” have fun with our Macs. We search for Easter eggs hidden in our programs. We contemplate the mysterious dogcow. We gather in massive numbers at MacWorld Expo—a great orgy of Macintosh products and culture. And we take Macintosh evangelism into our own hands, “selling” the Mac at every opportunity.

**More Than 10 Years After: A Personal Perspective by Don Crabb** I remember where I was. I was sitting at home watching the Super Bowl. Near the end of the first quarter, the most amazing thing happened. No, not during the game, itself (I can't even remember who played), but during a commercial break. There it was. An athletic blond woman throwing Thor's hammer at a big screen filled with the image of Big Brother. The image shattered as the voice-over intoned, "See why 1984 won't be like 1984."

At that precise moment, I knew I'd made the right decision. You see, I was working for the University of Chicago, for The Computation Center—the University's central computing organization. For the previous 18 months, I had been part of a small group lobbying the Center's director, and many of the University's top managers, to get in on the desktop computing revolution. Because of our annoying persistence, the University signed a deal in 1983 with Apple Computer, Inc., to become a founding member of a new organization—the Apple University Consortium (AUC)—agreeing to buy at

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least two million dollars worth of Apple computers over the next year and succeeding years.

That agreement was risky. We and the other founding members of the AUC inked the deal while Apple's current computing line was going through terrible growing pains. The Apple III was a dog. The Lisa, although innovative and important, cost an unbelievable \$10,000 per unit. And the Macintosh, although promised and impressive in its alpha and beta versions, was still just a dream. We really didn't know if the thing would fly.

And even if it did fly, we were having a tough time figuring whether there'd be software to run on the beige toaster. During our alpha and beta tests, we had exactly two applications to try—the alpha/beta MacWrite and MacPaint. Both applications stunned us with just how good and different they were than anything we were used to on Apple IIs, IBM PCs, and VT-100 terminals connected to our networked DEC system-20 mainframes.

But we were also shocked by how buggy they were. We learned to save your work every five minutes because you were guaranteed the programs would lock-up every 10 minutes. You think that today's type one errors disturb you? Those are nothing compared to the screen freezes we suffered during 1983's Mac beta testing. In the middle of something simple in MacWrite, such as highlighting selected text to change the font, the cursor would freeze. Then the application image would begin to decay, pixel-by-pixel, usually when you were showing the thing to a University gun who still thought the AUC agreement was pretty darn precipitous.

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With no Shift-Option-Command-Escape, you could forget a soft exit from these problems. You could try the programmer's switch, but that usually made things worse, so bad that you had to shut the computer off, wait a minute, then reboot, hoping that the disk containing the alpha/beta system, MacWrite, and MacPaint hadn't been fried.

Of course, we were so excited, so overwhelmed by the Mac-to-be, that while frustrating, none of these problems seemed significant. At least they didn't seem significant while we were working on the seed unit. But later, at home, when we'd reflect on what we did and did not accomplish during the day, we began to wonder if we shouldn't keep our resumes and vistas up-to-date, just in case the whole thing came crashing down around our heads.

As we moved closer to the January 1984 announcement date, we got good and bad news from Apple: The ImageWriter printer we were testing wouldn't be available at the announcement. We had to wait until March before they shipped. The external drive (so you could backup your work without disk flipping) wouldn't be ready until at least April, maybe longer. And the serial hard disk we were promised (a version of the 20MB Lisa hard drive) was going to be delayed even further. Apple had nothing to say about our 128KB RAM concerns, except that they expected software vendors to write their code tightly (they actually said this with a straight face!), and that they were going to address the limitation later in the year.

For those of us smarting under the failure of the Apple III and the Lisa, these were not hardware futures we wanted to hear about.

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But good news did start to come out of Cupertino. The system and ROM Toolbox were being debugged much faster than expected and it showed in our beta versions. MacWrite and MacPaint stopped crashing all the time. Microsoft promised a BASIC interpreter to go with Apple's promised Pascal interpreter. It looked as if the Mac might just be the user-friendly if we were still waiting on BASIC and Pascal, and Microsoft's Multiplan (the first Mac spreadsheet and precursor to today's Excel).

The beta Mac was reasonably solid and MacPaint and MacWrite worked. Using the Clipboard, you could cut and paste between applications (loading one and unloading the other, since they both couldn't fit into RAM at the same time). We hardly noticed the disk flipping effort such actions took, nor did we notice the real need for that promised hard disk or the additional RAM .

In January 1984, we were so mesmerized that the damn thing worked at all, that it cost much less than the Lisa, and that it was small and portable enough to lug around campus, we overlooked the first Mac's obvious shortcomings. These shortcomings became all too apparent during the following months and would have sunk Apple in 1985 if it wasn't for John Sculley, the 512KB Mac, AppleTalk, and the LaserWriter.

**The Macintosh Culture: Then and Now.** "1984" proved that Apple Computer, Inc., and the Macintosh were very special. In fact, Apple taught us that the Mac was more than another computer—it was the embodiment of the American ethos. The Mac heralded the dawning of a new age of self empowerment and personal liberty. It implied an assault on the corporate

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structure promised by Big Blue, a structure that demanded strict conformity and offered limited individual potential.

Although the first version of the Macintosh was seriously underpowered and overpriced, it rapidly developed into the state-of-the-art in personal computing because of the MacOS and Finder GUI. With hardware plug-and-play capability, instant AppleTalk networking, an intuitive graphical user interface, and much more, Apple founder Steve Jobs could rightly claim that the Mac was "insanely great." And Mac buyers knew it, even if they gritted their teeth at the high prices Apple charged for these Macs.

That arrogant attitude has gotten Apple into serious trouble in recent years. Apple can longer charge premium prices for their machines, compared to Wintel PCs, and the Apple "Not Invented Here (NIH)" syndrome caused the company to overlook hot new technology developed outside the company and to waste money trying to produce software challenging established industry standards. In addition, Apple resisted licensing its MacOS to other computer vendors (a strategy that has made Microsoft's Bill Gates a billionaire with his Windows operating system) until 1995, playing catch-up all the way.

As a result, in 1996, Apple finds itself in a pickle. It fired CEO Michael Spindler and brought in former National Semiconductor CEO Gilbert Amelio to run the show and redefine what Apple stands for and what the Mac culture ought to be about.

But all is not lost at Apple. Apple is going through many of the growing pains that a 20-year-old technology must go through. All signs point to Apple

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recovering and growing a new Macintosh culture—one that makes great products, but also learns to make nice with the rest of the world.

## ***For More...***

*If you want to do this...*

*Go to this entry...*

Know Apple's History

Apple Computer, History

Know how the Mac got started

Macintosh, History

Know about Apple's founders

Jobs, Steve

Wozniak, Steve

Wayne, Ron

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## Hinting

Theoretically, **outline fonts** make it possible for type to be perfectly reproduced when it's printed. In practical use, however, outline fonts are converted to dots when they're printed, with the printer itself deciding where to place the dots to best reproduce the outline. Hinting is information contained in font files that controls that conversion back to dots from an outline format, so that the type will be reproduced faithfully no matter what the printer's resolution or the type size.

### *See Also*

Bitmapped Fonts; Fonts; Outline Fonts

## Hit Counter

A script on a **World Wide Web server** that calculates each *hit* or visit to a **Web page** every time a connection is made, and displays the current total on the page to the current user.

### *See Also*

World Wide Web; World Wide Web Page

## Hollywood Games Connection

Any trend, sooner or later, captures the attention of Hollywood and computer



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games are no exception. Although movies that are simply about computers are in no short supply (*The Net*, *Hackers*, *Virtuosity*, *Sneakers*, *Lawnmower Man 2*), many hit films aimed at kids are based on games including *Street Fighter*, *Mortal Kombat* and the *Mario Brothers*. On the flip side of the coin, almost any good action movie sooner or later has a computer game tie-in.

The current onslaught of games based on the movies include *Blown Away*, a sequel to the movie with Jeff Bridges (although he is absent from the game), an arcade game from LucasArts based on *Indiana Jones* and the forthcoming *Die Hard* Trilogy from Fox Interactive. The best of the lot is the simple desktop diversion arcade-style game, *Indiana Jones Desktop* from LucasArts.

However, *Blown Away* holds its own against other video-heavy titles, and interactive movies like *Dracula Unleashed* or *The Daedelus Encounter*. Usually due to budget and licensing reasons, games like *Blown Away* and *Johnny Mnemonic* lack the stars of the corresponding films, but big-name actors are no strangers to games.

Tia Carrere blasts her way through **The Daedelus Encounter**, which is a surprisingly good game, especially when you look at the disappointing lot of other video-intensive titles. Dennis Hopper and Grace Jones get digitized in the surreal, creepy **Hell** whereas Debbie Harry and Corey Haim get trapped in the disastrous **Double Switch**.

In **Double Switch**, you are in charge of security in a large hotel and must keep the guests safe from lurking bad-guys. In this case, the game falls flat in accuracy and action. It is difficult to tell where you need to click and when

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to capture the bad guys and the video scenes are hard to figure when you need to do something and when to just watch.

Voyeur from **MacPlay** starring Robert Culp is another example of multimedia enhancement actually hindering game play. The premise is interesting: you are spying on a potential presidential candidate, looking for scandalous material, but the over-abundant video takes away from the interactivity of the game. Philips Interactive is currently working on Voyeur II and hopes to add more interactivity without losing the high quality of the video.

## *See Also*

Blown Away; The Daedelus Encounter; Hell; Wing Commander III; Return to Zork

## Home Key

If you are viewing a window in a list view, and the window has scroll bars, pressing the Home key (found only on extended keyboards) scrolls the window as far up as it can go, revealing the first items in the window.

The operation of the Home key varies from application to application, but the most common action of the Home key moves your **cursor** in front of the first visible word in a document's window.

## *See Also*

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Active Window; Cursor; Desktop Level

## Home Page

The opening document of a site on the World Wide Web, part of the **Internet** . Sometimes called a welcome page.

A home page serves as the “front door” from which a reader can follow Hypertext links that lead to all of the contents of a site. Because of its introductory nature, a home page should contain a number of essential elements that will tell readers about the Web site they are visiting.

A home page can be broken into three basic divisions: a *header*, a *body*, and a *footer*.

- The page *header* includes such general information as a banner or logo, a title, an introductory **GIF** or **JPEG** image or **imagemap** , or a series of buttons or links to various locations on an individual site. It also contains a statement of purpose.
- The *body* of the home page is often set off from the header by a horizontal rule. The body contains some introductory links or a list of contents, and the basic text you want to provide.
- The *footer* can contain a surprising amount of important information and should not be overlooked. It can contain a copyright notice; an indication of when the site was last updated; an email address or name

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of the person who set up and maintains the site; and links to other parts of the site.

Each primary category of information contained in a Web site leads to its own path of documents. The links on the home page lead the reader through the path and, taken together, make a “tree” of information.

The better organized the middle levels of information on your site, the easier it will be to navigate, and the more useful it will be.

A personal home page often contains a photo of the subject and tells some useful information about his or her activities, as well as conveying a sense of the author’s personality.

Personal home pages can easily become trivial unless the authors ask themselves some essential questions:

1. Is there a special reason people would want to read about me?
2. Do I have some service or business that people might want to utilize?
3. Do I belong to groups, companies, or large organizations that people might want to know about?

Maintaining a site’s contents and checking the links to see that none are “broken” (don’t lead to the correct file) are essential parts of creating both a home page and a Web site.

***See Also***

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Internet; Web Page; World Wide Web

## Home Publisher

*See*

Other Page Layout Applications

## Home Repair Encyclopedia

This **CD-ROM** guide is a “must have” for the homeowner. It walks you, step by step, through more than 50 home projects. Minor and major emergencies, such as wine stains on the carpet, gas leaks, broken pipes, and fire, are also covered. It explains how to use common tools and tells you which ones you need in your tool box.

It even covers tools you're likely to rent rather than own: cement mixers, post hole diggers, concrete saws, floor sanders, and scaffolding as well as a dozen other heavy duty items. Animated diagrams explain how things work, and there are tips on saving money and working safely. Any page can be printed out for reference, so you needn't keep running back to the computer to see what to do next. There's a list of 800 numbers for the handyman, and a paint reference guide that explains what alkyd, latex, and similar terms really mean.

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## Homebrew Computer Club

In the mid-1970s, the computer world was vastly different than today. It was dominated by huge, expensive, and inaccessible mainframe computers from IBM and others, and the slightly less huge, expensive and inaccessible “minicomputers” from companies such as Digital. The idea of a “personal” computer was foreign to all but a few hobbyists.

In 1975, the first personal computer, the Altair 8800, was introduced by a small company in New Mexico. The Altair came as a kit that had to be assembled by the user. It was programmed using switches on the front panel, and even with a concerted programming effort, it couldn't really do much. But the hobbyists were hooked.

Inspired by the Altair, one group of electronics nuts began meeting as the “Homebrew Computer Club” in Menlo Park, California, near Stanford University. Within months, its membership exploded. Among the group's first members were **Steve Wozniak** and his friend **Steve Jobs**, future founders of Apple Computer.

Many of the members of the Homebrew Computer Club saw these new, affordable computers as a great liberator that would level the playing field between big corporations, that could afford mainframe computers, and everyone else, who could not. This theme would later become a major selling point of the Macintosh, “the computer for the rest of us.”

In early 1976, Steve Wozniak showed his design for a new computer at a

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meeting of the club. Many club members were unimpressed, but Steve Jobs saw the potential of this new, cheaper design and convinced Woz to go into business producing Wozniak's new computer. Another club member, Paul Terrell, also liked the design and told Jobs to "keep in touch." Jobs showed up at Terrell's computer store, **The Byte Shop** , the next day and sealed Apple Computer's first order: 50 Apple I computers at \$500 each.

*See Also*

Byte Shop, The; Jobs; Steve, Wozniak, Steve

## Homer

*See*

IRC

## Hornet

*See*

F/A-18 Hornet

## Horror Themes in Games

*See*

The 7th Guest, Hell

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## Hot Spot

Each **cursor** has a hot spot. This is the exact point on the cursor that invokes an action. Having a hot spot enables a cursor to be used for very precise movements and selections. The tip of the arrow is the hot spot on the **arrow pointer** , meaning you put the tip of the arrow pointer on a **file** or a **folder** when **selecting** . If you put only the tail of the arrow pointer on a folder and **click** , it's not selected because the tail is not the hot spot.

Knowing a cursor's hot spot is particularly important for people doing graphic design or computer-aided design (CAD) work on a Mac. Adobe Photoshop, for example, has a cursor that looks like a paint brush. However, the paint does not flow from the entire cursor; it only flows from the hot spot of that paint brush cursor.

You can set a preference to change the cursor to one that displays the exact hot spot by displaying a cursor that matches the selected brush size. This enables you to be very precise when painting.

### *See Also*

Arrow Pointer; Click; Cursor; File; Folder; Selecting

## HSB

### *See*

Color Gamut, Desktop Publishing Color Models



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## HST

*See*

Modem Protocols/Modulation Protocols

## HST Cellular

*See*

Modem Protocols/Modulation Protocols

## HTML Tables

*See*

Tables, Creating in Netscape

## Hub

As **network** cabling stretches over long distances, the signals degrade. Because of this signal degradation, unassisted network cables can not work reliably beyond certain lengths. In situations where a small number of computers must be connected over long distances, repeaters can be strategically placed at appropriate intervals to amplify the network signal, allowing extension of the network over longer distances. The most common type of repeater is the hub, which is actually a multiport repeater (Examples

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include Farallon's StarController and Focus's TurboStar).

Hubs are used in Active Star **LocalTalk** networks and in **EtherNet** networks. In either case, the hub repeats each network signal to every node connected to the hub. There are EtherNet repeaters for all flavors of EtherNet cabling: thick, thin, and twisted-pair. In fact, with twisted-pair EtherNet (otherwise known as 10Base-T) repeaters or hubs are mandatory. All 10Base-T connections must be made through a hub.

**TIP** Hubs cannot translate protocols between the individual ports—they cannot, for example handle EtherNet traffic on one port and LocalTalk traffic on another. Translation tasks must be performed by a router.

## *See Also*

EtherNet; LocalTalk

## Human Interface Guidelines

The Human Interface Guidelines is a set of rules and suggestions for interface design on the Macintosh.

From its first days, the Macintosh was different. You could see what your document would look like on the screen, and you didn't need to remember strings of confusing commands to accomplish your work. Just as important, different programs behaved in the same ways. For the most part, things were

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*consistent* from one application to the next. If ⌘-S meant Save in MacPaint, chances are it meant the same thing in MacWrite.

Consistency is one of the most important reasons that the Mac is easy to use. Part of this consistency comes from the **Toolbox**. By using a common set of routines for things like windows and menus, programs tend to operate similarly whether they try to or not. But the single biggest contributor to consistency is Apple's Macintosh Human Interface Guidelines.

The guidelines follow 13 basic principles of interface design:

- Metaphors
- Direct Manipulation
- See-and-Point
- Consistency
- WYSIWYG (What You See Is What You Get)
- User Control
- Feedback and Dialog
- Forgiveness
- Perceived Stability
- Aesthetic Integrity

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- Modelessness
- Knowledge of Your Audience
- Accessibility

You can see these principles at work throughout any good Macintosh application. ClarisWorks, for example, uses a page metaphor to tie the computer world to the real one. To edit things on the sheet of paper, you manipulate them with the mouse and keyboard. You can see and point to various commands on the menu bar or tool palette rather than having to remember arcane commands. The program is consistent within itself and with other Mac applications; for example, opening and saving a file works the same way as in other programs.

Within the limitations of screen technology, what you see in your document window is the same as what you will see when you print the document. You, the user, have control over everything; the application will not start an action on its own or arbitrarily limit your options. Similarly, the application maintains a dialog with you by providing appropriate feedback when things have gone wrong. If you make a mistake, you can generally undo it rather than living with it.

The interface remains stable as you work; if a menu item is temporarily unavailable, it is dimmed rather than disappearing completely. Aesthetically, the application is consistent and pleasing to the eye; the interface is not cluttered, nor are standard graphical elements used for non-standard

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purposes. Although the application operates in several distinct modes (word processing, drawing, and so on), the modes are logical and not arbitrary; for example, you don't need to enter a special command mode before choosing from a menu. The application was designed with extensive knowledge of its target audience, as its sales will attest. Finally, the application is accessible to a wide audience, and is available in many localized versions for other languages.

Under these principles, the Human Interface Guidelines provide specific information about every aspect of Macintosh interface design. From the design of dialog boxes and alerts to the wording and arrangement of menus, the guidelines provide detailed information for creating a good Macintosh application.

Like much of Apple's programmer documentation, the Human Interface Guidelines are available in two formats: electronic and print. The electronic version is available on Apple's developer Web site (<http://dev.info.apple.com/>). In addition, Apple has created a multimedia companion to the Human Interface Guidelines. The *Making it Macintosh* CD-ROM illustrates many of the issues covered in the guidelines themselves using animated examples.

## ***See Also***

Inside Macintosh; Toolbox

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## HyperCard

HyperCard was, arguably, the beginning of the current multimedia wave. It was the first application that enabled users to create interactive presentations without having to write a program from scratch. Although it has mostly been superseded by its competitors (**SuperCard** does nearly everything HyperCard does and offers more features), it remains a useful tool.

Like most multimedia authoring tools, HyperCard is an interpreted environment; you need the HyperCard application to run a HyperCard presentation. HyperCard stores presentations in files called stacks. HyperCard uses a metaphor of a stack of cards. What you see on screen at any point in time is a card. That card contains text fields, graphics and buttons. A presentation can contain any number of cards, hence the term stack.

Cards can be linked together by a common background. A background is like a template. Backgrounds can contain any elements that a card can contain, and any card linked to that background contains those elements. This makes it very easy to create something with many repeating records, such as an encyclopedia or an address book.

Interactivity is created using HyperCard's **scripting** language HyperTalk. A **script** is a small routine or program that performs some action, such as going to the next card in a stack. HyperCard now also supports **AppleScript**, a scripting language that can be used to control other programs (provided

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the developer of that program has included support for **Apple events** , the commands provided by AppleScript). Any button in HyperCard 2.3 or greater can either have a HyperTalk script or an AppleScript attached to it.

While scripting provides a tremendous amount of flexibility (it's entirely possible that you will never reach the limits of the HyperTalk language), there are nonetheless limits to what can be done with a script. The biggest limitation is that there is no direct access to the operating system. So, for example, you can't write a script that uses the serial port. **XCMDs** address this limitation by enabling programmers to write a program using a language like C++ or Pascal, compile it as an XCMD, and place the XCMD in the HyperCard stack, using a utility such as ResEdit. The XCMD can then be used by a script. There are many shareware XCMDs available, as well as some commercially available. Check online services for latest lists of such tools.

HyperCard comes with some XCMDs that add support for color graphics and QuickTime. As part of the QuickTime VR Authoring Toolkit, there is an XCMD that supports QuickTime VR. An animation tool called ADDMotion is also included.

After a stack is completed, it can be distributed to others by adding the HyperCard Player. The stack that has the player attached to it operates like a regular HyperCard stack. The user can add new cards to the presentation and type-in information, but the editing tools that enable the manipulation of graphics or repositioning of fields are not available. Make sure that if your stack makes use of color that you increase the minimum size for memory

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requirements of the Player application you create or the color will not display!

One of the best sources for learning HyperTalk, particularly if you have done any programming before, is the On-line HyperTalk Reference manual. This stack contains nearly all of the information you need to program in HyperTalk. It includes examples and cross-references and is also fully searchable.

HyperCard remains a very useful tool. Unfortunately, over the years Apple has been uncertain how to support and market the product. Consequently, other tools, such as **SuperCard** and **Director**, have mostly replaced it, because they offer more features and are frequently updated. Oracle has even released a new tool, Oracle Media Objects, which closely resembles HyperCard and is a **cross-platform** tool.

## *See Also*

AskText XFCN; Audio XCMDs; CompileIt!; HyperGraph; QuickTime; QuickTime VR; Double-XX; Scripting; XCMDs

## HyperGraph

A graphics package that can be used in any program that supports XCMDs (**HyperCard** , **SuperCard** , FoxPro, and so on) Use it to create line, bar, and polar graphs. HyperGraph creates a graph based on numeric information, options chosen, and places the graphic on the Clipboard.



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Heizer Software

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Price: \$79

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Phone: (800) 888-7667 or (813) 559-6422

Web: <http://www.heizer.com>

## *See Also*

Director; Double-XX; FoxPro; HyperCard; SuperCard; XCMD

## HyperTalk

The scripting language used in **HyperCard** .

## *See Also*

HyperCard; Scripting; XCMDs

## Hypertext

First coined by **Ted Nelson** , designer, author and academic, the term Hypertext refers to electronic documents that contain links to other documents or other sections of the same document. These links are attached to a word or phrase (the Hypertext). Clicking the word or phrase displays the linked section.

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Hypertext is used and implemented in a wide variety of authoring packages and multimedia presentations. It is particularly appropriate for reference works, such as encyclopedias and technical manuals. Many online help systems make use of Hypertext. Hypertext is the essential design philosophy of the World Wide Web.

Ted Nelson has spent many years promoting a Hypertext system called **Xanadu**. Never completely implemented, Xanadu was an electronic network that would have resembled the **World Wide Web**.

**Hypertext, Tools** There are few authoring systems that provide flexible tools for creating Hypertext documents, even though Hypertext is one of the classic implementations of **interactivity**. It's possible to create Hypertext documents using tools, such as **HyperCard**, Allegiant Technologies Inc.'s **SuperCard**, or Macromedia Inc.'s **Director**. You can manually create links, but there's no automation; they must all be created and maintained by hand. The same problem exists with tools, such as Adobe **Acrobat**, which also provides capabilities for adding links to documents.

The Kerouac ROMnibus, an interactive CD-ROM produced using Director, uses colored, slightly bold text to indicate Hypertext entries that display an annotation window.

Netscape Navigator uses colored text to indicate Hypertext links; clicking a link takes you to another Web page, Web site, or might download a file.

The World Wide Web provides one alternative solution for anyone

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considering a project requiring Hypertext. The World Wide Web depends on links, and tools are appearing that provide for the creation and maintenance of links. Adobe's **PageMill** and **SiteMill** fit this bill. Remember, HTML doesn't have to be viewed over the Internet. It can be used over local networks (**Intranet** ) or from local hard drives or CD-ROMs.

**Hypertext, Design** Producing a good Hypertext system is difficult, because there are so few good tools for either creating the content, or for viewing Hypertext systems. Although an HTML browser is perhaps the best solution at the moment, the Web is still a new medium and there are many limitations; for example, only some browsers support the **Shockwave** plug-in and **frames** in Web pages.

A serious limitation of most Hypertext system designs is the confusion they create for the user. Clicking links often replaces the entire content window with new content. After several following several links the user no longer has a clear idea of where they were or where they are going. World Wide Web browsers attempt to solve this problem with the Back and Forward buttons, which take the user back and forth over a chain of links that they have already accessed, and the History window.

Due to the "on the fly" nature of the Internet, a simple history list is perhaps the only solution for the Web. For navigation within large sites or large Hypertext documents much better navigation techniques, such as maps and signposts indicating where the user is, should be used. Hopefully, new **HTML** features, such as **Frames** (a **Netscape** addition), might eventually lead to

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better Hypertext systems.

Whether using HTML or some other authoring system, Hypertext document authors still have to create their content using traditional non-Hypertext tools, such as word processors or databases. This can be as difficult a process as the implementation itself. If you are about to implement a Hypertext system, your primary consideration should be the authoring and viewing environments and how easy it is to enter and maintain your information.

## *See Also*

HTML; Intranet; PageMill; SiteMill; World Wide Web; Xanadu

## **Hypertext Fiction**

Hypertext is closely related to interactive fiction in that it basically consists of information and content organized in a non linear fashion. In an multimedia encyclopedia, Hypertext operates as a form of dictionary. When you read the sentence, “To get on the Internet, you will need a modem,” you may want to know more about modems. By clicking on the word “modem,” a Hypertext link carries you to a more in-depth definition or discussion of modem, which then may be linked to an even more specific topic such as “modem port” or “baud rate.” In Hypertext fiction, a story can take multiple twists and turns just following a character or line of plot that you choose. For example, in Eastgate Systems’ “Victory Garden” by Stuart Moulthrop, a story about a group of college kids caught in the middle of the Persian Gulf War,

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you can follow certain characters to the point where someone mentioned in the first chapter may not ever be mentioned again if you don't click on that character, but if you do pick them, they become the main character.

The multiple paths through the story and the randomness of the endings make Hypertext fiction much closer than regular linear fiction to life's complex selectivity and change. currently, Eastgate is the most prolific publisher of Hypertext fiction. Their latest titles include Patchwork Girl by Shelley Jackson a feminist Frankenstein and Tim McLaughlin's Notes Toward Absolute Zero, a novella. Their Afternoon: a Story, is considered one of the first Hypertext works with critical literary value. Sarah Smith's King of Space, also published by Eastgate, incorporates intriguing puzzles into the Hypertext novel, but its erotic content makes it suitable only for adults.

Hypertext is somewhat similar to the gameplay involved in **MUDS** on the Internet and **Non-Linear storytelling** , as well as some of the original interactive fiction and text-based **adventure games** .

## *See Also*

Cypher, the; MUDs and MOOs; Non-Linear Storytelling Games

# Hyphen

The hyphen is, logically, what you get when you press the hyphen key. It is used to indicate that a word has been divided, as when it jumps from the end of a line to the start of the next. A hyphen is not the same as an em-dash or

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an en-dash. An em dash — like this one — gets its name from the fact that in a given font, it's about as wide as a capital M. An en-dash is half the length of an em-dash and is used to indicate a range of numbers, like 1-5, or as a minus sign. Hyphens are even shorter than an en-dash. Type an em-dash with the combination Option+Shift+Hyphen, and an en-dash with Option+Hyphen.

*See Also*

Discretionary Hyphen

## Hyphen, Discretionary

Hyphenating words makes your columns of type look less ragged, and is often necessary when the type is set justified. Word processors and desktop publishing programs will hyphenate words automatically, according to rules supplied in the spelling dictionary. You can override these and place the hyphen where you want it, by clicking at the point where you want the word to break and pressing Option + hyphen.

You can also determine rules to follow for hyphenating words, defining the number of consecutive hyphenated lines to allow, and establishing a hyphenation zone. Words falling within the hyphenation zone would be automatically hyphenated. These discretionary hyphens are set differently, depending on the word processor, but there's usually a dialog box accessed through the Tools menu or Format menu. Because hyphenated text is often harder to read, avoid using too many consecutive hyphens.