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D1

A digital video production format that has rectangular rather than square pixels.

Daedelus Encounter, the

Actress Tia Carrere (*Wayne's World*) and comedian Christian Bocher star in this extravaganza from game developer Mechadeus. The Daedelus Encounter has all the elements of a potential gaming flop, big budget, big names, too many discs, and so on. But surprisingly, Daedelus is fun to play and even pushes the possibilities of the CD-ROM game format to another level.

Filmed against a blue-screen background, the actors are poured into a digital environment that would cost millions in a major motion picture (actually, Hollywood could learn a thing or two from Mechadeus). You play a disembodied brain that accompanies Carrere and Bocher onto an abandoned ship overrun with metal-eating birds who aren't very friendly to humans either. The puzzles in Daedelus are tough and game play, though somewhat limited by the linear storyline, is engaging. The sheer ingenuity behind the design of the game, and the thrill of watching convincing actors respond to your movements make Daedelus a breakthrough title. Though switching discs can be a pain, and non-power Macs can be a bit plodding between scenes, Daedelus is leader of the pack when it comes to live action animated adventures. Also, if the science fiction theme suits your gaming tastes, try

these titles as well: Star Trek: 25th Anniversary from **MacPlay**, Star Trek: The Next Generation: A Final Unity from Spectrum Holobyte, The Journeyman Project & Journeyman Project II: Buried in Time from Sanctuary Woods and **Hell** from Take 2 Interactive.

See Also
Eastern Mind; Full Throttle; Hell; Myst; Return to Zork; Riddle of Master Lu, the; 7th Guest, the; TimeLapse

Dark Eye, the

More of a game than Inscape's other non-linear storytelling venture—**The Residents' Bad Day on the Midway** —**The Dark Eye** enables you to wander through the world of Edgar Allen Poe. Based on his tales of horror, including "The Tell Tale Heart" and "The Masque of Red Death," The Dark Eye weaves a dark narrative around Poe's characters and landscapes. Dark Eye incorporates complex puzzles into the literary world and is much harder to maneuver around in than Bad Day, but is more faithful, in that respect, to its interactive fiction roots. Every choice you make in the game has a direct effect on where you end up next.

Poe fans will relish the chance to intermingle with creepy folk from their favorite work and gamers into adventure games will most likely find The Dark Eye a worthy challenge. The bizarre mix of art-forms, including 3D rendered characters, line drawing background and 2D hallways creates a

schizophrenic, disorienting mix of visual styles that probably would've made Poe proud. As with Bad Day on the Midway, hard-core gamers will be better off with non-literary based adventure games like **The 7th Guest** or **Myst**, but The Dark Eye is a good step in the direction of bringing a little more to gaming than simple seek and find commands. On a literary platform, The Dark Eye stands out as a unique interpretation of Poe's work.

See Also
Adventure Games; Cypher, the; Hypertext Fiction; Non-Linear Storytelling; Residents' Bad Day on the Midway, the

Dark Forces

See
First-Person Perspective Shooters

DAT

Originally developed as an audio tape standard, DAT (Digital Audio Tape) is now widely used as a backup medium.

The DAT format supports multiple **sampling rates** up to a maximum of 48KHz. It also supports the **CD audio** standard of 44.1KHz.

See Also

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Backing Up with Tape Drives

Data Bus, Types of

See
Power Mac Logic Boards

Data Communications Standards

Sets of standards that govern the format of data communications between computers connected by **modems** to the **Internet** or **commercial online services** such as **America Online** .

The most common standards are

- **V.22bis:** The standard governing communications at 2400 baud per second (bps).
- **V.32:** The standard for communications at 9600 bps.
- **V.32bis:** The standard governing communications at speeds of up to 14.4Kbps.
- **V. 32turbo** : An extension of V.32bis technology that allowed speeds up to 19,200 bps.
- **V. Fast** : (Also called V.Fast Class) Interim modem speed that eventually

led to V.34.

- **V. 34** : The standard for communications of up to 28,800 bps.
- **V.42:** The standard that provides error correction using the Microcom Networking Protocol (MNP). Checks for errors and automatically requests that data be resent if errors occur.
- **V.42.bis:** A standard that allows more data to be transmitted faster than other standards through data compression.

See Also
Asynchronous Data Transfer, Internet, Local Area Network, Modem, Packets, Parity

Data Compression
See
Modems/Chooing, Modems/Data Compression

Data Input Devices

There are many ways to get **data** into your Mac. Every method, be it a **keyboard, mouse, trackball, touchpad, joystick, graphics tablet** , and so forth, uses the same connection and data transmission vehicle—the **Apple Desktop Bus (ADB).**

The Mac supports many different types of data input devices. The following

table provides an overview of these ADB devices and their uses.

Data Input Devices for the Mac

Type of Device	*Examples Features*	*Price Range*
Keyboards	Apple Extended Keyboard, Microsoft Natural Keyboard, Adesso Tru-Form keyboard, Apple Adjustable Keyboard, Health Care's Comfort Keyboard, Infogrip's BAT Personal Keyboard	Standard QWERTY with Function keys, split-angle keyboards, built-in pointing devices, height and angle adjustments, QWERTY layout of keys $125 – $795
Mice and Trackballs	Mace Group MacAlly, Kensington's Thinking Mouse and Turbo Mouse, Itac Systems' Mouse-Trak, CH Products' Trackball Pro ADB	Single, 2-, 3-, and 4-button mice, softly rounded contours, rubberized sides $49 – $139.95
Touchpads	Hagiwara Sys-Com's PointPad, Touche Technologies' TouchPad, Alps Electric Desktop GlidePoint, MicroQue QuePoint II	Flat, rectangular devices using weak electrical signal to sense touch. $79 – $99
Pointers	Interlink Electronics' RemotePoint, Elo Touch Systems' TouchMonitors, FTG Data Systems' PenDirect ADB, Jabra Group's Ear Phone Streamline AV I R	

	receiver-based pointers, touch-sensitive monitors, cursor-control via pens $99.95 – $199
Graphics Tablets	Wacom Technology's ArtZ II and ArtPad, CalComp Drawing Slate IITablet and stylus for digitizing graphics $199 – $389.99
Joysticks	CH Products' FlightStick Pro for Mac and Jetstick, Kernel Productions' ChoiceStick 1.0.2 Game piloting devices $74.95 – $129.95

Some input devices are eccentric because they are designed for specialized uses— to assist handicapped people access information from computers, to assist in secretarial phone duties, or to speed up data entry. The chording keyboard, for example, solves problems for people who use the phone constantly or suffer from carpal tunnel syndrome. Voice input and control has become a rapidly growing field of interest since the introduction of the **AV Macs** and the **Power Macs**. For those working with virtual reality applications, 3-D imaging, musical performance, dance, or architectural walkthroughs, a glove, headgear, or sock fitted with motion sensors allows you to manipulate objects in space. As strange and esoteric as these devices may seem, they all deserve serious consideration. Many of them are even more useful in vertical applications for the physically challenged.

- **PowerSecretary.** PowerSecretary by Articulate Systems translates spoken words into word processor-readable text using Apple's **PlainTalk** software technology. If first recognizes the spoken sounds

and converts them to the most likely letters and combinations. Then, using a 120,000-word dictionary, it finds the correct words and displays them in your document at a rate up to 45 words per minute. PowerSecretary takes dictation within most applications that include text and numbers, such as spreadsheets and databases, and vertical applications in the medical and legal fields. PowerSecretary adapts itself to each user, and improves efficiency whenever users need hands-free entry. It also serves as a voice control system, similar to its other product, Voice Navigator. The street price for PowerSecretary is $2,495 plus a 16-bit sound card (such as the digital signal processor in AV Macs).

- **Voice Navigator II.** Voice Navigator II by Articulate Systems enables you to operate your Mac with voice commands. After it learns your particular vocal inflections, it executes any menu item, **Finder** function, applications command, or keyboard shortcut. It is all performed with software, but the package includes a good super-directional microphone. The street price is $699.
- **Headmaster Plus.** Headmaster Plus by Prentke Romich is a substitute for the mouse. This head-mounted pointer (see the illustration) helps those who cannot use their hands to control the Mac. A breath-activated puff switch clicks the mouse button. Headmaster Plus works with software that displays a keyboard onscreen so that users can point at letter to type them. The street price is $1,195.

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- **Ke:nx.** Ke:nx (pronounced *connects*) from Don Johnston, Inc., provides many methods of alternative computer access for the disabled with a package of hardware and software functions. You plug the input device into the Ke:nx controller box and the software opens menus, launches applications, and so forth. Over 100 products are offered in the package. The street price is $780.

See Also

Apple Desktop Bus; Apple Extended Keyboard; Bar Code and Magnetic Stripe Readers; Education, Special Needs; Graphics Tablets; Joysticks; Keyboards; Ke:nx; Logic Boards; Mice; Motherboards; NuBus; Pen/Handwriting Devices; Trackballs; Touchpads; Touch Screens

Data Link

The Data Link is a subdivision of the **AppleTalk** protocol stack that provides details about how and at what speed the computers will communicate over an AppleTalk network. In some ways, this is similar to selecting the dialect of a spoken language.

The AppleTalk data links currently in use are LocalTalk, EtherNet and Token Ring.

- **LocalTalk** : LocalTalk is the data link originally defined by Apple and included in all Macintosh computers. LocalTalk is very inexpensive to setup and is easy to maintain, hence it is extremely popular for small

business and home use. Despite these advantages, LocalTalk is fairly slow, transmitting data at only 230,400 bps, compared to EtherNet's 10,000,000 bps, limiting the applications in which it can be used. LocalTalk was originally designed by Apple to be used with Shielded Twisted Pair wiring as the **Transmission Media** , but is now most commonly used with unshielded twisted pair.

- **EtherNet** : EtherNet has quickly become the standard form of network data link for nearly all microcomputer network protocols. The high speeds of 10,000,000 bps coupled with the ability to support large numbers of users and diverse types of transmission media have made EtherNet a very common fixture in most business environments. A new EtherNet standard with a speed of 100,000,000bps is gradually replacing the previous standard, and as prices for the hardware drop, you can expect to see it take over the market completely.

  When first released, EtherNet was very expensive to implement on the Macintosh, often costing upwards of $1,000/workstation. Currently many Macintosh computers have support for EtherNet built in, and nearly all of the older Macs can be connected to an EtherNet network with the addition of relatively inexpensive internal or external expansion devices. Apple refers to EtherNet running under AppleTalk as **EtherTalk** .

- **Token Ring:** Token Ring was originally designed by IBM for use in connecting microcomputer networks to IBM mainframes. Apple refers

to Token Ring running under AppleTalk as TokenTalk. While not very common in Macintosh networks on the whole, in certain large corporations, Token Ring has remained a standard for personal computer networking and thus is a requirement for Macintosh connectivity. Token ring provides speeds comparable to EtherNet (either 4,000,00 bps or 16,000,000 bps). Token Ring's most interesting feature is its capability to incrementally handle increases in network traffic. Although activity measurement and control of LocalTalk and EtherNet networks can be difficult to predict and manage, activity on a Token Ring network scales with a predictable formula based upon the number of active users.

Despite these advantages, Token Ring is very expensive to implement on the Macintosh. Typical Token Ring cards for NuBus machines rage from $600-$1000/Computer. Computers such as PowerBooks that lack PCI or NuBus slots are unable to make a direct Token Ring Connection. Thus, in spite of its advantages, few Mac-centric networks use Token Ring, opting instead for the more economical **EtherNet** .

See Also
AppleTalk; EtherNet; Transmission Media

Daughterboard

A daughterboard is a special card or logic-board containing a processor,

which plugs into the main logic board (motherboard) of your computer.

See Also
Power Mac, PCI Models

Day of the Tentacle

See
Full Throttle

.dd Filename Extension

The .dd filename extension means the file has been compressed using Symantec's commercial compression utility **DiskDoubler**. This file extension lets others know to undouble (decompress) the file using DiskDoubler.

See Also
Compression Utilities; DiskDoubler

Dead Keys

Although this a somewhat rare occurrence, it is possible that a key on your Mac's keyboard could cease to operate, or go "dead." Chances are its contacts

are gummed up, and you can choose to send your keyboard in for repair or repair it yourself by carefully prying the key from the keyboard and spraying a tiny amount of lubricant (such as WD-40) on the key's stem. This should do the trick, and if it doesn't work the first time, give it another try. Remember to be stingy with the lubricant—there's no need to flood the keyboard.

Dead Mac

If your Mac is dead, you are greeted by a black screen with a **Sad Mac** icon that is frowning and has "X's" for its eyes where the **Happy Mac** icon used to be.

This screen is followed by a series of numbers below it designed to tell Macintosh technicians which hardware problem the Mac is encountering during **startup**. If you get a Dead, or Sad Mac, **restart** your machine. Chances are you'll be all right with the next startup, and whatever was causing this temporary Sad Mac state will be gone. It could've been a **SCSI** cable that wasn't plugged in all the way or a problem with the way a SIMM chip was making its connection inside your computer.

These problems can be the result of **RAM** not seated properly in its slot or some other RAM-related problem, or it could be a problem with an **Apple desktop bus** (ADB) port, or a host of other SCSI, printer port, or SIMM problems. If this dead Mac situation persists after you've restarted the

machine several times, and you've removed all SCSI devices from the Mac, you may need to seek the help of a qualified Apple service technician.

See Also
Apple Desktop Bus; Happy Mac; RAM; Restart; Sad Mac Icon; SCSI; Startup

Dead Mouse

If your **mouse** does not respond to your movements, first check to see that the mouse is firmly plugged in. If your mouse connects directly to your **keyboard**, make sure that the keyboard is firmly connected to the Macintosh.

If your mouse was working properly and the mouse suddenly froze while you were working in an application, you may have experienced a screen **freeze**, which is a software error that sometimes occurs when memory is running low. **Restarting** your computer alleviates this problem.

If your mouse appears to be acting sluggish or jumpy, you may have to clean the small rubber ball inside the mouse. You can clean this ball by turning the mouse upside down and rotating the plastic ring that holds the ball in place until it releases. Apple recommends cleaning this ball with a cotton swab moistened with alcohol, and then drying the ball with a lint-free cloth. Also, check the rollers inside the mouse, which can built up hard gummy deposits that can affect the performance of your mouse. They may need to be cleaned as well.

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See Also
Freeze; Frozen Screen; Keyboard; Mouse; Restart

DeBabelizer

See
File Formats

Debugger, The

Only one debugging tool has the audacity to call itself *The* Debugger. Generally called Jasik's Debugger after its author, Steve Jasik, this tool lives up to its name. Like fine wine, The Debugger is an acquired taste, but those who have managed to overcome its steep learning curve and quirky interface have been greatly rewarded by the richest feature set of any Macintosh debugger.

The Debugger is both a high- and a low-level debugger. That is, it can debug at both the source and **object code** levels. It debugs source code using standard SYM files (see **Debugging Tools**) or by interacting directly with the programming environment. An especially helpful feature, if you're just learning to debug at the object level, is The Debugger's capability to display source code interspersed with the corresponding object code.

Most low-level debuggers are stuck with very sparse interfaces, because

making calls to the **Toolbox** routines normally responsible for drawing and managing the Mac interface are off-limits to low-level debuggers. The Debugger, however, sidesteps this issue by implementing its *own* interface routines that look and act much like the standard Mac interface. As a result, The Debugger is able to use windows, scrollbars, and menus.

The Debugger is capable of debugging any code that can run on the Macintosh, whether it's in a normal application, a code resource, or a Toolbox routine in ROM. It can display structured data in its own editable display window (see the following figure).

A number of sophisticated testing tools are built in to The Debugger, such as memory stress-testing tools similar to those in **QC,** and Trap Discipline, which checks the parameters passed to Toolbox routines to verify that they're valid.

The Debugger is bundled with MacNosy and CoverTest. MacNosy is a global interactive disassembler that can show any object code in assembly format. CoverTest is used in product testing to identify which program execution paths have been tested.

The Debugger and MacNosy are published by Jasik Designs.

Jasik Designs
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Menlo Park, CA 94025
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See Also
Debugging Tools; Object Code; QC; Toolbox

Debugging

Debugging is the process of identifying and fixing problems (**bug**s) in hardware or software.

Debugging has been called, “a pastime similar to banging one’s head against a wall, but with fewer opportunities for reward.” While that may be a bit of an exaggeration, few programmers relish the long hours spent tracking down obscure and sneaky bugs.

It goes without saying that the easiest way to debug a program is to avoid the problem altogether. Just as defensive driving can help avoid accidents, defensive programming can help avoid bugs. This can take many forms. The first is purely a matter of programming style. Resist the urge to be clever with special features of a language at the expense of clarity. Even if you feel you fully understand your unique programming construct at the time you write it, chances are nobody else will. And, if you’re not quite as clever as you thought, debugging your code can be especially painful.

Check for errors as a routine part of your programming. If a **Toolbox** call returns an error code, for example, pay attention to it! If you’re working with a **handle**, make sure it’s valid before you use it. Some of the most heinous bugs can be avoided by a simple check for errors. A corollary is to

expect the unexpected. If you ignore an error code because, “that call could never fail,” rest assured that that call *will* fail when you least expect it. To be more general, don’t assume too much, and document any assumptions you do make.

You can use *assertions* to flush out some of your incorrect assumptions. Assertions are statements added to a program during the development phase to check whether any of your assumptions are incorrect. Another method is to use a stress testing tool, such as **QC**, to force your program to run under the worst possible memory conditions. Subtle and unnoticed problems can become downright nasty when you stress your program to its limits.

So, you’ve programmed defensively, limited the number of assumptions you’ve made, and checked for errors scrupulously, but a bug still turns up in your code. What now?

Well, first you need to decide what kind of bug you have. If your program runs, but gives you the wrong results, you probably have a logic bug. You need to go back to your original algorithm and reexamine the process you’ve taken to get the results you want.

If your program misbehaves, you’ve got a coding bug of some kind. For example, if your program crashes outright or won’t enable you to resize its windows, you need to track down a coding bug. These are the most common bugs and the most difficult to track down.

You can make the task of finding the source of the bug easier by being

systematic.

- Fully identify and describe the bug. What is the problem? Is it worse in some situations?
- Determine whether the bug is repeatable. If possible, make it repeatable using a stress-testing tool.
- Identify which general part of your program is responsible for the bug.
- Gradually narrow the search for the bug until the offending code is found.
- Implement a fix that doesn't create other bugs.

The first step is to identify the bug and narrow, as much as possible, the scope of your search for the cause. Is the bug repeatable or apparently random? In other words, is there a set of steps you can follow that will always cause your program to misbehave in the same way? Random bugs can often be made more repeatable with a stress testing tool or **MacsBug**'s heap scramble feature.

You can turn to a great many **debugging tools** to help you in your search. Stepping through some troublesome code in a debugger can often clear away the fog and make a previously hidden bug obvious. As you step, keep an eye on all of the relevant variables. Are they doing what you expect?

After you find the source of the problem, fix it! But be sure to avoid the urge

to just apply a quick fix, or patch, to that one bit of code. All too often quick fixes cause problems later. Take a careful look at the code and decide whether there's a fundamental design flaw that needs to be addressed. If so, address the fundamental problem, don't just put a Band-Aid on it.

Although the drudgery of searching for a bug can be maddening, actually finding a bug (and fixing it) can be one of the most rewarding parts of programming.

See Also
Bug; Debugging Tools; Handle; MacsBug; QC, Toolbox

Debugging Tools

The process of **debugging** can be nerve-wracking. Fortunately, many tools exist to help you ferret out bugs and stomp on them. Some tools enable you to step through your code one line at a time, watching every move your code makes. Others sit silently in the background, waiting for something to go wrong, and letting you know when it does.

One of the most valuable debugging tools is often overlooked: avoiding the bug altogether. Most **compilers** provide warnings about potential errors in your code. While these errors might not be serious enough to cause the compiler to complain, they might cause trouble when your program is running. The following figure illustrates an example of a very common mistake found by the Metrowerks **CodeWarrior** C/C++ compiler.

In this case, the programmer incorrectly used the **C** assignment operator (=) rather than the equality operator (==). The result is that if an error *is* returned by the ResError function, it is effectively ignored by the program. This example seems trivial, but the same sort of error could be catastrophic if allowed to make its way into a finished product. Compiler error checking helps to avoid these bugs before they happen.

Other tools take this error checking a step further and can identify much more complicated problems in your source code.

In spite of the best efforts of programmers and compiler writers, some bugs do make their way into compiled code. That's when debuggers and stress testing tools come into play.

High-level or source code debuggers display the original source code (in C, **Pascal**, etc.) that you are debugging and enable you to step through the code one instruction at a time. In addition, you can watch variable values as your code runs (see following figure). High-level debuggers are written as applications and run like any other application. Although this makes them relatively easy to use, it also means they have certain restrictions. You cannot use them to debug code that could affect the operation of the debugger. If the bug causes a system crash, it is likely to wipe out the debugger as well. Apple's SADE, SourceBug, and Macintosh Debugger, as well as the **Symantec C++** and Metrowerks CodeWarrior debuggers are in this class.

Many high-level debuggers use special files, called SYM files, to identify the

relationships between the object code being debugged and the original source code. These files are created by the **linker** when the program is created. Because the SYM format is standardized, any debugger that understands SYM files can be used to debug any program for which a SYM file has been created. This gives you some flexibility in choosing a debugger, because you don't necessarily have to use the debugger from the same company as your compiler and linker.

Low-level, or object-code, debuggers, such as **MacsBug** and **TMON Pro,** take almost complete control of the computer during debugging, and therefore avoid some of the difficulties that high-level debuggers frequently face. The trade-off is that these debuggers have less intuitive interfaces and generally show only the compiled object code, rather than the original source. **The Debugger by** Jasik Designs is unique in its position as both a low-level *and* a high-level debugger.

There are a number of debugging tools in addition to debuggers themselves. Memory analysis and stress-testing tools, such as **ZoneRanger** , **QC**, and The **Memory Mine,** can be invaluable. These tools force your code into a worst-case situation, where anything that can fail, will fail. They are system Extensions that sit quietly in the background watching for errors in memory handling and invoke a debugger when trouble arises.

Apple recently released debugging versions of parts of the operating system. So far, debug versions are available for the Modern Memory Manager, Apple Guide, and QuickDraw GX. These versions sacrifice some speed, because they

double-check for errors introduced by the programs that use them.

See Also
CodeWarrior; The Debugger; Debugging; MacsBug; Memory Mine; QC; Symantec C++; TMON Pro

Deck II

A sound digitizing and editing application that supports as many as 16 tracks on a **Power Macintosh** , and also supports **Digidesign** sound hardware.

Deck II uses an interface that resembles a four-track tape recorder, including volume sliders and playback controls. You can mix and bounce tracks, and Deck provides nondestructive editing tools (the changes don't affect the original sounds). A *scrub* feature (a tool for playing back and forth in a track at different speeds) makes it easy to locate points in a sound file, and the program also offers various automation features including automated mixdown and punch-in and punch-out points. the program also supports **QuickTime** movies and **MIDI**.

While great for recording original music and creating complicated mixes of sounds, this program might be too much for simple sound editing. A program such as **SoundEdit** is better suited for those tasks.

Macromedia
Price: $399

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600 Townsend Street
San Francisco, CA 94103
Phone: (415) 252-2000
Web: http://www.macromedia.com/

Decoding/Decompressing Files

Files downloaded from the Internet often have to be decoded or decompressed before they can be used.

One of the Internet's main benefits is the availability of software held on **host** computers such as **software archives** . Users can download this software to their own **client** computer. Usually the software is **encoded** or **compressed** to make the file smaller in size or recognizable by different types of computers.

Encoded or compressed files can be recognized by the file extension such as ".hqx," ".sit," or ".cpt." Such files can then be decoded or decompressed with a utility such as StuffIt Expander, which is itself a shareware program available on the Internet.

Other file types might also be downloaded from the Internet with compression/encoding schemes that are not common to the Macintosh. A UUCP-encoded file might be encountered on Usenet and can be decoded with the application uuUndo or uuLite. ShrinkWrap, another file decoding application, decompresses files saved in Apple's DiskImage format (Disk

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Image files usually carry the **filename extension** ".image."

All the aforementioned applications can be downloaded from http://wwwhost.ots.utexas.edu/mac/pub-mac-compression.html.

See Also
Client, Compressing Files, Encoding Files, Filename Extensions, FTP, Host, Software Archives, StuffIt Expander

Data Fork

See
Resource

Data Table

See
What-If Calculations

Database

A database is, quite simply, data organized in a searchable form. A telephone book is a simple form of database. The information is organized alphabetically, by name, last name first. It's useful only if you know the

name of the person or business you want to call. You'd need a different kind of directory to find the name of the person whose number is 555-1234, and another differently arranged directory to find the name and number of the family at 123 Oak Street. If you were to compile these directories into one, you'd have a book three times as thick as the original.

The main advantage of a computer database is that you can organize the same information in different ways, by breaking it down into smaller, labeled segments. The information from the phone book could be divided into three categories: names, addresses, and numbers. But you'd be able to search for someone by name, by number, or by address. Each set of information (one name, address, phone number) is called a **record**. The items within it are **fields**. The computer can sift through all of the records in the **database file** to find the address and phone number to match the name you search for, or the name and address to match the number. A record can contain as many fields as necessary to handle all of the data. The file can hold as many records as necessary.

You can search for data according to any single labeled field, or by any combination of labeled fields. The more fields you identify for a search, the closer you'll come to finding your specific target. Suppose that your phone book database covered a large city, with many high-rise office and apartment buildings. If you were to search for a phone number only by address, you'd get a list of everyone at that address. Then you'd have to search those listings by name to find the number you want to call. If you searched only by name in a large city, you might find a half dozen or more

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"Smith, J...," but if your search was for "Smith" and "Oak St.," your chances of finding only your friend John would be much better.

To work with database files, you need a database application, also known as a database manager or DBM. (To make matters more confusing, database applications, database files, and database managers are also just called databases.) There are several kinds of database applications for specific tasks, such as **NowContact**, **Quicken**, and **In Contact**. These may also be called **Personal Information Managers** or **PIMs**. More generalized database managers, like **FileMaker Pro, Phyla,** and **4th Dimension**, let you design and create custom databases to handle all kinds of information. You could use one of these to design your own PIM, but it's rather like swatting a fly with a wrecking ball.

There are two major kinds of databases, **flat-file** and **relational**. (An object-oriented database, such as Mainstay's Phyla, is also a relational database because of the way it shares information.) Flat-file databases access just one file at a time. You might have a Christmas card list in a flat-file database like **HyperCard**. Information from a second database file, perhaps your client file, can be read and copied in, but there's no real link between the two files. If one of your clients moves, and you change the address in the client file, you won't have automatically changed the address in the Christmas card list. In a relational database, however, there's automatic access to data between files. If you changed the client's address in one record, it would appear corrected in any other file that displayed the address.

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Data can be entered into a **database** in any of several ways. The simplest, but most time-consuming, is to scroll or tab through individual **fields** and type the required data into each one. In order to make the process easier, you can use a number of different tricks and shortcuts. Pop-up menus, check boxes, and buttons are easy ways to handle yes/no fields or short lists of choices.

Suppose that one of the fields in your customer database asks for preferred shipping method. You might have as choices US Mail, FedEx, UPS, or Airborne Express. You can format the field to show these as entries on a pop-up menu, as check boxes, or as buttons, depending on how much space there is for this field on your layout. Radio buttons are best when there are only two or three choices. The pop-up menu is best if there's one possibility that will be selected more often. Just put it at the top of the list.

In FileMaker Pro, these fields are added by typing Shift-Command-D or selecting Define Field from the File menu. Enter the name of the field and click Create. When you're done creating fields for your database, move to the Format menu and select Field Format or press Option-Command-F. This will bring up the default Field Format dialog box shown here.

Change the style from Standard Field to whatever you need, and then enter the values for it by selecting Define Value List from the Values pop-up menu. In the example mentioned above, we'd have entered "US Mail, FedEx, UPS, Airborne Express" as the four values for our pop-up menu.

To create other kinds of fields, go back to the Define Field box and look at the list of field types in the lower left. In the figure below, we're entering a date.

After you create this field, if you try to enter information in it that's *not* a date, the program will reject it.

You can also create calculation fields that will give automatic totals of mumbers taken from other fields. To format a calculation field, name it and click Create. You'll open a dialog box called Specify Calculation. Use it to set up the formula for the calculation, for example number*unit price.

Database Design Designing a **database** can be a major project or it can be quite simple, depending on your needs. The database applications available today, though extremely powerful, are generally easy to use. Most include a set of preprogrammed, customizable databases for various purposes. If all you need is a contact or personal information manager, you might not need to deal with database applications at all. There are many stand-alone applications that handle these simple database tasks very well. Among the better contact managers and **PIMs**, consider **Claris Organizer, Now Contact,** and **In Control.** One of these may solve your problems less expensively and more easily than a full-featured database.

However, if you need more information or more data handling and sorting capability, you can design a database that will exactly meet your needs. First, decide what categories of information you need to work with, and plan a separate database file for each major category. For example, your small business might need one for customers, one for employees, and one for products. Decide what tasks you want the database to handle. Will it print mailing labels? Invoices? Will it be used to create a catalog? If, for instance,

you want the database to print labels, you'll need to assign **fields** for name, address, city, and so on. If you want the database to do your invoices, you must plan fields for shipping and billing addresses, product code, quantity, etc., and **calculated fields** to turn the quantity and unit price into a net price, subtotal, shipping charge, tax, and invoice total.

Determine the relationship between the new file and any existing files. Doing so enables you to use **lookups** or insert fields from existing files instead of reentering the data.

Decide what layouts you will need for such activities as data entry, order entry, printing labels, printing invoices and form letters, and any other reports or **forms** you might generate with this database.

Consider whether other people will use this database, and whether you need to restrict access to any part(s) of it. If security is a factor, you can restrict access or password-protect certain files or functions.

Sketch out your forms on paper before you begin to enter them in the database. If you use window envelopes to mail your invoices, check the placement of the address block. Make sure all the information you need is included.

Keep these points in mind:

- Use separate fields for first and last name so you can search for or sort by either one.

- Use separate fields for city, state, country (if you do business abroad), and postal zone. This will enable you to sort mailings by ZIP code or send letters to customers in a particular area. If you combine the fields, you won't be able to sort records based on a single attribute.
- If you're dealing with individuals as opposed to companies, be sure to include a field for titles (Dr., Mr., Ms., Rev., and so on).

See Also
Flat-File Database; Database, Relational; FileMaker Pro; 4th Dimension; HyperCard; Personal Information Managers; Phyla

Database, Field

When you create a database file, you enter the data for it into fields. Fields in a pre-existing database simply look like boxes. You type or paste the information into them. If you're designing a database or adding fields to an existing one, you'll need to assign field types, attributes, and possibly formats and filters.

Field types categorize the data and control the size of the field (number of characters allowed). Field types differ with various databases, but generally they may be alphanumeric or "real numbers." Alphanumeric characters are letters and numbers treated as text. If the system will need to do arithmetic with the numbers in the field, be sure that it's a real number field and not an alphanumeric.

Field attributes place conditions on the field. A common attribute is "mandatory." The database won't accept the record if any of the fields that are tagged as mandatory have been left blank. If the field is tagged "Can't modify," database users will be able to view the contents of the field but not change it. "Indexed" means that the data in that field can be sorted according to some rule: alphabetically, by zip codes, by numbers, or whatever you choose to apply. The figure shows how this is handled in FileMaker Pro.

Field entry formats help you structure the data you're entering. Use them to help make sure the information you enter is consistent. For example, if you need to enter dates and assign the format MM/DD/YYYY, you will be sure that all dates entered fit that pattern. If you then need to sort by date, you can be sure that all of the dates have the same basis.

Field entry filters are another way of making sure the information you enter is correct and consistent. The filter evaluates individual characters as they're entered into the field. If an unexpected result is found, the program rejects the entry. If you're creating a field for an employee's social security number, you'd put in a filter (and a format code) so that only numbers in the XXX-XX-XXXX pattern would be accepted.

See Also
Database; Flat-File Database

Database, Procedures

D

Procedures are sets of instructions the database uses to perform specific tasks. A global procedure affects the whole database. An example might be adding the trademark symbol to every mention of your company's product. A file procedure is directly tied to manipulating one file. You might use a file procedure to sort your addresses by ZIP code before printing labels. A layout procedure affects only the layout with which it's associated—for instance, converting text to 10 point type before printing address labels.

Database, Record

A record is a compilation of related information. Files hold records, which are comprised of fields into which data has been entered. A single record can contain many individual pieces or fields of data. But all the data in that record pertains to it. If you think of a cookbook as a kind of file, then each recipe in it is a record. The list of ingredients, directions for preparing, and number of servings are all data entered into fields on the recipe page or record.

Data acn be entered into a database in any of several ways. The simplest, but most time-consuming, is to scroll or tab through individual fields and type the required data into each one. In order to make the process easier, you can use a number of different tricks and shortcuts. Pop-up menus, check boxes, and buttons are easy ways to handle yes/no fields or short lists of choices.

Suppose that one of the fields in your customer database asks for preferred

shipping method. You might have as choices US Mail, FedEx, UPS, or Airborne Express. You can format the field to show these as entries on a pop-up menu, as check boxes, or as buttons, depending on how much space there is for this field on your layout. Radio buttons are best when there are only two or three choices. The pop-up menu is best if there's one possibility that will be selected more often. Just put it at the top of the list.

In FileMaker Pro, these fields are added by typing Shift-Command-D or selecting Define Field from the File menu. Enter the name of the field and click Create. When you're done creating fields for your database, move to the Format menu and select Field Format or press Option-Command-F.

Change the style from Standard Field to whatever you need, and then enter the values for it by selecting Define Value List from the Values pop-up menu. In the example mentioned above, we'd have entered "US Mail, FedEx, UPS, Airborne Express" as the four values for our pop-up menu.

To create other kinds of fields, go back to the Define Field box and look at the list of field types in the lower left.

See Also
Database; Flat-File Database

Database, Relational

A relational database, such as 4th Dimension or FileMaker Pro, is one that

may contain many files and can manipulate data in more than one at a time. The files are linked together by a structure which defines their relationships. In FileMaker Pro, this is done easily in the Edit Relationships dialog box. Select the two files to link, and whenever you open the appropriate field in the first record, you'll also bring up the related one(s).

Database files can have a "one-to-many" or a "many-to-one" relationship. A "one-to-many" relationship allows one file to access and display related information from many files. Suppose that your Christmas card file contained a field you checked off if the person in that record sent you a card, and suppose you determined to send cards only to the people who'd sent them to you for the last three years. You could open a new file within the same database, asking the program to gather only the names that fit that criterion, sort by ZIP code, and print labels for this year's cards.

See Also
Database; Flat File Database

Database Server

See
Servers/Database

Date & Time Control Panel

D

The Macintosh's internal clock settings are controlled by the Date & Time Control Panel. There are a variety of options in this control panel that enable you to decide how the system displays time.

Even when the Mac is turned off, the internal clock and calendar keep running by use of an internal battery, so each time you turn your computer on, the time and date are correct. This is especially helpful if you use any programs that implement the time and date. The Macintosh also notes the time and creation date of each file on your Macintosh.

This control panel is split into four sections; The current date, the current time, the time zone, and the menu bar clock. Each section has a set of options accessed by a button at the bottom of the section.

The Date section enables you to set the current date. Setting the date is only necessary when you purchase your Macintosh; the internal clock will track the date from that time forward.

The Time section enables you to set the current time and the time format including military time and time with or without seconds displayed. It also enables you to display the time in the upper right corner of the menu bar by using the Menu bar option.

The Time Zone section enables you to tell the Macintosh what time zone you're in. This is helpful if you're using the Map Control Panel to determine the time in different time zones around the world. There's also a daylight savings time checkbox, which when checked adds an hour to the current

time. This enables you to click it on during daylight savings time without having to manually adjust the hour setting in the Time section.

The fourth section enables you to toggle the menu bar clock on or off, and you can choose from a host of preferences for the menu bar clock here as well. When turned on, this feature puts a digital clock in the upper right side of your menu bar that displays the current time in the time format of your choice. Through the clock options, you can choose the color of the menu bar clock; whether its display will includes seconds; if it will show the day of the week as well as the time; if the number separators will flash; the font that the menu clock will appear in; and you can set the clock to chime on the hour using your choice of system alert beeps.

To set the date using the Date & Time Control Panel, follow these steps:

1. Choose the Date and Time Control Panel from the Control Panels submenu on the Apple menu (or System Folder).
2. To adjust the month, day, or year, click the number representing that value. An up/down edit arrow appears to the right. You can either type the correct number or click the up arrow to move the numbers higher or click the down arrow to move the numbers lower. To confirm the date change, click the words Current Date and the edit arrows disappear.
3. To change the date format for International date formats, click the Date Formats button. You can choose from a variety of pop-up menus

the prefixes used to denote the date when displayed in a long date or short date format. You can also choose the order in which the day, date, or year will be displayed. In many European countries, for example, the day is displayed first, followed by the month, then the year, rather than the way its used in the U.S., with the month in the first position. A sample of your current date choices are displayed at the bottom of the dialog box.

To set the current time using the Date & Time Control Panel, follow these steps:

1. Choose the Date & Time Control Panel from the Control Panels submenu on the Apple menu (or System Folder).
2. To adjust the hour, minute, or seconds of the current time, click the number representing that value. An up/down edit arrow appears to the right of these numbers. You can either type the correct number or click the up arrow to move the numbers higher or click the down arrow to move the numbers lower. To confirm the time change, click the words Current Time or the clock icon, and the edit arrows disappear.
3. To turn the menu clock on, click the On button. You can set the preferences for the menu clock by clicking the clock options button. When your preferences are complete, click OK and close the Time and Date Control Panel.

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To set the time zone where your Macintosh resides, follow this step:

1. To set the Time Zone, click on Edit Time Zones, and a scrolling list of cities appears. If your city does not appear in the list, choose a city that does appear that shares your time zone. A user in Charlotte, North Carolina, for example, could choose Miami, Florida since they're both in the Eastern Time Zone. Click OK to confirm your time zone choice, and close control panel.

To turn on the menu bar clock using the Date & Time Control Panel, follow these steps:

1. Choose the Date & Time Control Panel from the Control Panels submenu on the Apple menu (or System Folder).
2. Click the "On" radio button. Click the Clock Options button to access the preferences for the clock. Click the checkboxes on the left side to choose your menu bar display format preferences. If you want the menu bar clock to chime on the hour, click the "Chime on the hour" checkbox. You can also select, from a pop-up list, your choice of font for the display of the menu bar clock and the type size that will be used.

See Also
Control Panels; Edit Arrows

D

Def Proc

See
Code Resource

Default Button

The Default button enables you to override an application's **default** factory settings and replace them with settings that match your needs and personal preferences. If you're using an application that enables you to choose a new setting as a default, you will see a **button** named Default. By clicking that button, the currently chosen setting in that **dialog box** becomes the default setting anytime that **command** or feature is used.

See Also
Button; Command; Default; Dialog Box

Default Settings

Your Macintosh comes with preset factory settings for your convenience. These factory settings are called *default settings*. The **font** that is used to display the names of **files** and **folders**, for example, was set at the factory as Geneva. Therefore Geneva is the default font. You can change the font that displays file and folder names by choosing a different font in the **Views**

D

Control Panel.

Applications also have default settings for any number of items within the application. Many applications enable you to determine your own set of defaults. If you use **PageMaker** , for example, the default font is Times. Every time you open a new PageMaker document and start typing, the text is displayed in 12 point Times Roman. In PageMaker, as in many other applications, you can change the defaults to suit your needs or personal preferences.

> TIP Software manufacturers often choose the user's most likely choice as the factory default.

Some applications enable you to return to the application's default settings simply by clicking a button. Other applications have a default file where current defaults are kept. If you want to permanently change the default settings, in some cases you can open a document, set the typeface, size, and other elements, and save that file as the default file.

See Also
Files; Folders; Font; PageMaker; Views Control Panel

DejaNews

DejaNews, which was recently added to Netscape's Internet Search page, is one of a handful of free services that enables you to search the labyrinth of

Usenet newsgroups. You can find it at http://www.dejanews.com/.

See Also
Usenet; World Wide Web; World Wide Web, Searching/Navigating

Del Key

Pressing the Del key on an extended keyboard deletes the letter to the right of the cursor's insertion point, whereas the regular delete key deletes the letter to the left of the cursor's insertion point.

See Also
Cursor; Delete Key

Delete Key

The Delete key, in the same place on a Mac keyboard as the backspace key is on many PC keyboards, enables you to delete a **selected item** in an application or to delete any text character to the left of the I-Beam **cursor's** insertion point. This key treats a selected item the same as choosing **Clear** from the **Edit menu** does.

See Also
Clear; Cursor; Edit Menu; Select

D

Deleting a File

The invisible files generated when a disk is initialized are sometimes called the *housekeeping* or *record-keeping* files. These files are extremely important because they contain the information which the Finder uses to perform its functions. The Directory and Volume Bitmap files control how files are added and deleted to a disk.

When you delete a file, the file does not move. Rather, its attributes and location are removed from the Directory file(s) and the volume bitmap is updated to show that the sectors formerly taken up by the data are now free for use by another file.

You can restore the files by resurrecting the directory entry for the file. There is one problem which increases the likelihood that the file will not be totally retrievable. When the volume bitmap is told that an area of disk is free it may place a newly added file or expanded file into part of the space formerly allocated to the erased file. If this occurs, part of the file is destroyed, and the file becomes difficult to recover in its entirety.

See Also
Delete; Directory File; Erase; Trash Can; Volume Bitmap

Delphi

Delphi is an **Commercial online service** first launched in1985. Delphi

offers text-based Internet access including **email**, FTP, gopher, newsgroups, and text of Web sites. Delphi is currently owned by MCI/Newscorp and maintains a Web site called iWorld, which features entertainment and news from Fox Broadcasting, another company owned by Newscorp's boss, Rupert Murdoch.

iWorld contains a directory of news, Internet, chat, sports, and entertainment resources online. A link to an online version of *TV Guide* magazine is available.

Delphi also offers many special interest forums including user run "custom" forums, software libraries, news, travel, reference materials, and everything else you'd expect to find on a commercial service. It's one of the best places to go for **multi-user games**, offering poker, trivia, word games, and more every night of the week. Delphi requires a monthly fee for membership. Several plans are available based on the amount of time members plan to connect. One such option, the10/4 Plan, charges $10 per month for four hours of connect time, and $4 per hour thereafter.

See Also
America Online; AppleLink; BIX; Commercial Online Services; CompuServe; Email; eWorld; Internet; Prodigy

Deltagraph Pro

See

D

Charting And Graphing Applications

Demo Software

To help potential customers evaluate their programs, many software publishers provide free demonstration versions.

These demo versions usually work just the same as a commercial version of the product, but important features may be disabled. For example, a demo version of an equation editor might place a gray box behind each equation so that it isn't usable in a publication. Other demo versions disallow printing, place the word "DEMO" on each printed page, or stop working after a specified amount of time.

Densitometer

See
Measuring Color

Dependencies, QuickTime

When cutting and pasting segments of QuickTime movies in a program like Apple's MoviePlayer, the system does not actually copy the entire contents of the movie. Instead a pointer, to the segment of the movie is copied and

transferred. This is done primarily for efficiency sake. Copying all that information into the Clipboard and out of the Clipboard would take a lot of time.

The edited movie is saved with the pointer to the other movies, but not with the actual movie data. The new movie is now dependent upon the other movies. This means that if you were to delete the original movie, the new movie will not play.

MoviePlayer is able to remove these dependencies and create a new movie with all of the clips copied into that movie. This creates a **self-contained movie**.

Not all programs create dependent movies. Adobe **Premiere**, for example, does not do this. Also, a self-contained movie is not the same as a **flattened** movie. Flattening a movie is used primarily when a movie will be played on a Windows computer, and removes the **resource** fork of the movie.

Not only are self-contained movies easier to distribute to others, they also play better, because QuickTime does not have to jump from one file, and one location on the disk, to another.

Another useful feature of MoviePlayer is the Get Movie Info option from the Movie menu. This displays information about the movie, including file size and any movies upon which that the current movie is dependent.

See Also
Flattened Movies; Self-Contained Movies

D

DeRez

See
Rez

Descender

A descender is that part of a character that sticks down below the rest of the character. Not all letters have descenders. Lower case g, j, p, and y are examples of letters containing descenders.

See Also
Ascender; Line Spacing; Typesetting Terms

Descent

MacPlay's foray into the **First-Person Perspective Shooter** realm is something to get excited about. Mixing Shooter tactics with a **Flight Sim** motif, **Descent** uses a 3-D rendering engine that allows for six degrees of freedom as you maneuver a spaceship through intergalactic mine shafts at breakneck speed. Descent rates as one of the most disorienting games, sending you through multiple turns, twists and loop-de-loops as you attempt to complete your missions. Because it is much less of a gore-fest than other Shooters like **Doom** or **Hexen**, Descent should appeal to those looking for the

rapid pace of a Shoot-em-up without the mess. Descent is arguably one of the better games in the shooter genre. The sequel, Descent II, should be available by the time this book is published.

See Also
Doom II; Hexen: Beyond Heretic; Marathon

Deselecting a File

If you select a **file** and then decide you don't want to use it, you can deselect the file by clicking your cursor elsewhere in the active window. To deselect an item, it first must be selected or **highlighted** (dark gray). To deselect a file, click the **desktop** once or click just above or below the file, for example. To deselect text, simply click your cursor elsewhere within the text.

See Also
Click; Cursor; Desktop; File; Highlighted; Active Window

DesignCAD 2D/3D

DesignCAD 2D/3D from DesignCAD, Inc. is one of the most widely distributed medium-end CAD programs on the world market. It offers intuitive easy to learn modeling and dimensioning tools and all of the basic CAD options most users expect. The DesignCAD environment takes the four-view approach for the layout of the editing screen (side, top, and front projection views and a

perspective view all shown at once), although the user can select to work in only one of the projected views while turning the other two off. The perspective view is dedicated to rendering purposes only, although renders can also take place in any of the three selected projection views. All of the editing of the selected object takes place in one of the projection views.

Dimensioning DesignCAD has very intuitive options for adding dimensioning data to a view, so much so that you should be able to master its dimensioning routines in about two hours. Fifteen separate dimensioning options are included, including degree of arc and straight overlaps.

3D Options DesignCAD offers only two viewplane possibilities, Orthographic and Perspective. It does feature a unique capability when it comes to viewing the 3D viewplane, however, since it includes a small control box that allows you to animate the 3D view in real time in any of six directions. At any time, using this controller, you can spin the view around to preview any viewing angle in 3D space.

Text DesignCAD offers basic text commands: Font, Style, Size, and three Alignment variables. It has no capacity for translating text into extrudable data.

Symbol Library DesignCAD includes a deep symbol library for standards-oriented applications. Included are collections of symbols for Architecture, Cabinet, Electrical, Electronic, Hydraulic and Piping.

Import/Export Normal saves are as a DesignCAD database, though PICT files

can be imported and PICT and RIB (MacRenderman files) can be exported. DesignCAD does include a separate program however, DesignCAD Importer/Exporter, for more extensive file imports and exports. With the aid of this module, DesignCAD can import DXF (AutoCAD release 10), IGES (International Graphics Exchange Standard), XY or XYZ coordinates, DesignCAD 2D MS/DOS and DesignCAD 3D MS/DOS. It can export a wider range of formats than it imports, including: RIB, EPSF, DXF, IGES, XY or XYZ coordinates, DC2, DC3, and two plotter language formats (HPGL and DMPL). The files targeted for MacRenderman from DesignCAD must be in the 3D isometric format.

Animation Except for the controllable animation of the 3D view already mentioned, DesignCAD has no animation capacity. The only work-around might be to save a series of PICT files and then compile an animation from them in a suitable editing program.

Rendering Options DesignCAD offers basic rendering options which can be targeted to any of the XYZ views or to the 3D viewplane: Flat, Goraud or Phong shading, and the ability to alter the color and the intensity of the specularity of selected objects. There is no capacity to add additional light sources.

Special Features DesignCAD allows for the object creation “Multigons”, 3D extruded polygons with any number of sides. The number of sides is set in a separate dialog. Layer addition and deletion are supported, similar to Photoshop. DesignCAD also includes a special smoothing algorithm that

transforms angular shapes into smoother curved surfaces, a process that can be repeated as many times a necessary.

Designing Web Pages

See
Web Page

Desk Accessories

Desk Accessories are designed as mini-applications that you can access while using any other application. You access them from the **Apple menu,** which always appears, regardless of which program is running, on the far left side of the menu bar. Before **MultiFinder** and **System 7,** the Macintosh did not let you open more than one application at the same time, so Apple created some mini-applications that you can access at anytime called desk accessories.

They get their name because many of the original items were based on common accessories found on an office desk, such as: a calculator, a note pad, a clock, and so on. These desk accessories were actually a part of the system and they were accessed from the Apple menu. The benefit was that you could access them in any program from the Apple menu without having to quit the program. So if you were writing a letter, and needed to do a little math, you

didn't have to quit and launch a calculator—you could select it from the Apple menu and it would appear, floating above your currently running application.

DAs had to be installed directly into your system through the use of a **Font/DA mover.** This Apple utility let you choose DAs and **Fonts** from a list and move them directly into the system folder . Since System 7, Apple has done away with the Font/DA mover completely and you can just drag items directly into a folder called **Apple menu Items** within your **System Folder** to add items to the Apple menu. Besides the DAs that Apple has developed, there are dozens of Desk Accessories developed by third-party developers that do everything from act as an electronic address book to dial your phone.

See Also
Apple Menu; Apple Menu Items; Font/DA Mover; MultiFinder; System 7; System Folder

Deskdraw

See
Other Drawing Applications

Desktop, the

D

When you start your Macintosh, it goes through a **startup** procedure to load the computer's **Operating System** into memory. After a Macintosh has completed this procedure, the Macintosh desktop appears. This is where you can access **icons** for your **startup** drive, any external drives, **disks**, and the **trash can**. A **menu bar** of command menus, across the top of the desktop, enables you to access a host of computer-related tasks such as: Printing, formatting disks, restarting and shutting down the computer, launching applications, finding files, and most of the housekeeping-type functions of the computer.

The Finder is the Macintosh computer's starting place, a type of home base for beginning a session with the Mac. You'll know you're in the Finder when you see the desktop. When the computer starts, it takes you to the desktop, and when you're finished with the computer, you go back to the desktop to shut down. The Finder's a key part of the Macintosh Operating System and probably its most recognizable feature.

When Apple originally introduced the Macintosh, the desktop metaphor was designed with the same items that might appear on a real desktop in an office: A **calculator**, a **notepad,** file **folders**, a **clock**, a trash can, and so on. They felt this would make learning how to operate the Macintosh much easier. Where, for example, would you throw away a file you didn't want? In the trash can, of course. Where would you store your business documents? In a file folder, of course. These metaphors proved so popular that the desktop of today looks much the same as it did when the Macintosh was introduced in 1984.

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See Also
Calculator; Commands; Disk; Folders; Formatting; Hard Drive; Icons; Launching; Menu; NotePad; Restart; Shut Down; Startup; System; Trash Can

Desktop DB

The Desktop DB is an invisible **file** that tracks which files were created by which applications**.** It ensures that your documents always match with their respective applications. The Desktop DB also ensures that a file you created in Microsoft Word, for example, knows it's a Word file. That way, when you **double-click** a Word document, Desktop DB finds and **launches** Microsoft Word and then opens the document.

See Also
Double-Click; File; Launches; System

Desktop DF

As you move files on and off your **hard drive,** the Desktop DF tracks each file. It tracks those files that have been moved or deleted, and the icon for each. Over time, this file can get rather large and sometimes **corrupted.** So, occasionally, you may have to **rebuild the desktop** to get this file back down to size and operating properly. Because this file is invisible, you won't have contact with the Desktop DF, but it is working behind the scenes on

every disk, tracking icons and files.

See Also
Corrupted; Hard Drive; Rebuild the Desktop

Desktop File

The desktop file actually is two invisible system files (Desktop DB and Desktop DF) that are responsible for keeping track of the following:

- Where your files are located on your **hard drive**
- Which **icons** are associated with each file
- Any comments you've added to a file's Comments box
- Which view you've chosen for specific windows (view by name, view by icon, and so on)
- Which files are in which folders
- Other important information on your system and contents of your hard drive

Keeping track of all this is quite a complicated task. After some time the desktop file can become rather large and possibly **corrupt**. When this happens, you may see files without icons, or you may have files whose icons have switched with one another. These are the early warning signs of a

corrupted desktop file that needs to be repaired through a process called **rebuilding the desktop** (which is done easily with a simple **key command** at startup). If this corruption continues, it can lead to a loss of files. For that reason, many users rebuild their desktops monthly as a preventative maintenance measure.

Desktop files are present in all types of disks (hard disks, floppy disks, external drives, and so on) as they all need desktop files to keep track of their contents and organization.

See Also
Corrupted; Hard Drive; Icons; Rebuild the Desktop

Desktop Level

The desktop level is the visual part of the Mac's **Finder** that is often called the Finder **Desktop**. The desktop level is where you have access to desktop items such as the **Trash** and hard drive **icon** or a mounted **disk.** After the Mac's **startup** procedure, you begin working from the desktop level. As windows and applications are opened, they stack up above one another. The desktop level is always the bottom level of all open windows and applications, with everything stacking on top of the desktop level. If you hear a reference stating, "return to the Desktop Level," it's telling you to return to the Finder and its desktop with the familiar desktop icons, such as the **Trash,** that you see when you first start your Mac.

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You can select files from your hard drive or any **mounted disk** and drag them onto the desktop. You can even keep applications or frequently used **utilities** on the desktop for easy access. **Stuffit Expander** is a utility often left on the desktop. Stuffit Expander enables you to drag almost any **compressed file** directly onto the Stuffit Expander icon to be decompressed. Keeping it on the desktop, rather than buried within a **folder** on your hard drive, makes it easy to **drag-and-drop** files directly onto Stuffit Expander from any disk or folder.

See Also
Aliases; Compressed File; Drag and Drop; Floppy Disk; Folder; Hard Drive, Icons; Mounted Disk; Startup; Stuffit; Trash Can, Utilities

Desktop Management Utilities

See
System and Desktop Management Utilities

Desktop Manager Extension

This little-known Apple extension was designed for people who were making the switch from **System 6** to **System 7** and were running both systems on the same computer. The way the desktop is built on these two systems is significantly different, and each time you switch from System 6 to System 7,

you have to wait for the System 7 desktop to rebuild, which takes a few minutes. The Desktop Manager extension avoids this problem by adding an invisible System 7 style desktop file to System 6 that alleviates the need to **rebuild the desktop** when switching systems.

See Also
Rebuilding the Desktop; System 6; System 7

Desktop Models, Macintosh Family

In 1984, Apple made a conscious decision to design a computer that could be quickly learned and used by an ordinary person. This decision determined the look, feel, and usability features of the Macintosh in all ways. The first Macs were compact, all-in-one systems that were not expandable. Today's Macs are modular systems where you can pick and choose the type of display you want to use, your keyboard, the amount of Random Access Memory and hard disk storage you want, and the additional peripherals, such as fax/modems or CD-ROM units you want to include. Yet, all Macs retain the ease of use that is based on the deep integration of its hardware and software.

There are actually several generations of Macintoshes available based upon two types of integrated circuits: the **Motorola 680x0** and the Apple/IBM/Motorola **PowerPC 60x**. 680x0 Macs are being phased out, although some consumer versions (called Performas) still use the **68040 chip and the lowest-end PowerBook, the 190, also uses this chip**. If

you see the term “Centris” or “Quadra,” these are the last in the line of 68040 Macs. Modern Macs are based on a newer chip technology called **Reduced Instruction Set Chip (RISC).** Most of the desktop Macs sold today are based on this PowerPC chip.

Although Apple is currently manufacturing mostly Power Macs and some specialized 68040 Performa desktop models, and laptops, there are many existing 680x0 Macintoshes in use. Apple provides **upgrade paths** for these desktop models via three ways: **Power Macintosh Upgrade Card** , the **Macintosh Processor Upgrade** , and the **Power Macintosh Logic Board Upgrade** .

The following table describes how these three methods can be applied to the various existing older Macs to bring them up to Power Mac performance. DayStar Digital also offers excellent upgrade cards and logic boards for use in upgrading Quadras and Centris Macs to Power Mac 6100 or 7100 performance levels.

Upgrade Paths for Existing Macs

Upgrade Method

Applicable Mac Model / Description of Process

Power Mac 601 Upgrade Card

Quadra 605, 610, 630, 650, 660AV, 700, 800, 840AV, 900, and 950, Centris 610, 650, and 660AV / Owner inserts card into the 68040 Processor

Direct Slot with a screwdriver.

Macintosh Processor Upgrade

Quadra 800 and 840AV, LC 475, 520, 550, 575, and 630 / A complete motherboard swap performed by an authorized Apple dealer.

Power Mac 6100 Logic Board Upgrade

Quadra/Centris 610, Quadra 630, Quadra 650, Quadra 660AV / A logic board swap that must be performed by an authorized Apple dealer.

The Power Mac is now in its second generation of computers and offers business users an extensive array of processing power and efficiency. What you see today in the Power Mac (see the following figure) is the culmination of twenty years of research into how to make a computer both usable and affordable.

As of the writing of this book (February 1996), Apple offers five Power Mac desktop models in varying performance and configurations:

- Power Mac 6100/66 with DOS Compatibility Card
- Power Mac 7200/75
- Power Mac 7200/90
- Power Mac 7500/100
- Power Mac 8500/120

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- Power Mac 9500/132

Desktop Macs come in both box and tower models. The model number denotes the type of case built. The higher the model number within the series, the more features the computer contains. Apple also designates the clock speed of each model in its name by adding a slash and a number, for example the 7500/90 and 7500/100 are two separate Power Macs within the 7xxx series containing the same feature set, but different PowerPC chip clock speeds. You will pay accordingly more for higher performance chips (measured in **megahertz or MHz**). The following table describes the various desktop model designs and their series numerical designations.

Desktop Macs

Series	*Models*	*Characteristics*
9xxx	Power Mac 9500	Tall, tower-style chassis with vertical expansion bays
8xxx	Power Mac 8500	Mini-tower chassis
7xxx	Power Mac 7100, 7200, and 7500	Square, desktop case
6xxx	Power Mac 6100	Flatter, “pizza box” case

Although Apple markets Power Mac desktop models in various configurations, all Power Macs provide the following features:

- The capability to recognize speech and to speak. This speech

recognition capability is based on both the **PlainTalk** software and the processing power of the PowerPC chip.

- The **Geoport** connector. Makes Power Macs telephone-savvy, providing voice and data telephone connections via specialized chip sets. Each Power Mac contains two Geoport connectors.
- High-quality sound input and output. The fidelity of the Power Mac sound system approaches that of a compact disk.
- Support for caching. Power Macs provide a slot for a level-2 cache card, that when inserted increases the performance of the processor by storing the most recently used instructions and data.

See Also
Geoport Connector; Power Macs; Power Mac 7200; Power Mac 7500; Power Mac 8500; Power Mac 9500; PowerPC

Desktop without Open Windows

When you restart your Macintosh, your desktop appears in the exact condition as when you shut down, meaning, it appears with any open windows and folders that were open when you shut down. To have all open windows closed when you start up, hold the Option key just before the desktop appears (after all the icons have appeared across the bottom of your screen), and your desktop appears with no windows or folders open.

Desktop Pattern

Your Macintosh computer's system enables you to customize the color and look of the background that appears on your **desktop.** You can customize the background by selecting a desktop pattern from Apple's **Desktop Patterns Control Panel.** This control panel provides you with a variety of designs, textures, and colors for customizing the background of your desktop.

To assign a pattern to your desktop background, **scroll** through the examples of patterns, and when you find one you like, **click** the Set Desktop Pattern **button.** That pattern will become your new background. The system will remember your choice, and the next time you **startup** , this new background choice will appear.

A number of third-party utilities are available that provide more desktop backgrounds. Some of the most popular include:

- Wallpaper
- Chameleon

Freeware desktop patterns can be **downloaded from online services** , and then **copied** and **pasted** directly into the Desktop Patterns Control Panel to add to your list of choices.

See Also

Button, Click; Control Panel; Copy; Desktop; Desktop Patterns Online Services; Paste; Startup; Download

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Desktop Patterns Control Panel

The Desktop Patterns Control Panel contains a variety of desktop patterns for you to choose from. To view the various patterns, use the scroll bars to **scroll** through the patterns. If you see a pattern you'd like to have as the background of your **desktop,** click Set Desktop Pattern and the currently displayed pattern becomes your desktop's background.

You can add any **PICT** image to your Desktop Patterns Control Panel and it will automatically be tiled to fit your desktop, regardless of the size of your monitor. To add a PICT image to your desktop Control Panel, simply copy a PICT graphic from a graphics program (including **SimpleText**). Open the Desktop Patterns Control Panel and on the **Edit menu** choose Paste. This pastes the PICT image from the **Clipboard** into the Desktop Patterns Control Panel. This PICT image will now be a permanent part of your desktop patterns. If you want to delete a PICT, select **Clear** from the Edit menu.

To change your desktop pattern using the Desktop Patterns Control Panel, follow these steps:

1. Choose the Desktop Patterns Control Panel from the Control Panels submenu on the Apple menu (or System Folder).
2. Scroll until you find the pattern that you'd like to use as your desktop background and click Set Desktop Pattern. That pattern is applied to your desktop.

See Also
Clear; Clipboard; Desktop; Edit Menu; PICT; Simple Text

Desktop Patterns Tricks

The **Desktop Patterns Control Panel** that comes with **System 7.5** has a hidden feature enabling you to make any desktop pattern the background for your desk accessories (such as the Find File dialog box, the **Calculator** , and so on). To add the background of your choice to your DAs, open the Desktop Patterns Control Panel. You see a button at the bottom of the window that reads, "Set Desktop Pattern." If you hold the Option key down, you'll see that the button now reads, "Set Utilities Pattern." All you need to do is choose a pattern, hold the Option key, and click "Set Utilities Pattern." The next time you open your Calculator or Find File DA, you'll see the background pattern you've chosen as the background for these utilities.

To edit an existing desktop pattern, select the pattern you want to edit, choose Copy, and paste the pattern into a graphic program document for editing. In System 7.5 and higher, you can find the pattern you want to edit and drag it out onto the desktop where it appears as a clipping file that can be opened in most graphics programs for editing. After a file has been edited, it can be copied again and pasted back into the Desktop Patterns Control Panel.

In System 7.5 and higher, you can drag any PICT file in your **Scrapbook** directly into the Desktop Patterns Control Panel, and vice versa.

See Also
Calculator; Desktop Patterns Control Panel; Scrapbook; System 7.5

Desktop Presentation Software

See
Presentation Software

Desktop Printing

The **desktop publishing** phenomenon has brought about a completely new way to reproduce printed matter—the desktop printer. Before desktop publishing brought professional quality printing within reach of anyone who could buy a Macintosh computer and a **LaserWriter** printer, printed matter was mostly generated from printing presses and various kind of duplicating machines, including the office copiers pioneered by Xerox. Office copiers still play a major role in reproducing printed matter, and some types of copiers are even used for direct output from a computer. It is the desktop printer, however, that has had the greatest impact on printing in general.

So many types of desktop printers are available, and the price ranges are so great, that many consumers find the process of choosing one very difficult. In fact, price is often the deciding factor, but this is not always the best criterion. Printing resolution, printing (imaging) technology, speed,

memory, **PostScript** compatibility, and color capability are really more important factors than price. Desktop printers can be placed into the two broad categories of PostScript and non-PostScript. PostScript is the desktop publishing industry standard for printer output. It is a programming language that enables printers to produce complex high-resolution images. Further categorization is based on the printing technology itself. For example, most desktop printers are laser printers that print only in black. These use toner and an electrostatic drum technology. Other types of desktop printers use the inkjet technology (both color and black and white), thermal-wax transfer (color), or dye-sublimation (color). We will discuss the difference between PostScript and non-Postcript first, and then examine each of the imaging technologies.

PostScript is fully described elsewhere in this book, but it is well to understand its benefits in regard to two basic desktop printing needs—sophisticated typography and high-resolution graphics. PostScript is the basis of the desktop publishing industry typographic standard: Adobe Type 1 fonts. These fonts are used almost universally by graphic industry professionals, and they will not print on a non-PostScript printer unless a separate processor is used. The **TrueType** font technology works with non-PostScript printers, but it is not widely accepted in professional circles. Encapsulated PostScript (EPS) graphics do not print well on non-PostScript printers. Certainly, non-PostScript printers are adequate for many types of office printing, but they are not a good choice as a primary printer in a desktop publishing operation.

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Desktop printers using the electrostatic drum technology are the most ubiquitous in the desktop publishing industry and in office environments. Invented by Chester Carlson in 1937, the electrostatic printing process involves placing an electrostatic charge on the photoconductive surface of a metal drum or plate. When the charged surface is exposed to light, the charge is dissipated wherever light strikes it. This results in a charged image area which attracts a toner composed of finely ground plastic mixed with metal particles. The toner is transferred to paper and bonded to it by heat. The process was originally marketed by Xerox and is sometimes known as Xerography. It was, of course, the technology behind the success of the first Xerox office copiers. Most brands of office copiers now use the process or a variation on it. The electrostatic charge is controlled by a laser beam in the typical laser printer. The beam itself is directed by software instructions from either the computer or the PostScript processor built into the printer. Laser printers may be either PostScript or non-PostScript with the non-PostScript printer generally being less expensive. Laser printers provide image resolutions of 300 dpi, 600 dpi, 1200 dpi, and 1800 dpi. Paper size ranges from 8.5 x 11 inches to 11.75 x 25 inches. The larger paper sizes allow for 11 x 17 inch full bleed. Laser printers do an excellent job in printing solid areas, and the higher resolution models can produce adequate **halftones** in the 65 to 100 lpi range. Considering that most newspapers use 85 lpi halftones, a high-resolution laser printer can be useful in this area of publishing. While most desktop laser printers use only black toner, highly sophisticated (and expensive) digital presses based on the same technology are now used for process color printing.

Many non-PostScript printers, such as the Apple StyleWriter, are of the inkjet type. In inkjet technology, liquid ink is sprayed or dropped on the paper through tiny nozzles. In some models the ink is already liquid, but in others, a solid ink is melted by heat. The type of paper is an important consideration for liquid ink models. Using a paper that is too absorbent can result in disappointing color and blurred images. A glossy paper especially developed for inkjet printers can actually expand the color gamut of the device. The solid ink models tend to print more brilliant color because the ink solidifies before it can soak into the paper. Paper size ranges from 8.5 x 11 inches to 11 x 17 inches. These small desktop printers are inexpensive, and some are very limited in their imaging capabilities. Inkjet resolution ranges from 360 dpi to 720 dpi, and they are very slow compared to a laser printer. Because many desktop inkjet printers are non-PostScript, they use the QuickDraw graphics language developed by Apple when they are part of a Macintosh system. Color inkjet printers can produce pleasing color images and are popular with some artists. The image quality of inkjet printers varies among the different brands, and it is wise to look at several before making a choice. A high-end inkjet printer, the Iris inkjet from Scitex America, is often used to make accurate color proofs. The Iris is, of course, much more expensive (about $100,000) than a desktop inkjet. It uses precision ink nozzles to produce high-quality calibrated color images.

Another type of desktop printer is the thermal-wax color printer. These printers produce brilliant color images by melting and bonding a wax-based pigment to the paper. The pigment is on a roll of plastic film or ribbon. Some

thermal-wax printers use four colors (cyan, magenta, yellow, black) and others use only three colors (cyan, magenta, yellow). Three-color printers sometimes produce muddy-looking blacks, however. As the paper passes through the printer, colored wax is applied in dots of color. The dots build up a full-color image in much the same way as process color printing on a printing press. Paper sizes range from 8.5 x 11 inches to 11 x 17 inches. Most thermal-wax printers can utilize plain paper, but paper quality can make a big difference in image quality. Thermal-wax printers are generally more expensive than inkjet but are still moderately priced. Banding in continuous-tone gradations is sometimes a problem with thermal-wax printers, but they can be useful to graphic designers in making color comps.

The best desktop color printing comes from dye-sublimation printers. These are more expensive than inkjet and thermal-wax color printers, but the difference in image quality makes up for the extra cost. Dye-sublimation printers provide near photographic quality images by applying a dye-like pigment that is absorbed into the paper in a gaseous form. This results in transparent colors that create a continuous-tone image. Otherwise, they somewhat resemble thermal-wax printers in the way they operate. Like thermal-wax printers, dye-sublimation printers use **process colors** (CMYK). Some printers are available that can switch between thermal-wax and dye-sublimation mode. A heavy paper resembling photographic paper is usually required and may range in size from 8.5 x 11 inches to 11 x 17 inches. A dye-sublimation printer is the best type to use for desktop color proofs. The 3M Rainbow, a high-end dye-sublimation printer, is often used by printing

firms and prepress trade shops for color proofing on jobs to be offset printed.

In recent years, the color laser printer has become more popular due to decreasing prices. Desktop color laser printers use the same electrostatic drum and toner technology used by standard black and white laser printers. The color in toner-based images is rich-looking, with excellent density range. Output resolution for color laser printers, including color copiers with raster image processers, ranges from 300 to 600 dpi. Higher resolutions should be available soon. Most color laser printers are in the 8.5 x 11 inch format, but some 11 x 17 inch models are available. Of course, any paper suitable for a standard laser printer will work well in a color laser printer.

See Also

Color Gamut; Color Printing; Color Separations; Digital Halftones; Dithering; Preflight and File Hand-Off; Prepress; Printing Methods, Digital; Process Color

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DESKTOP PUBLISHING

Desktop publishing (DTP) is the process of producing any publication or document using a **personal computer (PC).** Personal computers are also known as desktop, or micro-, computers. Most publications produced in this manner are intended to be printed on a **printing press** for mass distribution; however, many are printed using a **digital printing** device. Quantity and image-quality requirements usually determine whether a desktop publication will be printed on a printing press or a digital printer, such as a **laser printer.** The international graphics industry has been greatly affected by desktop publishing. In the United States, DTP has all but replaced traditional publishing methods. Desktop publishing has had such far-reaching effects that it is truly a technological revolution. The term, electronic publishing, is sometimes used instead of desktop publishing.

A wide range of publications can be produced using desktop computers. Desktop publications may include anything from a single-color advertising flyer to a full-color coffee table book or corporate brochure. Simple publications, such as the single-color advertising flyer, are sometimes referred to as “low-end” desktop publishing. More expensively produced

desktop publications, such as the coffee table book, are said to be "high-end." Desktop publishing on a personal computer is the first step in a process known as **electronic prepress (EPP).** Electronic prepress involves **digital imaging,** color adjustment, **digital halftones, color trapping, page imposition, stripping,** and high-resolution output to film or printing plates.

Conversation with Paul Brainerd

Newspaperman, computer whiz, and now environmentalist, Paul Brainerd helped Apple establish its foothold in business when he created PageMaker, the product that linked with Adobe's PostScript page description language and Apple's LaserWriter, to create a new industry—desktop publishing.

Maclopedia: How did you come to invent PageMaker?

Paul: I'd been a newspaper reporter and editor for about ten years. In the early 1970's, I went over to Atex; they were providing DEC PDP 11s for newspapers, with VDTs—video display terminals—that were going to replace all the manual typewriters, so the writers could write at the terminal, and then go right to the typesetter without rekeying. We were right at the transition from hot metal to cold type.

In 1984, I was working for Atex, and several things came together. Atex was purchased by Eastman Kodak, and I moved out to the West Coast to manage a plant in Redmond, Washington. I got an opportunity to start my own business because they closed down the plant. You see,

there were all the engineers who had just been laid off, so we started Aldus. I put in a hundred thousand dollars, and worked for a year without pay, and another year or so at half pay.

Four things came together to make it happen—along with time and good luck and hard work by several groups, and some connections. The Mac had been introduced in January 1984. John Warnock had formed Adobe, with a vision for a new printing language called PostScript. And Jonathan Seybold was being a consultant to Apple at the time, and doing work for Adobe. I had known his father, back to Volume One, Number One of the *Seybold Reports*. But Jonathan was the glue that introduced us all to one another. He said, "You should talk to Adobe. I can't tell you what they are doing because I'm under nondisclosure, but go talk to John."

Now we already had the basic concept of the microcomputer as a layout tool, but we were still defining the market, from January through June of 1984. So I went down and I introduced myself to John Warnock. He shared with me some of their ideas. And then I talked with Apple. I met Bruce Blumberg, the product manager for a product that was going to become the LaserWriter. We ended up being one of the first three companies to get a LaserWriter up here in Washington—Microsoft, Lotus, and us.

In June 1984, then, we had our vision of the software project, and Steve Jobs had the Mac with its graphic interface, and Adobe was

trying to build this printer software, PostScript, so we could get output comparable to what the traditional graphics industry expected. So all these groups converged, and even then it wasn't clear how it was going to work.

Maclopedia: How did the development process go?

Paul: It was very much bottom up. People think desktop publishing came about because someone made a top-level executive decision, but it was actually driven by people at the bottom of the organization, helping each other out.

Maclopedia: How did you come up with the term "desktop publishing?"

Paul: I came up with the term in June or July 1984, at a board meeting of Aldus. One of our directors said, "Well, what are you going to call this concept?" And one of these other companies was using the term *desktop*. So I said, "Why don't we call it desktop publishing?" I worked with the press to define what desktop publishing was, and the press was really interested because every reporter is a closet book author, and a lot of people would call and ask, "What is desktop publishing," and I would go over it on the phone with them.

In early 1985, there were very few units of the Mac being sold. Apple needed to get manufacturing up. We had announced PageMaker in January of 1985, but we didn't actually start shipping PageMaker until July 1985.

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And in the summer of 1985, Bruce Blumberg called, and said, “I need a marketing plan. Can you put it together in ten weeks?” So I pulled together a marketing plan with dealer training and a video, all the components for the launch of desktop publishing, and that went to John Sculley and he approved it. Desktop publishing became a way to distinguish the Mac from the IBM PC, and gave it an entry in the door, even if it was a back door. Sculley gives credit to desktop publishing in his book, *Odyssey*, saying it was the thing that made the Mac successful because it brought more volume. Desktop publishing wasn’t the only thing, but it was one thing that gave the Mac credibility.

There weren’t a lot of resources. I remember sitting in a small dark room at Apple, and we wrote down on the white board what Apple would do, and Aldus, and we divided up the work. It was a real grassroots, ground-up effort. We had designers here in Seattle come in and sit down and design pages. John Rennell came over one afternoon and played around for three or four days and produced the first page of a financial newsletter. That sample page was reproduced millions of times. We supplied the content and Apple supplied the money for *Wall Street Journal* ads.

I’d come down to Cupertino, and we would talk about the projects, and then get out and walk the hallways. [Rennel] would take me over to see the education department dealing with K-12, and he’d introduce me to the people and they would say, “I need some educational examples by Monday,” and that would be Thursday. So we would go back to Seattle

and work all weekend and FedEx packages out, and lo' and behold, they would be in the ads a month later.

Bruce had a real problem because the Apple sales folks in the field and the marketing people were campaigning to have the LaserWriter project killed. They thought that something selling for $7,000 was a disaster, and they had just been through the Lisa, which had been a disaster at $10,000. I give credit to Steve Jobs, who really believed in the LaserWriter and kept it going. And it had Adobe PostScript. And PageMaker came up with sample pages that demonstrated the quality of what you could do with the printer.

At trade shows, people would grab the output out of their hands, it was so unbelievable.

But Apple dramatically underestimated demand, and Canon didn't have enough engines. They were in short supply. In the United States you had to wait six weeks, but in Europe you might have to wait three to six months. There just wasn't any product—for eighteen months.

In the UK, when we launched our promotion, we booked more orders for Apple computers in the first four weeks than they had booked in the previous year. It just took everyone by surprise.

Maclopedia: So now that you've sold Aldus and PageMaker to Adobe, what are you doing?

Paul: I'm running an environmental foundation, supporting conservation

in the Northwest forest. I'm giving back some of what I've learned. We gave out almost a million dollars in 75 grants last year, mostly to small grassroots community organizations. For instance, there's a Montana group working on a watershed, which is a prime trout habitat. In Alaska, a group is working to mobilize public participation in mine licensing. Water rights are a big issue. One third of the streams in Washington are oversubscribed in terms of sustainable water, but everyone takes it as a God-given right to have water, but it won't be there.

And I've been seeing what I can do to link technology with the schools. At the University of Oregon school of journalism, I set up a fund to set up a network for faculty and students five years ago. It became a model for the rest of the school. Almost everyone is hooked up. They have two computer classrooms, with the faculty bringing in laptops and getting access to the Web. The key to that whole thing was that I insisted they hire a full-time technical support person to provide counseling to the faculty in a non-threatening way.

The **Apple Macintosh** computer has played a key role in the development of desktop publishing. The **graphical user interface (GUI)** developed for the Macintosh **operating system (OS)** provided a platform for the development of desktop publishing software. In a graphical user interface, computer processes are displayed as graphic objects. Icons, windows, menus, dialog boxes, and other objects are manipulated through a **keyboard** or **mouse** to control the computer's software functions. Desktop publishing on

the Macintosh spurred the development of **peripheral devices** such as **scanners** and laser printers.

Although **DOS**-based personal computers utilizing the **Microsoft Windows** GUI play a significant role in desktop publishing, the Macintosh computer is preferred by most graphics industry professionals. The most recent version of Microsoft Windows, **Windows 95,** has opened up the possibility of increased competition between the Macintosh platform and the many brands of PCs that have evolved from the original **IBM PC.** Windows 95 creates a GUI very similar to that of the Apple Macintosh and more effectively utilizes the computer's **CPU** to perform graphics operations. Many desktop publishing and graphics software applications are available in both Macintosh and Windows versions.

Desktop publishing has redefined the graphics industry by making graphics technology accessible to anyone who owns a personal computer. Some traditional graphics professions have been greatly affected. For example, the **typesetting** profession no longer exists as a clearly definable vocation in most of the United States. The reason for this is that people who are engaged in DTP are performing their own typesetting, and it is not necessary for them to have it done by a professional. The **graphic design** profession is another that has been affected. Prior to DTP, most printed material was designed and prepared for printing by graphic designers and graphics production personnel employed by advertising agencies, graphic design firms, trade shops, and commercial printing firms. These individuals and firms are involved in desktop publishing now; however, there are many

people with no background or experience in the graphic arts who are also involved in DTP. This creates a need for training and eduction that specifically addresses desktop publishing and the broader-based graphic design issues it has engendered.

Page layout software, such as **Adobe PageMaker** and **QuarkXPress,** forms the basis of most desktop publishing on the Macintosh computer. **FrameMaker,** a sophisticated publishing software application marketed by **Adobe Systems Inc.,** is popular with some book publishers. Other software with page layout and typesetting capabilities is available, but PageMaker, QuarkXPress, and FrameMaker dominate the field. These software applications provide most of the tools necessary to design and produce any kind of publication. Desktop publishing may also require other types of software applications. Vector-image drawing (Adobe Illustrator, MacroMedia FreeHand) and raster-image manipulation (Adobe PhotoShop) software applications are extremely useful. The Adobe PageMaker publication window displays an electronic page on which text and graphics can be manipulated. A tool palette (upper-right) provides tools for selecting objects, and creating text and simple graphics.

The frontiers of desktop publishing and electronic prepress are being rapidly expanded by the development of faster computers and more sophisticated software, and the Internet and the World Wide Web (WWW) provide an exciting glimpse into the future of publishing. Can you imagine that future without paper publications—where all communications are electronic?

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For More...

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Desktop Publishing, Hardware

Hardware

Macintosh, History and Culture

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Desktop Publishing Application Types

Know more about publishing on the WWW

Internet, The

Know more about DTP terms

Typesetting Terms

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For more information on desktop publishing, refer to the following books:

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Desktop Publishing, Beginnings of

The first **desktop publishing** systems were not serious competition for **traditional publishing** methods. The **Apple Macintosh** computer with its **graphical user interface (GUI)** operating system provided a platform for the development of **page layout software** such as **PageMaker** and **QuarkXPress** in the mid-1980s, but there were many limitations. Early desktop publishing was performed on Macintosh computers with only 128K or 512K of **RAM.** The earliest Macs did not have **internal hard drives,** and kept all data, including operating system and software applications, on 400K **diskettes.** Since these Macs had only one built-in **diskette drive,** it was

necessary to continuously switch the diskettes to operate the computer—a process humorously known as the "Macshuffle." In addition to the lack of data-storage capacity, other limitations included primitive software applications which "crashed" frequently, a poor selection of typefaces, and low-resolution output devices. Few individuals in the graphics industry were impressed with desktop publishing in its early days, and the whole process was scoffed at by many professionals.

The Macintosh rapidly grew in performance capability, however. **Hard drives, scanners,** and 300 dpi **laser printers** were developed, and desktop publishing began making small inroads into the traditional graphics industry. Even **DOS**-based computers joined the fray when **Microsoft** marketed the **Windows GUI.** It was not until high-resolution output capability was developed, however, that desktop publishing came into its own. By the late 1980s, electronic publication files could be output at very high resolutions on **imagesetters** such as the **Linotronic.** The **PostScript** page description language developed by **Adobe Systems, Inc.** became the DTP industry standard for high-resolution output and typography. After **Linotype-Hell, Scitex America, DuPont Crosfield, Screen,** and other traditional graphics industry vendors began developing high-end electronic publishing technologies in the early 1990s, desktop publishing began replacing traditional publishing.

See Also

Desktop Publishing, An Introduction to; Desktop Publishing, Present-Day; Desktop Publishing, The History of; Mac History and Culture; Publishing,

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Traditional

Desktop Publishing Applications

Desktop publishers use many different programs to create different kinds of documents, choosing their tools just as carpenters or machinists pick the right tool for a particular job. Here's a look at the main categories of software commonly used for DTP:

- Page layout software allows you to take your ideas from words to fully-designed pages for newsletters, magazines, newspapers, or books. Programs such as Adobe **PageMaker**, **QuarkXPress**, and Adobe **FrameMaker** are designed to do many of the things modern word processors can do (such as creating running heads, automatically numbering pages, and formatting text in different styles), but they also allow for the integration of graphics, full color, and more complex formatting.
- Draw programs for the Mac include **Adobe Illustrator** and **Macromedia Freehand**. These applications are used to create graphics based on lines, curves, and fills—**vector** graphics—from simple black and white line art to complex designs using color blends. Vector images can be scaled without any loss of resolution. Features like layers and the ability to move, skew, rotate, and otherwise alter components of a drawing make these packages very powerful.

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- Adobe Photoshop is probably the best-known program for working with bitmapped graphics, like scanned photographs. Photoshop is a production workhorse for color correcting, retouching, and color separating photographs. But it's not limited to that. Photoshop and its competitors, such as HSC Live Picture, can also be used to create images from scratch, and other such applications, like Fractal Design Painter, are specifically designed as "paint" programs, used to create commercial and fine art on the Mac.
- If page layout and graphics applications are the framework of desktop publishing, fonts are like bricks. Thousands of typefaces are available, some based on designs that have been used for centuries and some as fashionable as the latest styles in shoes. A few fonts come with every Mac, but most designers end up with libraries of hundreds of fonts appropriate for any use imaginable. While the industry is dominated by PostScript fonts from Adobe, other fonts and formats (most notably TrueType, developed by Apple, and now widely distributed on Windows and Macs) are available from large "foundries" (a term left over from when type was made out of metal) and small ones, as well as from thousands of shareware authors.
- In the mid-1990s, **color management** software is just beginning to be truly useful; since the inception of desktop publishing users have found it difficult, if not impossible, to make sure that the colors seen on a computer monitor will look the same when a piece is output from a color printer or printed on a four-color press. Now different

software products can help make sure that happens—but the industry hasn't yet settled on a standard, although Apple's **ColorSync** 2.0 is being adopted by many hardware and software manufacturers.

- **Utility programs** pull all these others together. They can manage font collections (**Suitcase** and Adobe **Type Manager**), make sure all your software works together without crashing your Mac (**Conflict Catcher**), translate files back and forth from the different formats used by different applications (**MacLink**, **DeBabelizer**, **Transverter Pro**), compress files so they take less time to transfer over a modem (**StuffIt**), and more.

In addition to these definite categories, desktop publishers often use programs like Design Science's **MathType** for special purposes such as creating equations that can be imported into other documents. Other special programs create charts or tables and automate layout functions.

Whether these divisions will remain valid for long depends on two competing trends that will affect the future of desktop publishing applications. First, Apple is working on its OpenDoc technology, which allows applications to work more smoothly together on the same documents. Dozens of "applets" could be used to work on different parts of a document—some for creating graphics, others for setting up charts, and still others for other functions, like spellchecking. Microsoft's OLE (object linking and embedding) technology is offering the same idea on a more limited basis on both Windows and the Macintosh.

But for several years most software companies have competed to add features to their applications, rather than stripping them down to essentials. So drawing programs have built-in spellcheckers, page layout applications allow users to edit scanned photos, and word processors can act like spreadsheets. This trend has resulted in applications that tend to be large (taking up both hard-disk space and RAM) and often slow.

For the time being, users need to evaluate their needs and choose software accordingly. For many home users, a "**works**" program that incorporates many functions may be appropriate, while professional desktop publishers will probably need several different programs from the categories listed previously.

Prices vary wildly depending on a program's capabilities—a professional-level page layout application like QuarkXPress costs about $650, while low-end programs that claim to have the same features can costs as little as $30—so it's important to know as much about a program as possible before making a purchase. **Demo software** can help a lot—these versions of commercial applications are distributed free, but they have important features like printing disabled. Demos offer a good look at what a program does and how easy it is to use. Usually, they're available on online services, at many Internet sites, and on request from software companies, and they often come "bundled" with other software to fill up space on a disk.

See Also

Adobe Type Manager; Bitmapped Graphics; Color Management; Colorsync;

Conflict Catcher; DeBabelizer; Demo Software; Drawing Applications; Fonts; FrameMaker; Freehand; Illustrator; Live Picture; MacLink; MathType; Page Layout Applications; PageMaker; Paint Applications; Painter; Photoshop; Postscript; QuarkXPress; StuffIt; Suitcase; Transverter Pro; Utility Programs; Vector Graphics

Desktop Publishing Careers

The advent of desktop publishing technology opened up the graphics field to many more people. Probably the first traditional graphics industry career to be affected by desktop publishing was typesetting. In the mid-1980s, when the term "desktop publishing" was beginning to be a major buzz word, most graphic designers and other print-production specialists relied on professional typesetters for much of the typeset copy that went into a paste-up. Today, typesetting no longer exists as a clearly definable profession in most of the United States because desktop publishing enables everyone to set their own type, for better or worse. As for the typesetters themselves, many of them became desktop publishers or began providing other DTP-oriented services such as high-resolution output or training.

Of course, almost all other existing graphics and publishing industry careers have also been affected by desktop publishing. Most writers and editors have probably switched from the typewriter to the computer **word-processor** by now, and some authors even design and desktop publish their own books. One can hardly get a job as a graphic designer or art director with an advertising

agency without some knowledge of computer graphics and **page layout software.** Trade shops and commercial printing firms have had to accommodate the new technology and even give up some traditional practices and attitudes. The **prepress** stage of print production has been greatly involved in the change to electronic technologies. Traditional prepress technicians are often faced with having to retrain, abandoning tried and true methods. Even printing industry sales personnel have had to change. Having had such a revolutionary effect on a well-established industry, it is no wonder that desktop publishing is still controversial at some levels.

Perhaps it is not the effect of desktop publishing and electronic prepress on the traditional graphics industry that is so remarkable, however. The really astonishing thing about DTP is how it has captured the imagination of so many people who were never involved in graphic design or publishing before. In the middle ages of Europe, only a privileged few members of the nobility or the clergy owned or had access to books or could even read and write. Everything was handwritten on parchment or paper that was so scarce it was used over and over again by scraping the ink off the surface. Contrast that with the newest communication revolution on the **World Wide Web,** and we must come to the conclusion that publishing is potentially in the hands of virtually everyone. The borders between the specialized areas of writing, graphic design, prepress, and print production are growing ever more blurred, and new specialties are emerging. A major difference is that the new specialties are much broader and harder to define due to the

continuing tumult of change. Nevertheless, many types of jobs directly involve desktop publishing, and these we will identify and discuss.

Two categories are useful in discussing desktop publishing careers: freelance/entrepreneurial and institutional/corporate. The freelance/entrepreneurial category is a natural for desktop publishing. For about $10,000.00, one can set up a bare-bones desktop publishing business. Some may feel that number is too low for even a basic operation, but a truly frugal person can do it. The hardware and software is easy to purchase at a discount, and one really can do a decent job with a low-end Macintosh, **laser printer,** and **scanner** set up in a home office. So many options exist (as well as so many potential entry-level expenses) that many enterprising individuals make a living as independent purchasing consultants. The point is that desktop publishing is very attractive to individuals who want to be their own boss because it is apparently easy to get into. Unfortunately, many find that it is not all that easy to make a living by setting up a desktop publishing business—a fact that freelance graphic designers have always known.

In the freelance arena, a high-level of graphic design skill and computer knowledge may be necessary to survive. Freelancers are often employed by advertising agencies, and many temporary job placement services have departments for placing graphic designers and production artists. Advertising agencies usually have high graphic design standards and expect freelancers to have a good portfolio of work to show. A temporary job service usually tests individuals seeking work in desktop publishing and business

presentation graphics and then tries to match their skills with the needs of its clients. In that situation, the more adept one is in various software applications, the more work one can get. One advantage to freelancing as opposed to a full-service DTP business is that freelancers often work on-site using the employer's equipment and software. It is probably best to be prepared by having one's own desktop publishing setup, but it would be possible to be a freelancer without purchasing the hardware and software.

Lack of experience in printing production and no art and design training are major handicaps for many DTP entrepreneurs. This can be remedied to some extent by a commitment to training and education, but there is no substitute for experience. Part of the desktop publishing phenomenon is the proliferation of what professional designers consider bad design. In fact, many traditional graphics professionals bemoan what appears to be a widespread acceptance of mediocrity throughout the desktop publishing industry. Whether this is actually true or not is beyond our purpose here. Suffice it to say that the graphics business is still changing and quality always seeks it own level. Anyone wishing to get seriously involved with graphic design and desktop publishing should be willing to make a commitment to excellence in order to succeed.

Aside from the expenses and training that may be necessary, some personal traits may affect an individual's performance as a desktop publishing freelancer or entrepreneur. These are the same traits that any self-employed person should have—self-reliance, confidence, good organizational and money-management skills, good communication and negotiation skills, and a

willingness to set goals and work hard. Working in desktop publishing may require some additional qualities on top of that. The graphic design and publishing industries are notoriously deadline-driven, and the pressure of meeting deadlines (realistic or not) is more than some people can take. Patience and determination are required to operate a computer, and that often goes double in desktop publishing. Freelance work may be of a "feast or famine" nature, so there is not much job security. Attention to detail is the mark of a professional—sloppy work will not bring repeat clients. Finally, how will you react if you have worked twenty hours straight without a break to produce something you think is great, but your client rejects it out of hand and refuses to pay for the changes? And, can you wait 30, 60, or 90 days to be paid?

The institutional/corporate category may be where most desktop publishing is actually done, and it's not always done on a Macintosh computer. **MS-DOS** and **Windows** computers are very prevalent in corporate America. This is not particularly a problem for an experienced Mac user, for the Windows GUI or the Windows 95 operating system are needed to run desktop publishing software such as **Adobe PageMaker, QuarkXPress,** and **FrameMaker.** The Windows environment is similar enough to the Mac that most people can get the hang of it rather quickly. The software applications are nearly identical on both platforms. The Macintosh has made some inroads, and loyal Mac users seeking jobs may luck out and find their favorite machine producing the company newsletter.

Regardless of which platform is in use, many different kinds of DTP

situations exist in corporate or institutional environments. The types of publications produced are newsletters, technical documents, reports, sales proposals, advertising materials, catalogs, forms, books, and magazines. In most corporate settings, desktop publishing gets its start because management wants to save money and gain more creative control by bringing the design and production of publications in-house. In the early days of corporate DTP, the task of design and production often fell to barely qualified individuals who were quite overwhelmed. This situation was a boon to private training companies and consultants, and it still happens. More and more organizations are taking advantage of the growing number of people in the job market who are experienced in desktop publishing. Success in finding a DTP job in a large company may hinge on the job seeker's versatility with software and hardware. Success in the job itself will probably stem from an ability to adapt to a less than efficient operation while working to institute beneficial procedural changes. Office politics may be a hindrance. Knowing how to use more than one of the major software applications is a definite plus.

See Also

Desktop Publishing, An Introduction to; Desktop Publishing, Present Day; Desktop Publishing Hardware; Desktop Publishing Training

Desktop Publishing and Color

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Electronic Prepress Systems (CEPS)

A color electronic prepress system (CEPS) is a high-end proprietary system dedicated to color image **scanning,** color correction, and **color separating.** The major vendors of CEPS are Linotype-Hell, Scitex America, DuPont Crosfield, and Screen.

See Also

Desktop Publishing Hardware; Desktop Publishing, The History of; Desktop Publishing and Digital Color; Prepress

Desktop Publishing and Color Management Systems (CMS)

A color management system (CMS) is a means to calibrate and control the appearance of device-dependent **digital color.** Color management systems are software applications that map the **color gamut** of an output device and use the information to control color specifications in desktop publishing software. EFIColor in **QuarkXPress,** Kodak Precision in **PageMaker,** and ColorSync from Apple are typical desktop publishing color management systems. The Kodak Precision CMS as well as other proprietary color management systems can be accessed from Adobe PageMaker's Edit Color dialog box. The CMS Source Profile dialog box allows a specific device profile to be selected.

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See Also
Color Gamut; Color Printing; Desktop Publishing and Digital Color

Desktop Publishing Color Models

Color models are used in graphics software applications to specify **spot** and **process colors.** Typical color models are: the process color model (CMYK), the RGB model (red, green, blue), and the HSL model (hue, saturation, lightness) or HSB model (hue, saturation, brightness). The PhotoYCC color model was developed by Eastman Kodak for photo CD systems. Although not strictly classified as color models, **color matching systems** such as PANTONE, TOYO, TRUMATCH, FOCOLTONE, and MUNSELL provide other means to specify both spot and process colors. The Edit Color dialog box in QuarkXPress provides access to color models and color matching systems. Adobe PageMaker has a similar dialog box.

See Also
Color Matching Systems; Color Printing; Desktop Publishing and Digital Color; Process Color; Spot Color

Desktop Publishing Color Standards

A color standard is a means of standardizing color based on the science of colorimetry. Color standards, such as CIEXYZ or CIELAB, are an attempt to

overcome the problems of device-dependency characteristic of **digital color.** The CIE (Commission Internationale de l'Eclairage) color standard was developed in 1931.

See Also
Color Gamut; Color Printing; Desktop Publishing and Digital Color

Desktop Publishing CPU Requirements

Desktop publishing CPU requirements are directly related to the types of software being used and individual needs for processing speed, graphics display, data storage, and peripheral devices. Basic desktop publishing can be performed on almost any Macintosh, but faster processing speeds and plenty of **RAM** mean better productivity in most cases. The recent versions of many DTP software applications require 16MB of RAM or more to function well.

Processing speed has proven to be the single most important feature to determined the marketability of a computer. The Power Macintosh 9500 uses the132MHz PowerPC 604 **RISC microprocessor** and is the fastest Mac on the market today. The Macintosh RISC (Reduced Instruction Set Computing) microprocessor was introduced in 1994 with the Power Macintosh 6100, 7100, and 8100 series after joint development by Apple, IBM, and Motorola. In addition to the 132MHz **clock speed,** everything about the 9500 is geared to greater speed: a faster **internal hard drive** and **disk drive,** quad-speed **CD-ROM,** and **PCI bus** architecture. With the addition of an accelerated **24-**

bit graphics card and up to 2.0GB of internal data storage, the 9500 is a very desirable CPU for high-end desktop publishing and electronic prepress. At the low-end, good desktop publishing results may be had with almost any Macintosh that has enough RAM to run the software of choice.

The PCI (Peripheral Component Interconnect) expansion bus architecture of the Power Macintosh 9500, 8500, 7500, and 7200 series is an important development. Designed to replace the older **NuBus** technology, PCI bus architecture allows faster throughput for peripheral devices, graphics accelerators, and network connections. PCI cards are also less expensive than NuBus cards. Although the change to PCI may be unfortunate for owners of expensive NuBus cards, NuBus to PCI adapters are available from Second Wave Inc.

See Also
Desktop Publishing Hardware; Hardware

Desktop Publishing and Digital Cameras

Digital cameras provide an alternative to **scanners** for capturing images from the real world to be included in **electronic publications.** Digital cameras range in cost from several hundred to thousands of dollars with the more expensive ones providing the better quality images. As is the case with scanners, **image resolution** and **dynamic range** are important characteristics. Digital cameras are similar to analog cameras in having

various kinds and grades of lens assemblies. Many digital cameras also have a built-in flash. The major difference is that digital cameras store captured images as digital data rather than on film. The internal memory of the camera determines how much data can be stored. A digital camera can be connected by cable to a computer where its image date can be further processed. Digital video cameras are also available.

See Also
Desktop Publishing Input Devices

Desktop Publishing and Digital Color

Color fidelity in reproduction has always been an important concern in the graphics industry, and since the advent of **desktop publishing (DTP)** in the mid-1980s, **digital color** has become an area of rapid technological development. Digital color is important because color is **device-dependent,** and it is difficult to maintain an accurate rendering of a color as it is processed by each device. **Color electronic prepress systems (CEPS)** spurred the development of more sophisticated digital-color processing on the **Macintosh** and other computer platforms. It is possible for a desktop computer system to link up with a CEPS through software or hardware gateways which convert **PostScript** data from the DTP system into the proprietary CEPS format via a **raster image processor (RIP).** The problems of color fidelity are addressed by industry **color standards** and **color management systems.**

See Also
Desktop Publishing and Color Management Systems; Desktop Publishing and Color Electronic Prepress Systems (CEPS); Color Gamut; Color Matching Systems; Color Printing; Prepress

Desktop Publishing Display Monitors

The ideal **desktop publishing** computer monitor for the Macintosh is capable of displaying in actual size two facing 8.5-inch x 11-inch pages. The 20-inch or 21-inch screen size is usually chosen for this purpose. These numbers represent diagonal measurement. Of course, much DTP work is done on computers with smaller monitors, but the larger size contributes to productivity. With a large display, less time is spent zooming in and out, and graphic design decisions can be made with more accuracy due to the ability to view whole pages in actual size. Large display monitors are available from various manufacturers such as Apple, RasterOps, Sony, NEC, and Radius. An interesting variation on the full-page display is available from Portrait Display Labs. This manufacturer's 17-inch monitor can be rotated between landscape and portrait views. When the monitor is pivoted to portrait mode, a single 8.5-inch x 11-inch electronic page easily fits the screen in actual size view with extra room for palettes and toolbars.

In addition to size, color is another important consideration for a computer display monitor being used in desktop publishing. The number of colors that can be displayed is dependent on the type of video circuitry in the computer.

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A **24-bit video** card can enable a high-resolution monitor to display millions of colors. Special video **RAM,** called **VRAM,** affects the overall performance of the display.

Other needs in computer display for desktop publishing are high **resolution,** smaller **dot pitch,** and a flat screen. All the major display manufacturers strive for a flatter screen, and there are a great variety of choices in resolution and dot pitch. A top-of-the-line monitor will have a resolution (measured in **pixels**) of 1280 x 1024 (Sony) or 1600 x 1200 (Radius). A .25mm dot pitch is considered best, but some good displays have a .26mm dot pitch.

See Also
Color Resolution; Desktop Publishing Hardware; Hardware

Desktop Publishing, Future of

We are in a period of rapid technological development, and there is no reason to believe that it will slow down anytime soon. The changes brought about by new technologies today occur more rapidly and have farther-reaching effects than past technologies. The concept of the "global village" is no longer theoretical. We are in the Age of Information, and the global communication of ideas is the basic commodity. Having become standard procedure in the graphics industry (an industry based on communication), **desktop publishing** itself must change to keep up with the times. Graphics

production will probably remain a hybrid of traditional and DTP for some time, but digital technology must eventually dominate. The effect of the **Internet** on global communication has started a new technological revolution that is already affecting desktop publishing. The focus of DTP and **electronic prepress (EPP)** is still primarily on supporting printed material. In the near future, this focus may change to the production of complex electronic images that can be presented through a variety of media that may or may not include paper.

The electronic format for the communication of ideas is already widely used. The **CD-ROM** is now integral to most computers. **Online services** are gaining popularity almost daily. **Interactivity** is an appealing aspect of these media and is what gives the electronic publishing format such a clear advantage over paper-based publishing. The flexibility and visual and conceptual richness of electronic media are seductive even to dedicated bibliophiles. To some, electronic publications may not be as accessible as paper publications. Surely this is a matter of education; and as new generations become acclimated to the computer screen at an early age, paper-based publishing may disappear.

See Also

Desktop Publishing Careers; Desktop Publishing, An Introduction to; Desktop Publishing, Present-Day; Desktop Publishing, The Beginnings of; Desktop Publishing, The History of; Desktop Publishing Online; Desktop Publishing Training; Internet, The; Publishing, Traditional

D

Desktop Publishing Hardware

A variety of computer hardware is available for **desktop publishing** on the **Macintosh** platform, ranging from low-end to high-end. Although it is difficult to discern any clear dividing line between low-end and high-end, some hardware characteristics can be identified for each category.

A typical low-end hardware setup of today might include only relatively inexpensive equipment: a basic **CPU** such as the Macintosh Performa, Power Macintosh 6100 or 7100, or a PCI Power Macintosh 7200; a 14- or 15-inch **color display monitor;** and a 600 dpi **PostScript laser printer,** such as the Apple LaserWriter4/600 PS or Select 360. Memory upgrades may be necessary to run full-featured **page layout** and **image manipulation software,** but these machines are good basic DTP platforms right out of the box.

It is true that a great deal of desktop publishing is being performed on older, slower computers and printers, but the new versions of standard software **(PageMaker, QuarkXPress, PhotoShop,** etc.) make large demands on the hardware, and older equipment usually must be replaced or upgraded to keep up. At the low end of DTP, personal choice plays a significant role. If one is working on an older Mac and finds that it continues to adequately meet the demands placed upon it, then there is no reason to change. Fortunately (or unfortunately, depending on your point of view), the Macintosh and other computers continue to get better, faster, and relatively less expensive. The frequency of these upgrades can be disconcerting, especially when one has

just purchased a system only to find that it has been superseded several months later.

High-end desktop publishing hardware includes the more powerful Macintoshes such as the PCI Power Mac 7500 and 9500. The older, but extremely fast, Power Macintosh 8500 is also a good DTP computer. Since high-end desktop publishing usually includes **digital color processing,** larger and higher-resolution display monitors are necessary. The Apple Multiple Scan 20-inch display is representative of this category. A **color desktop scanner** and a 600, 1200, or 1800 dpi **laser printer** are also usually found on the high-end desktop. A high-quality **color printer** might also be present in such a system.

Flatbed scanners and **35mm film and transparency scanners** are common, and deskside **drum scanners** are beginning to appear in high-end DTP environments. The deskside drum scanners are related to the drum scanners found in **color electronic prepress systems (CEPS)** but are less expensive. Although the CEPS scanners provide the best color image quality and control, deskside drum scanners, such as the ICG 300i Series, yield superb results. A desktop scanner should be capable of at least 24-bit color and 36-bit is preferable. Although scanners are more widely used, **digital cameras** are having a definite impact on DTP. The best digital images are captured with a Hasselblad or Nikon lens body mounted on a digital camera back, but good results can be obtained with a less expensive digital camera like the Apple QuickTake.

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Both low-end and high-end desktop publishers often use **service bureau imagesetters** to obtain **high-resolution output** (1200 to 2540 dpi), but a 1200 to 1800 dpi laser printer can be the next best thing. Most high-resolution laser printers also allow **full-bleed** 11 x 17-inch printing. Examples of this type of printer are the SelectPress 1200 from GCC Technologies and the PrePress VT1200. A color printer is useful for first-level **color proofing** and **color comps.** The **dye-sublimation color printer** is often favored for its almost photographic image quality. The Fargo Pictura 310 is capable of printing in either dye-sublimation or **thermal-wax** mode and accepts sheet sizes up to 12 x 20 inches. Even an inexpensive Hewlett-Packard **color ink jet printer** can be very useful for color comps.

High-end desktop publishing systems often act as gateways to the color electronic prepress systems (CEPS) and in themselves constitute a mid-range electronic prepress category. Just as DTP hardware can be categorized as either low-end or high-end, electronic prepress can be roughly divided into mid-range and high-end. However, as noted earlier, the divisions between these categories are mutable, and they exist chiefly for the sake of discussion. Because **color reproduction** is the primary focus of high-end DTP and CEPS, CPUs and display monitors must be equal to the task of processing large and complex color files. Souped-up Macs and **UNIX workstations** can be found side-by-side in many **trades shops** and **color houses.** They are connected to large drum scanners, **raster image processors (RIPs),** and **film recorders** capable of extreme precision in

the various aspects of digital color imaging.

See Also

Color Printing; Desktop Publishing CPU Requirements; Desktop Publishing and Digital Color; Desktop Publishing Display Monitors; Desktop Publishing Peripheral Devices; Desktop Printing; Desktop Publishing Proofing and Printing; Desktop Publishing, An Introduction to; Desktop Publishing, Present-Day; Imagesetters; Service Bureaus, Trade Shops, and Desktop Publishing

Desktop Publishing, History of

Desktop publishing technology began to be developed in the mid-1980s from the collaboration of three companies: **Adobe Systems Inc., Aldus Corporation,** and **Apple Computer, Inc.** Paul Brainerd, then president of Aldus Corporation, is credited with coining the term "desktop publishing." In 1994, Aldus Corporation, the original developers of the PageMaker page layout software, merged with Adobe Systems Inc. and the Aldus name is no longer used. Adobe Systems Inc. and Apple Computer, Inc. continue to be major players in the desktop publishing market.

In the beginning, the basic marketing premise of desktop publishing was that anyone could do it without any previous experience or education in the graphic arts. Advertising by the leading vendors of desktop publishing software and hardware strongly supported this premise. Many people bought

into it thinking that all one had to do to create a sophisticated brochure or newsletter was to click on a few icons with the mouse. Certainly, the Macintosh computer and software like **PageMaker** and **QuarkXPress** were marvelous innovations. They were even somewhat intuitive in their mode of operation but not to the extent hinted at in some of the advertising of the time.

As a consequence of the aggressive marketing, and due to the undeniable merits of the products, desktop publishing gained a foothold in business and industry. Because using desktop computers and software proved not so easy for everyone to learn, many forms of training began to appear. Software companies created and promoted training courses. They instituted authorization programs for outside training centers. Book publishers discovered a lucrative new market for computer books. Individual consultants began to thrive. Finally, community colleges, vocational-technical schools, and some universities began offering courses and degree plans in desktop publishing and computer graphics technologies.

From the beginning, DTP was especially popular with small business entrepreneurs who saw it as a way to cut expenses and gain control over newsletters and other business publications. Early desktop publishing technology was practically ignored by many graphics professionals and held in contempt by others. The contempt was not entirely unjustified. Until the early 1990s, desktop publishing suffered from limitations in **digital imaging, output resolution, color imaging** and **separation, digital halftone** technology, and other areas of concern for the high-end graphics

industry. Relatively slow **CPU** speeds and the lack of both standardization and a good technical support infrastructure also contributed to the slow start of DTP among professionals.

Desktop publishing would not have been possible without the **graphical user interface (GUI)** for operating a computer. The **Apple Macintosh** operating system provided such an interface. Eventually, the **Microsoft Windows** software provided a GUI for the **DOS**-based **IBM PC.** The Mac and the IBM PC were the first **desktop computers.** They are both in the category of **microcomputers.** Of course, the IBM PC (personal computer) was cloned by many different manufacturers, and the term "PC" was loosely applied to them all. In fact, "PC" still implies a DOS-based computer or a computer that does not use the Apple operating system.

Aldus PageMaker (now **Adobe PageMaker**) is generally considered the first desktop publishing software for the Macintosh. It was released in 1985, and was, strictly speaking, the first **page layout** software. **MacWrite, MacDraw,** and **MacPaint** probably qualify as the first DTP software applications if one is willing to grant a liberal interpretation of the term. They were quite unsophisticated compared to PageMaker, which was the first software to allow relatively easy manipulation of graphic elements on an electronic page.

Specifically, PageMaker created a user interface based on the traditional **paste-up.** Before PageMaker, it was practically impossible to create side-by-side columns on the computer. PageMaker did so with ease, and its text blocks

were extremely fluid, allowing greater flexibility in graphic design. PageMaker also provided unprecedented **typographic** control and drawing tools for creating straight rule lines, rectangles, and ellipses directly on the layout. Perhaps the most important innovation found in PageMaker was the ability to import text and graphics created in other software applications. The fact that text created in a **word-processor** and graphics created in a **draw** or **paint** program could be imported and manipulated together on the electronic page made PageMaker and, later, **QuarkXPress** and **Ready, Set, Go,** the defining software applications of the DTP movement. Aldus soon developed a **Windows** version of PageMaker, and it proved to be very popular in business and industry, providing a much broader-based market than the Macintosh version.

QuarkXPress was released in 1987 and began serious competition with PageMaker on the Macintosh platform. Eventually, QuarkXPress was to surpass PageMaker in popularity among graphics professionals in many parts of the U.S. This was due in part to the attention **Quark, Inc.** paid to the **prepress** aspects of its software. QuarkXPress's **color separation, color trapping,** and **page imposition** features quickly made it a favorite with **service bureaus, trade shops,** and printing firms. An extended version of QuarkXPress called **Visionary** was developed by **Scitex America** to link DTP systems to its proprietary high-end prepress systems. QuarkXPress differs from PageMaker in significant ways, although the two have many similarities. **Adobe Systems Inc.** has taken steps to improve PageMaker's viability as a front-end software for electronic prepress, and competition is

sure to remain strong between the two.

Other page layout software applications, such as Ready, Set, Go and **FrameMaker,** have contributed to the growth and success of desktop publishing on the Mac. **PostScript** drawing programs, such as **Adobe Illustrator** and **Macromedia FreeHand** (formerly Aldus FreeHand) also play an important role. **Adobe PhotoShop** has established itself as a standard in desktop scanning and image manipulation.

Due to its strong graphics characteristics and relatively trouble-free handling of peripheral devices, the Macintosh computer has remained the DTP platform of choice for many in the graphics industry. The development of the **Power Mac** and, more recently, the **PCI Mac** would seem to assure that position for some time to come.

See Also
Desktop Publishing Applications; Desktop Publishing Hardware; Desktop Publishing, An Introduction to; Desktop Publishing, Present-Day; Desktop Publishing, The Beginnings of; Desktop Publishing, The Future of; PageMaker; Publishing, Traditional; QuarkXPress

Desktop Publishing Industry Standards

Standards or guidelines are important in any industry but take time to develop. In the instance of the desktop publishing industry, standards are still undergoing development although some basic guidelines have been

well-established for several years. The traditional graphics industry has had well-developed standards for many years and some of those affect desktop publishing. For example, Specifications for Web Offset Publications (SWOP) are a set of professional standards for offset printing in the United States which have a particular bearing on any publication printed on web offset lithography presses. As an example of how these standards apply directly to desktop publishing, the **EFIColor CMS** (Color Management System) in **QuarkXPress** lists SWOP as a target output choice when establishing a color range (gamut) for the colors specified in a particular publication.

Standards are usually established by a leading professional or trade association, and such is the case with desktop publishing. The **Graphic Communications Association (GCA)** has developed one set of standards called the Electronic Mechanical Specifications (EMS), and the **Scitex Graphic Arts Users Association (SGAUA)** has developed another, the Computer Ready Electronic Files (CREF). Both of these standards have as their goal the elimination of problems in the process of preparing desktop publication files for high-resolution output to film or plate.

The EMS and CREF guidelines were developed by printers, separators, consultants and others who are directly involved in the processes and therefore greatly affected by problems that occur due to improper practices. When electronic publication files are prepared incorrectly, prepress technicians and printers often must troubleshoot the files, resulting in overtime, excess charges, and missed press schedules. The guidelines represent suggestions for minimizing the chance of problems. For example,

the CREF document addresses issues concerning fonts, providing and marking proofs, revisions and corrections, transmittal and shipping, file naming, grids and stylesheets, text handling and special effects, trapping, frames and borders, importing graphics, defining colors, bleeds, blends and gradients, and methods of production. The EMS and CREF guideline documents can be obtained from the Graphic Communications Association and the Scitex Graphic Arts Users Association respectively.

See Also
Desktop Publishing Professional Organizations

Desktop Publishing Input Devices

The two most common computer input devices, the mouse and keyboard, are usually taken for granted because they are such key parts of any hardware system. However, on the larger Macintoshes, keyboards may have to be purchased separately from the **CPU,** and many users prefer to purchase a different mouse. Desktop publishing puts no special demands on the Mac keyboard except that an extended keyboard with "F" keys may be required if SoftWindows is used. The new ergonomic keyboards are nice and may even be necessary for individuals suffering from repetitive motion syndrome or other computer-related ailments.

Because the mouse is so important in using the Macintosh **graphical user interface (GUI),** it has always been a part of the Mac hardware. Graphic

designers and other desktop publishers are usually intensive mouse users and may particularly suffer from one of the repetitive motion syndromes. Relief may sometimes be had by switching to a **trackball mouse, graphics tablet** with stylus, or a **trackpad.** The graphics tablet and stylus are almost a necessity for illustrators and others using drawing and painting software. Which mouse to use is essentially a personal choice, for they all have the same basic function. Perhaps owning one of each is not out of the question.

Scanners and **digital cameras** are important to desktop publishing operations because they allow images from the real world to be captured and digitized for processing by the computer. Scanners digitize photographs or any two-dimensional image so that they can be manipulated and included in electronic publications. Interesting results can be had from scanning three-dimensional objects. The development of the digital camera has made it possible to digitize life's images on the fly. Actually, this sort of image capture was already possible with video-capture hardware and software, but the low-end digital cameras are more affordable and commonplace. Excellent image quality can be expected from the high-end digital cameras which consist of a **digital camera back** mounted on a traditional SLR camera body.

Desktop Publishing and the Mouse If any single piece of hardware can be said to represent desktop publishing, it would have to be the mouse. This whimsically-named device, attached to the Macintosh by its long tail, represents the power of the **graphical user interface (GUI)** for computers that revolutionized the graphics industry. The first Macintosh

mouse was like a new bar of soap—blocky and hard to grasp. Today, it is a streamlined extension of the user's hand. The standard Macintosh mouse still has only one button; but most **DOS** or **Windows** -based computers come with a two- or three-button mouse, the extra buttons having various functions other than pointing and clicking. The basic function of the mouse is so simple and straightforward that it needs no explanation. Clean it occasionally, and it will serve you well.

Desktop Publishing and the Trackball The trackball is one of the more successful variations on the standard mouse. Although it is available in different configurations from different manufacturers, a trackball mouse is essentially a stationary platform with a ball mounted on top. Depending on the design, the ball is rolled with either the fingertips or the thumb, and clicking is done with the opposite digit. Many users feel that a trackball mouse is more precise for graphics work, and trackballs usually come with programmable features. A small trackball is commonly found on **laptop computers.**

Desktop Publishing and the Graphics Tablet A graphics tablet with cordless stylus is the perfect input accessory for an illustrator or artist working with **drawing** or **painting software.** In fact, anyone who prefers to point and click with something resembling a pen or pencil might like the graphics tablet as an input device. Many users feel that the stylus and tablet are almost a necessity for using painting software because it feels more "natural" than a standard mouse and makes it easier to create long smooth strokes. Graphics tablets come in different sizes with the larger sizes

offering more precision and allowing for broader hand movements. The tablets are pressure sensitive, and the stylus has a small button for clicking operations.

Desktop Publishing and the Trackpad A relatively recent innovation, the trackpad is a small, slightly resilient pad sensitive to the touch of a fingertip. Moving the fingertip in contact with the pad moves the mouse cursor on the computer screen. It is intended as an alternative to the standard mouse or the **trackball mouse** and has been incorporated into the newer **Apple PowerBooks.** A button is located near the edge of the pad within reach of the thumb. Many users find a trackpad easier to control than a trackball, and it may be a good alternative for individuals who need a change from the standard mouse.

See Also
Desktop Publishing Hardware; Desktop Publishing Peripheral Devices

Desktop Publishing and the MacOS

Desktop publishing and the Macintosh operating system go hand-in-hand. The defining aspect of the MacOS is its **graphical user interface (GUI),** and the very nature of this interface is what made desktop publishing possible. The graphical user interface on the Mac was often bewildering to **DOS** users who had grown accustomed to the linear, text-oriented, command and response behavior of their computers; but it was a miracle for others,

particularly those who had never used a computer before. At first, computers were not widely used by graphics industry professionals except in the typesetting and prepress areas, but the Macintosh proved to be an inviting tool for established, as well as would-be, graphic designers. Intuitive ease of use coupled with sophisticated graphics capability have made the Macintosh the platform of choice for many in the graphics industry.

Despite early hardware limitations (a tiny monitor screen, no **hard drive,** inadequate **RAM,** low-resolution output), developers wrote software based on the Macintosh OS that could perform amazing feats. Never before had it been so easy for a graphics production artist to draw straight rule lines or boxes. Creating rounded-corner boxes, never an easy task with ink pen or rule tape, became such a snap that most novices over-used the ability. The point, click, and drag capability of the **mouse** made it not only a symbol for the operating system's graphical interface, but also an indispensable tool for performing page layout, drawing, and painting on the Mac.

The Mac OS introduced true typesetting capacity on the desktop. In spite of a limited typeface selection, early Mac users began to put the typesetting industry out of business. **Apple** developed a bitmapped font technology which was included with the operating system (the city-name fonts), but it was the development of the PostScript-based **LaserWriter** with its built-in complement of high-resolution fonts that really started the process.

The capability of the Macintosh operating system to incorporate fonts for use in all its software applications was a key factor. In fact, it was this very

universality that made the Mac OS so unique and successful. For the first time, software was written in such a way that all software applications had certain things in common—windows, menus, dialog boxes, and so on. Even some specific features, such as type styling conventions and drawing tools, were the same in different software applications.

Over the years, many refinements in numerous areas have contributed to the success of desktop publishing, and the Macintosh operating system remains a firm basis for development. The completely redesigned new Mac OS, code-named "Copland," promises to make great improvements in memory usage and operating speed—two areas of special importance in desktop publishing.

See Also

Desktop Publishing, The Beginnings of; Desktop Publishing, The History of; Desktop Publishing, An Introduction to; Mac History and Culture

Desktop Publishing Online

The **Internet** and the **World Wide Web** have revolutionized communication in a way that is reminiscent of the **desktop publishing** revolution of the mid 1980s. Millions of people worldwide are using the Internet to obtain and provide information. Entertainment, commerce, and social interaction are also typical online activities. The development of the World Wide Web and **HTML** (HyperText Markup Language) are part of the global online publishing phenomenon. HTML is the authoring language used

to create web pages.

New software and hardware development is driven by the popularity of online information exchange just as it was driven by the early successes of desktop publishing. Web authoring and management software products such as Adobe PageMill, Allegiant Marionet, and WebSTAR from StarNine, make World Wide Web pages easier to produce by providing a simplified means to use HTML. Although paper-based publishing will no doubt be around well into the twenty-first century, online publishing is a significant force for change.

See Also
Desktop Publishing, An Introduction to; Desktop Publishing, The Future of

Desktop Publishing Peripheral Devices

In it broadest definition, a **"peripheral"** is any device that extends the functionality of the **CPU.** This includes functions such as **scanning, printing, networking, telecommunications, data storage,** and so on. Many of these are important in **desktop publishing,** particularly scanning and printing.

A peripheral device is usually connected to the Macintosh computer via a cable to the **SCSI** (Small Computer Systems Interface) port. The SCSI port is the connection outlet for scanners and external drives. Desktop scanners connected to the SCSI port may be of the flatbed type, the 35mm film or

transparency type, or, more rarely, the drum type. External drives are available in many forms. They may be conventional hard drives, removable cartridge drives, optical drives, DAT (digital audio tape) drives, CD-ROM drives, WORM (write once, read many) drives, or even diskette drives. More than one SCSI device may be connected to the Macintosh SCSI port in a chain with cables connecting each device.

The **NuBus** card is another way to extend system functionality. On many older Macintosh computers a NuBus card is used to connect a **graphics accelerator** or **EtherNet** cable. The newer Macintoshes are designed to utilize a different kind of card, the **PCI** (Peripheral Component Interconnect) expansion bus. This card is meant to replace the older NuBus technology. Apple claims that PCI cards can perform up to three times faster than NuBus cards. PCI technology can even be used to speed up the flow of data from SCSI devices.

In a sense, printers and modems are also peripheral devices. Printers can be directly connected with a cable to the Macintosh printer port. Workgroup situations are now common where many computers are connected to each other and one or more printers via **AppleTalk** or EtherNet cables. This is known as a **Local Area Network (LAN).** The modem represents the ultimate in connectivity to other users and devices. Connected to a telephone line, a modem may be used to access online services, the Internet, or another computer at a remote location. Data transfer between computers can be useful in desktop publishing, especially when publication files need to be sent to a service bureau.

See Also
Desktop Publishing CPU Requirements; Desktop Publishing Hardware; Desktop Publishing Input Devices; Hardware

Desktop Publishing, Present Day

Today, **desktop publishing** is well established in the graphics industry of the United States and many other countries. It is widely established as standard procedure in book and magazine publishing, and is commonly used to generate reports, newsletters, and many other documents in corporate and government offices. Authors, editors, copywriters, and others who are responsible for writing and organizing the content of a great variety of publications have provided much of the impetus by more fully utilizing **desktop computers.** Business owners and other entrepreneurs have continued to rely on DTP as a cost-effective way to produce advertising materials and business stationery. Advertising agencies almost universally require new hires to be proficient in **QuarkXPress** or **Adobe PageMaker,** as well as **Adobe PhotoShop, Adobe Illustrator** or **MacroMedia FreeHand,** and other DTP-related software. Desktop publishing operates at many levels and takes many forms.

Advancing technology has removed many of the obstacles in the transition from traditional to desktop publishing. Some hybrid practices still exist. For example, electronic publication files can be output in a form that practically eliminates traditional **stripping** procedures. However, this may require

expensive high-end proprietary hardware and software, depending on desired image quality and other factors. It is common for electronic publication files to be output on less expensive, but adequate, equipment. In this case, **manual stripping** or other traditional prepress activity may be necessary.

Many educational institutions have developed curricula for desktop publishing and related graphics fields. Although it originally succeeded because it incorporated formerly specialized fields such as typesetting, graphic design, reprographics, and some aspects of prepress, DTP and **electronic prepress** have become so technologically advanced that individuals are finding it increasingly necessary to specialize in one or two software applications or a single operating system. Early practitioners could easily cope with the relatively simple DTP systems of the mid-1980s, but the proliferation of new software and hardware has complicated the field.

The **Macintosh** computer is still the mainstay of high-end DTP, but the descendants of the original **IBM PC** are many and must be considered viable platforms for desktop publishing software. Using the **Microsoft Windows** software, these computers are used at many levels of desktop publishing in business, industry, government, and educational institutions. The ability of the Macintosh to interface smoothly with high-end prepress systems is a major factor in its success. Desktop publishing is only the first stage of the overall process of printing and publishing. Electronic documents created on a Mac or PC are primarily printed on paper or some other two-dimensional surface. The process of getting those documents from the computer to the

printing press is known as **electronic prepress (EPP).** Electronic prepress involves image scanning (digitizing), color adjustment, high-resolution digital halftones, color trapping, electronic page imposition and stripping, and high-resolution output to film or printing plate. In some cases, electronic files are output directly to a digital printing press. Any consideration of DTP technology must include a look at EPP.

See Also
Desktop Publishing Careers; Desktop Publishing Process, The; Desktop Publishing Proofing and Printing; Desktop Publishing, An Introduction to; Desktop Publishing, The Beginnings of; Desktop Publishing, The Future of; Desktop Publishing, The History of; Desktop Publishing Training; Prepress; Publishing, Traditional

Desktop Publishing Process

The process of desktop publishing has several clearly definable stages. Although it mimics the traditional publishing process in many ways, desktop publishing has revolutionized the graphics industry by automating, combining, and simplifying many of the stages. This discussion provides an overview of the entire desktop publishing process from beginning to end.

- Stage 1 (Concept/Writing/Design)—The first stage involves the use of creativity and aesthetic principles. All publications start with ideas and the roles of authoring and graphic design are to communicate the

ideas. The author, whether of an in-house company report or a major book, is responsible for expressing the ideas clearly, succinctly, and, perhaps, entertainingly. The designer uses artistic ability and creativity to devise an attractive and effective vehicle for the ideas. The author and designer may even be the same person; but, in any case, preliminary examples of the publication are prepared as rough drafts. Traditionally-trained graphic designers usually prepare thumbnail sketches, full-size pencil roughs, and more finished-looking **comprehensive layouts (comps)** for the purpose of communicating design ideas to a client, boss, or colleague. A comp is often created on the computer using the same **page layout software** that will be used to produce the final publication files. These comps are output on a **desktop color printer** and are capable of more accurately showing color, illustrations, and actual text than were traditional comps. An electronic comp may be printed on the actual paper that will be used in final press production. Once the written word and the preliminary designs are approved, the publication is ready for the next stage.

- Stage 2 (Page Layout/Text Formatting/Graphics)—In the second stage, text and graphics are combined in a page layout software application to create an **electronic publication file.** This file will be used to output the publication in some form that leads to mass reproduction. This part of the process replaces the older practice of pasting up type galleys and other elements to create a page mechanical (camera-ready

copy). Incorporating text in an electronic publication file is straightforward and relatively simple. Text can be typed directly in the page layout software or imported as a word-processor file. Typographic features allow the text to be formatted and arranged on the pages according to graphic design principles and the aesthetic sensibilities of the designer. Illustrations and other graphics are incorporated by importing them into the publication file and arranging them as part of the overall design. Page layout software applications provide simple tools for creating rule lines, boxes, and frames. Boxes can be filled with patterns and tint screens directly on the electronic page. Line art graphics are often created in a **drawing software application** and are known as **vector images** or **object-oriented** art. Photographs and other continuous-tone images must be digitized with a **scanner** to be placed in the publication and are called **bitmap** or **raster image** art. Although desktop scanners can do a good job, high-end **CEPS (Color Electronic Prepress Systems)** scanners are often used for publications with high production values. Desktop publications can be processed and output on these high-end systems through software and hardware links, or gateways. When a CEPS is used, photographs are scanned on a high-speed drum scanner capable of very high resolutions and dynamic range. Two image files are generated: one is low resolution and the other is high resolution. The low-resolution file is provided to the designer and imported into the publication as a for-position-only (FPO) image. When the publication file is sent to the trade shop for **electronic stripping**

and output to film or plate, the high-resolution images are automatically substituted in place of the FPO images. Two well-known schemes for image-replacement are **Open Prepress Interface (OPI)** and **Automatic Picture Replacement (APR).**

- Stage 3 (Prepress/Printing)—At this stage the publication is ready to be printed. Many decisions must be made regarding this part of the process. The quantity desired, the printing surface (paper or other substance—often called "substrate"), the size and type of printing press, folding and binding procedures—all must be decided upon. One thing often dictates another. For example, the quantity of the reproduction run and the number of colors will probably determine many of the other factors, but quantity must be balanced with quality in an effort to obtain the best-looking results at the lowest possible price. These decisions are usually jointly made by the principals involved, such as the designer, a production manager, and a representative of the commercial printing firm. If the publication is to be printed on a traditional printing press, **prepress** activities must be performed to convert the electronic publication file into printing plates. Electronic prepress involves the substitution of high resolution images (if necessary), **color trapping, page imposition** to make a press layout, and the creation of film or plates. In some instances, film is manually assembled into press layouts in a process called **stripping,** creating **flats** (assemblages of film and orange masking paper) that are used in a photomechanical process to make printing

plates. In desktop publishing, film or plates may be generated on an **imagesetter** at a **service bureau** or a film recorder at a CEPS trade shop. Publications printed on a **digital press** can be output directly from a computer, bypassing the film and/or platemaking stage.

- Stage 4 (Folding/Binding/Distribution)—The fourth and final stage in desktop publishing has scarcely changed from earlier methods, except in the area of distribution. Books, magazines, brochures, and pamphlets printed on paper are still folded and bound (and distributed) in the same manner as they have been for many years. Certainly the machines have improved and may be electronically controlled, but folding and binding have not been affected by the DTP revolution in quite the same way as stages one, two, and three. It is in the distribution of desktop published information that a new revolution is occurring. The **Internet** "information superhighway" and the **World Wide Web** have provided a new way to publish that could eliminate, or at least greatly reduce, the need for paper and all the procedures that attend printing.

See Also

Automatic Picture Replacement (APR); Color Printing; Color Separations; Color Trapping; Desktop Printing; Desktop Publishing and Color Electronic Prepress Systems (CEPS); Desktop Publishing, The Future of; Desktop Publishing Online; Image Manipulation for Printing; Image Scanning; Imagesetters; Mechanical; Open Prepress Interface (OPI); PostScript; Prepress; Printing; Printing Methods, Digital; Printing Methods, Traditional

D

Desktop Publishing Professional Organizations

Belonging to a professional organization has long been a way for individuals to benefit from association with others in their field. This is particularly valuable for graphic designers and others in the field of desktop publishing. Such organizations can be national, state, or local and can be categorized as professional associations, guilds, and user groups. Many groups have regular formal meetings for socializing and the presentation of educational programs. A newer category, online forums or chat groups, must be included because it fulfills many of the same needs as the more formal organizations. Trade shows such as those held by Seybold Seminars are another category of organization many in the desktop publishing and computer graphics field find valuable, especially for those who want to stay on the leading edge of technology.

The benefits of belonging to an organization are many. The members form a reliable base for networking and information exchange. Local user groups are especially good for this. All large cities and many medium to small ones have user groups. Asking around at computer stores, service bureaus, or the local community college or public library will probably reveal the names and telephone numbers of local groups. Many novices in the field find that belonging to a user group provides a resource for freelance work, new clients, and emergency aid when a hard drive suddenly won’t respond at 10

p.m. on the night before an 8 a.m. deadline. User groups are usually structured around a specific platform or software application. A large umbrella group may have sub-groups called SIGs (Special Interest Groups) that deal specifically with one software application. User group meeting often feature guest speakers from local businesses, industries, or educational institutions. Larger groups may succeed in luring hardware and software developers in to give new product demonstrations. One of the most valuable aspects of a user group meeting is the open forum where anyone can ask for or give out information and advice. Larger groups may publish a newsletter with information about new products, listings of training classes, the availability of shareware, display and classified advertising, and so forth. The members of user groups are usually very helpful to each other and belonging to one can ease the isolation of computer work. Because many user groups are voluntary organizations without paid staff, members are expected to volunteer to perform the chores of keeping the organization going. Only the very large umbrella groups may have management and support staff, and members still have an opportunity to provide services. Some groups may charge small membership fees.

Associations, guilds and other professional organizations form a somewhat broad category. These organizations may have a large national, or even international, membership. Some have local or state chapters, and all are characterized by members who belong to a specific profession or practice a particular trade. In function, they are much like user groups but less community oriented. Members benefit from services such as newsletters,

professional education programs, legal referral services, group insurance, and many other programs. Membership fees may be substantially higher than for user groups. The following is a list of well-known professional organizations associated with the desktop publishing industry:

- Association of American Publishers (AAP), 1718 Connecticut Avenue NW, Suite 700, Washington, D.C. 20009, (202) 232-3335. Internet site: www.publishers.org
- Graphic Communications Association (GCA), 100 Daingerfield Road, Alexandria, Virginia 22314-2804, (703) 519-8160. Internet site: www.printing.org
- Graphic Artists Guild (GAG), 11 West 20th Street, New York, New York 10011, (212) 463-7759. Internet site: www.gag.org
- International Prepress Association (IPA), 7200 France Avenue South, Suite 327, Edina, Minnesota 55435, (612) 896-1908
- National Association of Desktop Publishers (NADTP), 462 Old Boston Street, Topsfield, MA 01983-1232, (800) 874-4113
- Scitex Graphic Arts Users Association (SGAUA), P.O. Box 2345, 750 Old Hickory Boulevard, Suite 264, Brentwood, Tennessee 37027, (800) 858-0489

D

Desktop Publishing Proofing and Printing

The fact that work can be easily proofed and revised is one of the strengths of desktop publishing. Proofs for desktop graphics are of three basic types: **digital proofs, off-press proofs,** and **press proofs.**

The computer's monitor screen provides the first opportunity to proof one's publication and is the most basic kind of digital proof. The quality of black and white images (type and line art) can be judged to some degree on the computer screen; but color display is usually quite inaccurate, and one cannot rely on it as a final proof for color images. Desktop printers provide a more accurate way to proof black and white publications, and **laser printer** output is probably the most common form of digital proof. **Thermal wax, dye sublimation,** and **ink-jet printers** are also frequently used, especially for color proofing. Desktop color printers often do not reproduce color accurately, however. **Direct digital color proofing (DDCP)** systems, such as **Digital MatchPrint** (3M), **4Cast** (DuPont), and **Pressmatch** (Hoechst), provide good color fidelity but require specialized equipment.

Off-press proofs are the traditional proofs made directly from the **film** that will be used to make **printing plates.** A **blueline proof,** such as the DuPont **Dylux,** is the most basic proof in this category. Bluelines are monochrome and cannot show color images. **Color overlay proofs** made of

four pieces of film representing each of the **process colors** are another form of off-press proof. **Color Key** by 3M and **Chromacheck** by DuPont are typical overlay proofs. The most color-accurate off-press proof is the **laminate,** or integral, proof. The **MatchPrint** (3M) and the **Cromalin** (DuPont) are both popular laminate proofs. The **Water Proof,** a new type of laminate proof from DuPont, is becoming popular because it uses water as a solvent, doing away with the need for hazardous chemicals. It may also be laminated to the actual paper stock to be used in the printing job, providing a more accurate forecast of how the finished piece will look.

Press proofs are made on a printing press using the same plates, ink, and paper that will be used on the actual job. This provides the most accurate color proofing but is expensive and time-consuming. Such proofs are usually called "progressives" and are composed of separate sheets showing each color, various combinations of colors, and all the colors together.

Desktop publications are printed in a variety of ways, the most basic being the desktop printer. Quantity, paper size, image resolution, color fidelity, folding and binding, and distribution needs are determining factors when choosing a printing method. Desktop printers are often used to print business documents in small quantities. Larger quantities usually require commercial printing facilities. Many options exist for mass reproduction, ranging from sophisticated **duplicators** like the IBM **DocuTech** and **digital presses** like the Indigo **E-Print** to traditional **offset printing.**

See Also

Color Printing; Desktop Printing; Desktop Publishing Hardware; Printing Methods, Digital; Printing Methods, Traditional

Desktop Publishing and Scanners

Scanners are a key part of desktop publishing. Photographs and other continuous-tone art must be digitized by a scanner to be incorporated into electronic publications. The best quality color scanned images come from high-end **CEPS** (Color Electronic Prepress Systems) scanners installed at **trade shops** and **service bureaus.** Good quality color scanning can be accomplished with **flatbed** or **35mm film** or **transparency scanners** on the desktop. The quality of a scanner is determined by its resolution and dynamic range capabilities. Less expensive than CEPS scanning but better quality than desktop scanning, the Kodak Photo CD system provides a cost-effective alternative where images in several resolutions are installed on **CD-ROM** through the services of a professional photo lab.

See Also

Desktop Publishing and Color Electronic Prepress Systems (CEPS); Desktop Publishing Hardware; Desktop Publishing Input Devices; Service Bureaus, Trade Shops, and Desktop Publishing

Desktop Publishing Training

D

Typing is probably the most basic manual skill needed in desktop publishing. Next to that is the hand/eye coordination needed to operate a **mouse**. Mouse operations are intuitive and become faster and more accurate with practice so no particular training is necessary, but a typing class in the continuing education department at a community college or a typing tutorial software program will probably be required to learn touch-typing. Hunt and peck is just too slow. Even if most copy is typed by someone else, a considerable amount of keyboard input is usually involved—including those time-saving keyboard shortcuts for menu commands.

An interesting training issue was raised in the early days of desktop publishing and is still viable. It has to do with the standards for design aesthetics practiced by professional graphic designers. Before desktop publishing, most graphic designers had some kind of art background, either a college degree or certificate or a lengthy apprenticeship in the graphic design field. Desktop publishing changed that to some degree because it made graphic design tools, and the profession itself, more accessible. Anyone with a Mac and a **LaserWriter** could become a graphic designer overnight. Early advertising by **Apple Computers Inc., Adobe Systems, Inc.,** and **Aldus Corporation** (the developers of the **PageMaker** page layout software) stressed this accessibility. Experienced graphic designers were concerned about (and offended by) the resulting proliferation of "bad" design. Naturally, many established designers felt threatened by this new technology which had not yet reached a stage of development that provided the sophistication *they* needed. At first the novelty and money-saving

aspects of desktop publishing overcame the lack of aesthetically pleasing design; but, today, desktop publishing is mainstream and higher standards again apply.

In addition to the manual skills of typing and mousing and the practice of good design skills, software knowledge must be developed. Of course, basic computer literacy is a necessity. It is very difficult to master a complicated page layout or graphics software application if one has not mastered the basics of the operating system. The need for personal computer software training was recognized from the beginning, and many software developers and computer retailers provide it in various forms.

Another important area of knowledge is printing production. Although printing is rapidly moving in the direction of **digital presses, traditional printing** methods such as **offset** and **gravure** will no doubt be around for many more years. It is a lack of experience and training in this field that seems to be the most severe handicap for many, including experienced graphic designers. Current desktop publishing technology is encompassing the once arcane practices of **prepress** and printing production. Established graphic designers may have little knowledge of these areas because they grew accustomed to handing off finished **paste-ups** to the prepress technicians and waiting for a proof. Novices are simply overwhelmed by the vast body of knowledge representing the hidden part of the iceberg.

In summary, the areas of knowledge necessary to the successful practice of desktop publishing are: (1) manual skills in typing and using the mouse; (2)

graphic design; (3) computer literacy and software; and, (4) printing production.

There are several options for learning the necessary skills to work in the desktop publishing field. Books are an obvious, if bewildering, choice. The sheer quantity of computer books, even those dealing specifically with DTP software, is overwhelming. The best advice is simply to take your time and look at all of them to get a sense of how different books take different approaches to the same thing. It is important that you be able to easily understand the concepts, and this is often a matter of writing style and organization. Many people find the manuals that come with software applications to be difficult, but there are plenty of alternatives at the book store. Look for a book that takes a step-by-step tutorial approach and provides pedagogical features such as exercises, lists of key terms, and a good index. Make sure the book you buy deals with the same software version that you have. Some self-tutorial training combines a workbook with audio or video tape. If being led step-by-step through a tutorial appeals to you, look for this type of publication at larger book stores and computer stores or in mail-order catalogs. Learning from a book is not for everyone, but books are a valuable reference resource in any case and are a good investment.

The electronic tutorial is another way to teach yourself a software application. Most of the major software developers provide such tutorials as part of their software packages. They are usually very professionally done and provide a quick (but shallow) experience in how the software actually works. In some cases, a printed tutorial guide is also provided.

D

Training classes are probably the best way to learn all four of the knowledge areas. These classes run the gamut from one short session at a self-improvement learning center to entire semesters at a college or university. The self-improvement classes are relatively inexpensive but lack depth due to time constraints. Use them mainly to get a quick introduction and possibly shorten your learning curve. The next level of training can be found at private training companies. Many of them specialize in graphics, desktop publishing, and **multimedia** software training. Regularly scheduled classes at these establishments may have a duration of one, two, or three days. This type of training is popular with corporations and institutions who do not have in-house training facilities. Private training can be expensive compared to the other types but often has the advantage of extremely knowledgeable instructors who are good communicators. When shopping for this kind of training, ask the training company for references you can check out regarding the effectiveness of the instruction. If a particular instructor seems to get the most kudos, ask for him or her when you sign up. Software companies sometimes offer training seminars with very effective instructors; however, travel may be necessary. Some computer stores offer training classes, but the training center may be a low priority item on the management agenda, resulting in indifferent training procedures and poor instructors. On the other hand, the training may be free to a purchaser of a new computer system.

Colleges and universities are the place to go for very thorough longer-term training. Regular desktop publishing and electronic prepress degree

programs are offered at many community colleges and vocational-technical schools, and night classes are common. Individuals who do not wish to get a degree or certificate may enroll in computer classes in the adult education or continuing education department of a college or university. The community colleges seem to be leading the universities in setting up curricula for desktop publishing. One advantage to classes at a community college is that instructors who have practical, first-hand knowledge in their subjects are often recruited from business and industry.

See Also
Desktop Publishing Careers; Desktop Publishing, An Introduction to; Desktop Publishing and Traditional Publishing

Desktop Publishing Utility Software

The Macintosh utility software that we discuss here falls into the broad categories of font management, file conversion, file compression, and miscellaneous useful utilities. The term "utility software" itself is rather broad but we define it as any kind of software application that focuses on a particular function, such as **virus detection** and **removal.** Utility software is packaged and sold in the same manner as large mainstream software applications, but a variety of useful freeware or shareware utilities can be found **online** or through users' groups.

- **Font Management—** Font data files can drastically increase the size

of a Macintosh System file if they are dropped into the **System folder.** Most desktop publishers need access to many fonts, but as power users, they want to keep the System file as small as possible in the interest of faster processing speed. The font management utility **Suitcase** (by Symantec) solves the problem by allowing the font files to be stored in a folder on a hard drive (or other storage device). Individual typefaces can then be temporarily accessed by the system through the Suitcase utility. Suitcase has many features to enhance this basic function: (1) sets of typefaces can be named and saved, (2) font (and sound) files can be compressed, (3) fonts can be viewed in their actual typeface, and (4) font conflicts can be detected and solved. These and other features make Suitcase a popular utility. Suitcase is a **System Extension.**

Adobe Type Manager (ATM) is another font management utility that is so ubiquitous on the Mac it is often taken for granted. ATM is widely used because it is a necessary adjunct to **Adobe Type 1 fonts,** the desktop publishing and **electronic prepress** standard for font technology. The most basic function of ATM is to accurately render a font on the computer screen in any size on demand. Prior to ATM, a separate **screen font** file for each desired point size of type had to be installed in the system before it could be rendered accurately on the monitor screen. When ATM is installed in the system folder, any point size of type can be rendered with only one screen font file present. ATM is a **Control Panel** document and **Init** file.

- **File Conversion—** In desktop publishing and other computer work, files are often transferred from one platform to another. Many desktop publishing software developers, such as **Adobe Systems, Inc.** and **Quark,Inc.** market nearly identical software versions for the Macintosh and **Windows.** The documents created in these cross-platform software applications can usually be transferred between platforms with no difficulty. File transfer can take place via **local area network (LAN), telecommunication,** the **Internet,** or diskette sharing. Problems can arise, however, in two areas: font technology and graphics file formats. As long as two computers use the same font technology there is no difficulty; but, for example, if a Macintosh **PageMaker** publication with **Adobe Type 1** fonts is opened in the Windows version where **TrueType** fonts are used, font substitution must take place. Substituting a different font will probably drastically affect how text flows on the pages and create layout problems.

  Graphics files can present a problem because of the many different types of formats and the software requirements for processing them. Fortunately, graphics software applications such as **Adobe Illustrator, Adobe PhotoShop,** and **Macromedia FreeHand** can save or export graphics in various formats, including cross-platform (Mac and Windows). The native file formats of the PostScript drawing programs, Illustrator and FreeHand, are more or less fully cross-platform compatible as long as the software versions are the same.

When graphics created in either one of these programs are to be imported into a **page layout software application,** they must be converted to the **EPS (Encapsulated PostScript)** format because native files will not import. The EPS graphics are also cross-platform compatible if they are saved or exported from the drawing program properly. An EPS graphic must have a preview image saved with it, and this image must be compatible with the particular platform. In FreeHand, for example, the Export dialog box provides many choices of file formats, and two of them are Macintosh EPS and MS-DOS EPS.

Bitmapped images saved in **TIFF (Tagged Image File Format)** are also cross-platform compatible if they are saved properly. The byte order of a Macintosh TIFF image is different from that of a PC TIFF image. Adobe PhotoShop can save a TIFF image in either format, and conversion utilities, such as DeBabelizer Toolbox do the same job. If either EPS or TIFF images are to be transferred from a Mac to a DOS/Windows environment, only eight characters can be used for the file names. Additionally, a three character file extension must be added—.EPS or .TIF. Another solution is the **Adobe Acrobat Portable Document Format (PDF).** The Adobe Acrobat software converts any document to PDF so that it can be read from virtually any computer—Mac, DOS, Windows, or UNIX. Fonts and graphics in an Acrobat document are simulations and cannot be modified. **DeBabelizer Toolbox** from Equilibrium is a popular file conversion utility for the Macintosh. DeBabelizer is actually a major software

application with many different functions for processing graphic images. It provides internal scripting and batch features, editing and manipulation tools, and the ability to save in all commonly used bitmap and animation file formats. Both Acrobat and DeBabelizer can be valuable tools for Internet publishers.

Apple File Exchange is a utility developed by Apple to facilitate the exchange of diskettes and files between the Macintosh computer and computers using MS-DOS. Apple File Exchange came with the Mac system software until version 7.5. Essentially, this utility can initialize and/or read a 3.5-inch diskette in the MS-DOS/Windows format if the Mac involved has a SuperDrive floppy disk drive. All Macintosh computers since the IIsi have been manufactured with a SuperDrive. It can also convert files created on DOS/Windows computers for use on the Macintosh and vice versa. Apple File Exchange uses two translation methods: text and binary. Text translation is used for text-only files, and binary is used for all others. Apple System 7.5 eliminated the need for Apple File Exchange, providing instead the **PC Exchange** and **Easy Open** system extensions. Beginning with System 7.5, Mac users can simply insert a DOS/Windows disk and read it directly on the desktop, using the extensions to convert files.

- **File Compression—** Even today's multi-gigabyte hard drives can fill up pretty fast with graphics files. Some graphics file formats, such as **TIFF** and **JPEG,** can be self-compressing, but a file compression utility is often used to gain more storage capability from a hard drive.

DiskDoubler from Symantec is popular on the Macintosh. The latest version, Norton DiskDoubler Pro, is a combination of AutoDoubler, DiskDoubler, CopyDoubler, and several other utilities. AutoDoubler compresses files automatically by about 50%, and DiskDoubler compresses files manually and can be used to create multiple-file archives. The manual DiskDoubler provides the smallest file compression. CopyDoubler is a control panel item that speeds up file copying and trash emptying.

StuffIt Deluxe is another popular file compression and archiving software for the Mac. StuffIt provides a drag and drop method for compressing and decompressing files. StuffIt is widely used and can be downloaded from the Internet (www.shareware.com).

- Miscellaneous Useful Utilities—RayDream's **JAG II** removes jagged edges from digital images. Aladdin's **Desktop Tools** speeds up basic file-management activities on the Mac. **RAM Doubler** and **Speed Doubler** from Connectix perform the functions described in their names. **Conflict Catcher 3** (Casady & Greene) helps prevent crashes and freeze-ups by pinpointing conflicts between startup files on the Mac. **OneClick** from WestCode Software creates customized buttons for Macintosh software.

DeskTopMovie

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See
MovieTrilogy

DeskTopText

See
MovieTrilogy

DeskTopTV

See
MovieTrilogy

develop Magazine

develop is Apple's technical journal for programmers and developers. It is published quarterly by **APDA**.

develop is one of the truly great things about being a Macintosh programmer. This superb journal stands up well against any technical journal on any topic. It frequently covers the latest Apple technologies in depth, sometimes before a technology is even available. The subject matter is definitely for programmers—most articles would make nonprogrammer's eyes glaze over pretty quickly. But if you are a programmer, *develop* is well

worth the investment.

Each issue of *develop* is accompanied by the Bookmark CD, an excellent resource of technical documentation and source code. *develop* is also available in electronic form on Apple's developer Web site (http://dev.info.apple.com/) and on the CD-ROMs that accompany the Developer Mailing.

Apple Developer Catalog
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See Also
APDA; Developer Mailing

Developer CD Series

See

D

Apple Developer Mailing

Developer Mailing

See
Apple Developer Mailing

Development Environment

Every programmer creates a suite of development tools that best serve his needs. This collection of tools is his development environment. When programmers speak of a development environment, they may mean this total collection of tools, but more likely they are referring to a single set of tools designed to work together.

Development environments fall into two major classes: integrated and non-integrated. **Integrated development environments** (IDEs) bundle a set of tools together in a closely coupled application or set of applications. IDEs typically include a source code **editor**, **compilers**, **linkers**, and **debuggers** that work together within an application or are closely coupled with a single application. Metrowerks **CodeWarrior** and **Symantec C++** are the most popular IDEs for the Macintosh.

A non-integrated environment is more like an open shell. In fact, using a non-integrated development environment is very similar to using the UNIX

shell to issue individual commands or scripts to control separate compilers and other tools. The primary development shell is **MPW**, the Macintosh programmer's workshop.

An important quality in any development environment is scriptability. As the size of any development project increases, it becomes more and more important to perform routine development tasks automatically. IDEs often have this functionality built-in, but it's always helpful to be able to extend the built-in features with your own scripts. Depending on the type of environment, scripting may take a very different form. The Symantec C++ and CodeWarrior IDEs are scriptable using **AppleScript** (or **Frontier**), for example, whereas MPW supports its own rich scripting language similar to UNIX shell scripts.

See Also
AppleScript; CodeWarrior; Compiler; Debugger; Editor; Frontier; Integrated Development Environment; Linker; MPW; Programming Tools; Symantec C++

Development Tools

See
Programming Tools

Device Profiles

D

Making colors match between scanned images, those created on a computer, and those printed by a variety of color output devices is a tough job. Today's **color management** software, which attempts to do just that, relies on device profiles. These are software descriptions of how a particular input or output device (scanner, digital camera, color printer, imagesetter, video monitor) reproduces the color images it processes.

Until 1995 many color management programs produced incompatible device profiles. That spring, Apple introduced **ColorSync** 2.0, a totally new version of its own color management system software that used ICC-compliant device profiles—ones that conform to the specification laid down by the International Color Consortium. ColorSync and the ICC spec for device profiles have since been embraced by the major software developers producing color management software.

See Also
Color Management; ColorSync

Diamonds 3-D

Highly addictive combination puzzle/arcade game reminiscent of Pong at its lower levels. Diamonds 3-D requires that you bounce a ball to break bricks set up in a three dimensional play area. Your mouse controls the paddle. Some bricks require several "hits" before they disappear. Some can be broken only by balls the same color, so you must bounce off a "color-changer" brick

first. Fast action, and sometimes unpredictable vectors make this game a real challenge.

See Also
Puzzle Games; Zoop

DiaQuest

See
Animaq

DIC

See
Color Matching Systems

Digital Audio Tape

See
DAT

Digital Cameras

If you're adventurous, you can skip the film stage altogether, and digitze

photos right in the camera. Digital cameras range in quality from simple point-and-shoot cameras that offer experienced photographers little control to sophisticated and very expensive digital adapters for high-end photographic equipment.

As of this writing, digital cameras are a relatively new technology, and units that are adequate for professional color publishing can cost tens of thousands of dollars. It's likely that more reasonably-priced professional-quality digital cameras will begin to appear by the end of the century.

See Also
Desktop Publishing; Scanners; Digital Still Cameras; Digital Video Cameras

Digital Chisel

Digital Chisel is a multimedia authoring tool built upon Allegiant Technologies **SuperCard** . With custom programming, pre-scripted templates and a built-in database, Digital Chisel is a specialized tool that is best suited for creating quizzes and computer-based training programs. It is much easier to learn and use than SuperCard.

Digital Chisel projects are made up of a sequence of screens containing text fields and graphics. A text list window displays the order and name of the screens in a presentation. A number of multimedia tools are available for adding visual excitement to a presentation, including path- and frame-based animation, and hypertext features. Buttons can play QuickTime movies,

sound, and control laser disc and CD-ROM drives, as well as provide navigation to other presentation screens. A reasonably complete 8-bit paint tool is included, along with a CD-ROM full of clip art. One problem the first time user might have is that a lot of these elements are hidden in toolboxes, which can be difficult to find.

The main strength of Digital Chisel is that it can quickly and easily create interactive on-screen tests. A built-in database (which can be password-protected) enables you to track and score users performance, and the program can record the length of time it takes a user to complete a specific test. This makes Digital Chisel especially attractive for educational and training purposes.

When creating a presentation, you can start from scratch or use one of nine screen templates. The True/False template features fields for questions and check boxes for the two possible answers. There are also multiple choice and single field answer templates (though this type can be limiting as the user must type the answer exactly right). When a student runs the project, Digital Chisel compares the answers with those stored in the answer field during the authoring session. If a question is answered incorrectly, the program can automatically branch to a different screen.

The same amount of memory should be used when authoring as will be available when running a project, or the projector may not work correctly.

Pierian Spring Software
Portland, OR

D

Price: $149
Fax: (503) 222-0771
Phone: (503) 222-2044 or (800) 472-8578
Web: http://www.pierian.com

See Also
Astound; Director; Persuasion; Special Delivery

Digital Color

See
Color Gamut, Desktop Publishing and Digital Color

Digital Gourmet

Can you really learn to cook from a computer program? Probably not, but you can certainly use a digital database to keep track of recipes, plan meals, and print grocery lists. And there are several good programs available to help you do so. One of the best is Digital Gourmet, from the Books on Disk division of TeleTypesetting, a small, friendly company in this editor's hometown. Digital Gourmet comes on a CD-ROM along with a matching HyperCard stack called Digital Bartender. The format's the same for each. The program comes with lots of recipes, including many Mexican and Kosher-style dishes, and some truly fabulous desserts. Drink recipes in the Digital

Bartender range from the familiar to the definitely esoteric.

There's an index which you can search alphabetically or by category. Once you've found the recipe you want, clicking a button on the recipe card adds the ingredients to your shopping list. Once you've settled on a menu, clicking the edit shopping list button will sort all the ingredients, combining the dab of butter for the chicken dish with the quarter pound for the cheese straws and so on. There are also cooking tips and nutritional information provided. It's a good idea to print out the recipes you intend to prepare. Most Macs don't react well to flour and shortening on the keyboard.

Digital Halftones

Digital halftones are halftones created by a digital output device rather than by a camera. They are an attempt to mimic the older photomechanical halftone technology, and, if done properly, they succeed quite well. The actual quality of digital halftones versus photomechanical halftones has always been a matter of some controversy among graphics arts professionals. As is often the case with other matters in life, the older generation may sometimes regard digital halftones as an upstart technology which doesn't quite measure up to the previous one. Nevertheless, digital halftoning has all but replaced the older camera method in the United States.

Digital halftone quality has been vastly improved since the beginnings of desktop publishing in the mid-1980s. This is due primarily to the

development of **imagesetters** and other output devices with a high repeatability factor. Repeatability is the ability of an imagesetter to place a laser spot in exactly the same position on the imaging area time after time. Excellent repeatability is necessary because digital halftone cells are composed of groups of the very small laser spots (or dots) produced by imagesetters. These are also called machine spots. The dpi (dots per inch) rating of an output device is an expression of how many of these tiny spots can be placed in a linear inch. These terms can be quite confusing. In fact, some imaging professionals prefer to use the term epi (elements per inch) rather than dpi when describing output resolution so as to avoid confusion with the term dot as it applies to printed halftones. This makes a lot of sense, although it is not generally accepted. Elements per inch seems a vastly more accurate way to refer to the very different kinds of dots produced by inkjet printers, toner-based laser printers, and high-resolution imagesetters. The bottom line, however, is that it takes a group of these elements, dots, or spots set closely together in a matrix to make a digital halftone cell. See the following figure. The halftone dot is created by a matrix of imaging elements called a halftone cell.

This cell becomes a halftone dot when it is printed. Photomechanical halftone dots are often round or elliptical, but digital halftone dots may be slightly irregular in shape. Imagesetters and film recorders make the best digital halftones because they have a higher resolution rating. They can place more of the elements per inch and the elements are more sharply defined. Laser printers can produce halftones, but the elements are fuzzy

because they are created from toner. For this reason, a high-resolution laser printer (1200 or 1800 dpi) cannot produce halftones as sharp and clean as an imagesetter operating at the same resolution. See the following figure. High-resolution laser printer halftones are perfectly adequate for some applications though. The definition of a dot is important to the quality of the reproduction. The quality of a laser printer dot is less than the typical imagesetter dot.

Another confusing issue in digital terminology is the difference between dpi (dots per inch), lpi (lines per inch), and ppi (pixels per inch). It is to be hoped that dpi was clarified in the previous paragraph, so I will contrast lpi and ppi. The former is the line screen ruling, or screen frequency, of a halftone expressed in lines per inch (lpi). The latter is the linear pixel resolution of a digital image. Lines per inch (and dots per inch) should always be associated with printing output, and pixels per inch with scanning input and monitor display. It is not uncommon for dpi to be used instead of ppi in scanning terminology, but ppi seems the better term because it is more precise. To further confuse the issue, some references state linear pixel resolution as samples per inch (spi).

Because scanners are used to digitize images that will be printed as digital halftones, it is important to understand how pixels are related to the screen ruling of halftones. In scanning, a widely accepted ratio of pixels to halftone screen ruling is 2:1. This means that two pixels of a digital image are required to make one printed halftone dot. This is known as the *sampling ratio*. Actually, the pixels in a digital image are always expressed as a square unit,

so two pixels are really 2 x 2 pixels. See the following figure; a unit of 2 x 2 pixels is needed to make one halftone dot using the 2:1 ratio.

The sampling ratio for converting pixels to a halftone must be determined to establish an optimum scanning resolution. This formula is expressed as follows:

screen frequency (lpi) x 2 = scanning resolution

Therefore, an image to be printed at 133 lpi has a sampling ratio of 266 ppi to133 lpi. Some people use a multiplier of 1.5 or even 1.25 to avoid large file sizes. The digital image resolution (266 ppi in the example) is the ideal scanning resolution.

When a scanned image needs to be enlarged or reduced (scaled) for final output, it should be done at the time of scanning if possible. Alternatively, the digital image may be resampled in **Adobe Photoshop** or similar software. A digital image should *never* be scaled by simply enlarging or reducing it in a page layout software application unless the scaling has been compensated for at the time of scanning. If the image must be enlarged and the proper pixel content for that enlargement was not calculated when the image was scanned, Photoshop can create new pixels to maintain the original image resolution. If it is to be reduced, Photoshop can discard pixels for the same purpose. If the final size is known at the time of scanning, it is more desirable either to calculate the proper pixel content for scaling in the page layout or perform the scaling on the scanner itself. The image quality resulting from creating new pixels in Photoshop is not as good as when the

image is scanned at the proper size and resolution in the first place.

If a scanned image is to be scaled in a page layout or other software application, further math is necessary to determine the proper pixel content and the optimum scanning resolution:

1. First, the total number of pixels is determined by multiplying the final image size by the digital image resolution obtained with the 2 to 1 formula.

   For example (using a width measurement only), a 3.5 inch wide image that will be enlarged to a final width of 6 inches multiplied by 266 ppi equals 1596 pixels (6 inches x 266 = 1596).

2. To determine the ideal scanning resolution for this image, divide 1596 by the original size of the image.In this example that is 3.5 inches.

   Therefore, 1596 divided by 3.5 equals 456 ppi, making 456 ppi the optimum scanning resolution for this image.

3. Dividing this scanning resolution (456 ppi) by the original resolution (266 ppi) will result in the percentage of enlargement for the image (170 percent). Therefore, when this image is enlarged to 170 percent of its original size, it will still have the proper number of pixels.

These formulas assume that the aspect ratio (ratio of width to height) is maintained. If the scanner allows scaling (and the process is far easier if it does), simply enter 266 as the resolution and 170 percent as the enlargement

and click the Scan button.

Some desktop scanners seem to have native resolutions (suggested scanning resolutions listed in a menu), and it is probably acceptable to use one of them if it is close to the optimum number that you determined with the formula. It is also acceptable to round off the number derived from the formula. The main point to remember is not to end up with a number that is too low.

See Also
Halftones; Image Manipulation for Printing; Image Scanning; Resolution Measurement; Stochastic Screens

Digital I/O Connectors

Digital I/O connectors are used to connect digital audio gear and transmit the digital signal without having to perform a Digital/Audio and **A/D conversion** that is necessary if traditional cables and connectors are used. This is a concern of professional musicians and sound engineers who need to produce best-quality recordings. It's unlikely that typical computer users would need this capability, and it is only available on the most expensive plug-in audio cards for the Macintosh, such as **Digidesign** . The two most common connections are **S/PDIF** and **AES/EBU** .

See Also
AES/EBU; S/PDIF

D

Digital Modems

See
ISDN Terminal Adapters

Digital Printing

See
Printing Methods, Digital

Digital Scenery, Introduction

For years, organic life and the natural world were the most difficult subjects to model or emulate with any degree of believability with computer graphics media. The problem was one of sharpness and cleanliness. Nature is neither sharp nor clean, but has torn and hidden symmetry, and corners and edges where light plays unkind tricks on the eyes. Computer graphics, on the other hand, were known from the start for razor sharp visual displays and mechanistic photo-realistic drama, as exemplified by the familiar animated metallic sphere flying above a checkerboard plane, reflecting every nuance of the cold virtual world below. But as the scruffy all-too-real dinosuars in Spielberg's Jurrasic Park demonstrated quite shockingly, computer graphics has come a long way in just a few short years. In addition to the development of larger and faster systems, more detailed texture mapping and more

accurate models, the new super-organic realism now expected from computer graphics media owes its existence to two individuals and their life's work: Fibonacci and Mandelbrot.

Leonardo Fibonacci lived in the thirteenth century, and his contribution to computer graphics was the rediscovery of a mathematical formula known by the Egyptians but lost until he revived it, an arithmetic progression that now bears his name, the Fibonacci Series. The series is a simple additive process.

0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89,...

You start with zero and then go to one. Add zero and one which equals one, add one and one which equals two, add two and one which equals three, add three and two which equals five, five plus three is eight, eight plus five is thirteen, and so on. As the series progresses, the last two numbers (the last divided by the second to the last as for example 89 divided by 55) gets closer and closer to 1.618. The magic is in this last number, because 1.618 seems to be present in some measure in the way natue works. Tree branches and the bones of the human body seem to evidence this magic proportion in the comparative length of their connected parts. Tree and scenery software contain Fibonaccian algorithms as based upon the proportion 1.618 as a central part of their graphics generating engines.

Mandelbrot, unlike Fibonacci, is still alive. He did his central work under the auspices of IBM in the 1960's. Mandelbrot is responsible for presenting us with the theories of fractal dimensions, the observation that the closer we magnify the natural world, the more our view of it seems to replicate the

stage we just came from, an endless repeating series of like-images. With Fibonacci, the math came first. With Mandelbrot, thanks largely to the emergence of the computer as a visual tool, the graphics preceded the mathematical theories. To Fibonacci, numbers led to the appreciation of beauty, while, in Mandelbrot's thought, visual beauty led to the appreciation of beauty in numbers. Most of the software used to generate subjects in the natural world, from living things to the land, sea and air that they live on and in, is based in good measure upon Mandelbrot's work and fractal geometry.

With the powerful and fast new computers like the Power Macs that sit at the ready in our homes and at the workplace, we can create believable virtual worlds and populate natural rolling landscapes with trees, rivers and clouds. Thanks to the work of Fibonacci, Mandelbrot and others, computer art is no longer the home of cold mechanistic visions alone, but a virtual environment that mirrors the beauty of nature itself.

Suggested Reading:

Ghyka, Matila, *The Geometry of Art and Life*.

Moreau, Rene, *The Computer Comes of Age*. Cambridge, Mass.: The M.I.T. Press, 1984

(Periodical) Taubes, Gary, "Mathematics of Chaos." *Discover*, September 1984.

D

Digital Signal Processors (DSP)

See
Coprocessors, Types of

Digital Still Cameras

Digital Still Cameras differ from conventional cameras in that they do not use film. Instead, a CCD (charged coupled device)—a small chip that is sensitive to light—is used to capture an image. The image is stored as digital information in RAM memory, and can then be downloaded to the computer. The primary advantage of Digital Still Cameras is the speed with which an image can be photographed and transferred to the computer. With conventional film cameras, the film must be processed before digitizing (using **PhotoCD** or a **slide** or **flatbed scanner**).

Digital Still Cameras are available in a range of prices and features, but currently there is a big step both in price and quality between the lowest priced units, which claim to offer 640 x 480 resolution, and the higher resolution cameras that support resolutions in the thousands of pixels. Although the low-end cameras cost less than $1,000, the higher resolution cameras start at around $6,000. This is in part a result of the CCDs (charged coupled devices) used to capture the image. Because the primary use of these sensors is in video cameras, which have resolutions that match standard **NTSC** images (about 640 x 480) those chips are the widest and cheapest.

D

Another problem with the low cost digital still cameras is that these cameras use a **range finder** rather than **SLR**s (Single Lens Reflex). When you look through the range finder, you aren't seeing what the camera sees. This is a problem if you use lens attachments to adjust the **focal length** of the lens. Also, these cameras compress the images, so that they fit in a reasonable amount of RAM.

Unlike video cameras, and the first generation **still video cameras** , there is no need for a **digitizing board** to turn the **analog image** into a digital file. The camera does that when the picture is taken. It's just a matter of connecting the camera to the serial port of the computer and running the software that transfers the image from the camera to the computer. It can take several minutes to send all the images from the camera. To prolong battery life, it is worth purchasing a power adapter (if not supplied) to use while the camera is connected to the computer. It's not mandatory, but it will prolong the life of the batteries.

Many of these cameras offer limited options for deleting the images from the camera after you no longer need them. Most require that you delete all of the pictures, or only allow you to delete the last image taken.

All cameras use some kind of **compression** to reduce the size of the image. This can impact the quality of the image, although the biggest factor affecting quality is the CCD chips used in these cameras.

All of the lower priced digital still cameras can capture an image of at least 640 x 480 (see table), but when viewed on-screen, these images do not look as

sharp as a comparable scanned image from a slide or flatbed scanner. The images are suitable for rough work, and quick shots, but are not suitable for final screen work except at less than full screen (640 x 480). The images look best when they are resized with **Photoshop** , or a comparable application, to half size, which results in a sharp image of 320 x 240.

Exposure is also a problem with these cameras. Exposure limitations of the sensors means that even the cheapest 35mm camera will perform better in most situations. Best results are obtained in bright, evenly illuminated conditions.

If you need images quickly, but of higher quality, it might make more sense to buy a slide or flatbed scanner, or use PhotoCD. With a slide or flatbed scanner, it is possible to have film rush developed in about an hour in most cities. Although not as quick as a digital camera, it is fast enough for many purposes (remember to add scanning time. It will probably take about two hours to capture what would take about ten minutes with the digital camera). PhotoCD usually takes at least a day.

Digital Still Cameras

Camera	Pictures	Image Size	Price	Special Features
Chinon	10[2]	640 x 480	$700	3x zoom ES-3000[1] lens PCMCIA card
Dycam 10-C[1]	10[2]	640 x 480	$900	3x zoom lens

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				PCMCIA card
Kodak DC50[1]	10[2]	756 x 504	$1000	3x zoom lens
				PCMCIA card
Kodak DC40[3]	42	756 x 504	$700	Larger image size
				48 images in memory
Logitech[3]	42	756 x 504	$700	Larger image size
				48 images in memory
QuickTake 150	32	640 x 480	$700	Camera can appear as a disk drive on the desktop
Casio QV-10A		320 x 240	$500	Camera can connect to regular TV set and display computer graphics

1: This is essentially the same camera. The Kodak DC50 produces a picture with a larger number of pixels.

2: The camera has 1MB of on board RAM. Additional pictures can be stored on a PCMCIA card. A 4MB card holds 43 pictures.

3: This is the same camera.

D

See Also
Flatbed Scanner; NTSC; PhotoCD; Scanners; Slide Scanner; Still Video Cameras

Digital Stripping

See
Prepress

Digital Swatchbook

See
Measuring Color

Digital Telephone

See
Modem/Conecting

Digital Telephone Line

See
ISDN

D

Digital Video Cameras

The digital video (DV) format is a new tape format that stores a video image digitally on tape rather than as an analog signal. DV rivals the quality of Betacam SP, yet the cameras cost 1/3 that of a comparable Betacam SP camera. The image quality compares favorably to Betacam SP. DV offers 500 lines of resolution versus Betacam SPs 650, but this will be hardly noticed.

DV uses a new form of compression, similar to **MPEG**, that compresses at about 5:1, resulting in a 3.475 MB/sec data rate. It's possible to use a new digital interface—**1394 Fire Wire** —to connect the camera to a computer that is equipped with an appropriate input. The digital video signal can then be transferred directly to the computer with no need for redigitizing. If the proper translation software is provided, these files can then be opened and edited using an application such as Adobe **Premiere** .

See Also
1394 Fire Wire; Digital Still Cameras

Digitizing Tablet

See
Graphics Tablet

D

DigiTrax 1.2

A sound digitizing and editing application that features an interface that resembles a four-track tape recorder (i.e., there are buttons for play, record, and so on, and sliders for adjusting volume).

DigiTrax can record and mix up to six tracks on a **Power Mac** or **AV** Mac. The program supports mixing and **bouncing** multiple tracks and **automated mixdown** features, can open **QuickTime** movies, and can synchronize to a **MIDI** sequencer or with **SMPTE** timecode.

While great for recording original music and creating complicated mixes of sounds, this program may be too much for simple sound editing. A program such as **SoundEdit** is better suited for those tasks.

See Also
Automated Mixdown

Opcode Systems
Price: $199.95
Phone:(415) 856-3333
Web: http://www.opcode.com

Dingbat

See

D

Symbol

Dingbat Fonts

See
Ornament and Dingbat Fonts

Direct Connect Modems

See
Modems

Director

Macromedia's Director began life as an animation package called VideoWorks. Over time, features and a **scripting** language called Lingo have been added. Lingo is similar to **HyperTalk** and **SuperTalk**, the scripting languages of **HyperCard** and **SuperCard**, but just different enough to cause confusion as you switch between them.

Director is an ideal tool for creating most multimedia presentations, because it's very flexible. Its primary strengths are animation and its cross-platform capabilities, which has made it one of the most popular commercial authoring tools. Director includes a built-in paint program, so editing and

creating graphical elements is easy, although you may still want to use a dedicated program, such as **Photoshop** , for complex editing jobs.

The three primary parts of Director are: the Cast, the Score, and the Stage. The Stage is the area in which objects are arranged and displayed during a presentation. The Cast is like a database containing the graphics, sounds, and other objects used in the presentation. The Score holds the information regarding what Cast objects appear on the Stage at what time. The Score is divided into frames, and each frame represents the Stage at a point in time.

There are many tool windows in Director, including the paint tool, a text tool for creating and editing text fields, scripting and debugging windows and so forth. When you first use the program, it can be rather intimidating. Just remember that it is the Score and Cast Windows you need to become comfortable with first.

Animation is created by dragging objects from the Cast to the Stage and arranging them for each frame in the sequence. You can create each frame from scratch, or you can duplicate an existing frame, and then alter the position of the objects in the duplicated frame.

Director includes some automated positioning tools. You can place an object in position on one frame, and then in another frame several frames ahead, place the object in a different location. Director creates the in-between positions using a process called **inbetween** ing, saving a lot of time when animating objects.

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It is possible to create simple interactivity (stop and start an animation, for example) using timer functions in the Score without any scripting. For more complex actions you must use the Lingo scripting language. For an introduction to principles of scripting, refer to **Scripting** .

Other elements, such as sounds and QuickTime movies, can be imported into the Cast and arranged on the Stage. These elements (as well as imported graphics) can be linked to the Cast rather than imported. Linking means that they remain external files, and must be read by Director before being played. The primary advantage of this is that you can actually edit the sound files without having to re-import them. The next time Director runs the presentation it reads in the updated files.

When a movie is complete, it can be turned into a Projector, a file that runs without the user having a copy of Director. A projector adds about 300K to a movie.

Although there was a Windows Player for Director 3.0, it was only with the arrival of Director 4.0 that there was true cross-platform capability (and a Windows version of Director itself). The Director file format for both operating systems is now byte-compatible. Files created on the Macintosh can be opened in Director for Windows, edited, and then brought back to the Macintosh and changed again. All that's required is to copy the files from one machine to another. It's also possible to create a cross platform CD-ROM that has one data file, but two projectors (one for the Macintosh, the other for Windows).

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You will need both copies of Director if you plan to cross-develop.

Like HyperCard, Director's functionality can be extended with special programs. These are very similar to the format of HyperCard's **XCMDs**, but Macromedia has defined its own format for Director routines called XObjects. Director also comes with an XObject called XCMDGlue. This routine serves as an interface between Director and XCMDs written for HyperCard. Many HyperCard XCMDs can be called successfully from Director using XCMDGlue. Director also supports a new plug-in format called **Xtra**s, which a number of third party developers have released, including Xtras for MIDI playback and database handling.

See Also
Authorware; HyperCard; mTropolis; Shockwave; SuperCard

Directories and Reference Materials

See
Reference Materials and Directories

Disable the Warning Box (Keyboard Shortcut)

When you choose **Empty Trash** to **delete** items in the **Trash**, an **alert box**

warns you that you are about to permanently delete items. The alert box tells you how many items, calculates their total file size, and asks if it's okay to empty the Trash. To disable this warning, hold the **Option key** while choosing Empty Trash from the **Special menu.** The items are deleted without the alert box appearing. You can also hold the Option key while emptying the Trash to delete locked files.

To empty the Trash without the alert box appearing, follow these steps:

1. Hold the Option key while choosing Empty Trash from the Special menu.
2. The files in the Trash are deleted without the warning box appearing.
3. If you had any locked files in the Trash, holding the Option key will also delete them as well.

See Also
Alert Box; Empty Trash; Keyboard Shortcuts; Option Key; Special Menu; Trash, Locked Files

Disabled Users

See
Software, Special Needs, Big:Calc

D

Disc

See
CD ROM

Discretionary Hyphen

See
Hyphen, Discretionary

Digital Signal Processor

See
DSP

Disinfectant

Disinfectant is a free utility written by John Norstad of Northwestern University. It includes a very detailed discussion of viruses and prevention of any known virus program. Disinfectant can install an INIT to watch over your system for known viruses and alert you when a virus is detected.

Disinfectant cannot scan compressed archives and does not detect HyperCard viruses. You cannot teach Disinfectant about new viruses; you must get an

update to the program. You can obtain Disinfectant from online bulletin boards, from many Internet Web sites, or by sending a self-addressed, stamped disk mailer and floppy disk to:

John Norstad
Academic Computing and Networked Services
Northwestern University
2129 North Campus Drive
Evanston, Illinois 60208

See Also
Virus

Disk Cache

You can set aside a small amount of your Mac's memory (RAM) as a separate memory section known as a disk cache. This cache contains a copy of recently or often used information from your hard disk (or other mounted disks). By setting aside this disk cache, the Mac can store these often used items in memory, rather than having to search the **hard disk** each time it needs the items. By having them handy in memory, it can add a significant boost to your Mac's speed.

For example, if you're using a program that utilizes floating palettes, the first time you open the palette the screen redraws it quickly, but did you notice that the next time you reopen that same palette, it opens much faster? That's

because that palette was cached into memory. Menus are another example. Click and hold a **pull-down menu** you haven't used yet. Then release the mouse button, and then click and hold it again. You'll notice that the menu now appears almost immediately. That's the disk cache in action.

You choose the amount of memory that will be set aside as a disk cache in the **Memory Control Panel** (see the following figure). You set the amount by using the up or down arrows to increase or decrease the amount of memory set aside as a disk cache. Although the disk cache is always turned on, changes to the disk cache take effect only after a **restart.**

To increase or decrease the amount of disk cache, follow these steps:

1. Choose the Memory Control Panel from the Control Panels folder in the Apple menu.
2. In the disk cache portion of the memory control panel (the top section) click the up arrow to increase the disk cache, or click the down arrow to decrease the cache. When you've made your selection, close the Memory Control Panel.
3. For your changes to take effect, you must restart your Mac.

See Also

Apple Menu; Memory Control Panel; Pull-Down Menu; Restart

D

DiskDoubler

DiskDoubler is a compression utility from Symantec (10201 Torre Ave, Cupertino, CA, 95104-2132, Phone (800) 441-7234. Web site at http://www.symantec.com) that enables you to compress the size of files on your **disk** or **hard disk**. DiskDoubler comes in two parts: a free-standing utility application and a **desktop menu bar icon** enabling you to compress and expand files without having to launch the application. The amount of file space saved depends on the type of file being compressed. Files can sometimes be compressed by 99 percent, though the average is 50-60 percent compression. The capability to compress files saves drive space and time if you're transferring files with a **modem** or over a **network**.

DiskDoubler gives you a variety of compression options, including the capability to choose from a variety of compression methods and the capability to create self-extracting archives (**.sea**). Self-extracting files can be expanded by Mac users who don't have DiskDoubler.

When a file is compressed, DiskDoubler attaches a modified version of the file's icon with a small .dd to let you know the file is compressed with DiskDoubler. To expand, or decompress the file, you can either select the file and choose Expand from the DiskDoubler **Finder** menu, or you can **launch** the program and the file will expand prior to opening.

See Also

Compression Utilities; .dd File Extension; Disk; Finder; Hard Disk; Launch;

D

Menu Bar; Modem; Network; .sea File Extension

Disk to Disk Copying

Copying a **file,** or a set of files, from one **disk** to another is a simple task achieved by **dragging** the files you want from one disk to the other disk. Let's say, for example, that you want to copy a text file from your **desktop** to a **disk.** Simply drag the file onto the **icon** of the disk. A copy **status bar** appears showing the progress of the copy **command**, and within a few minutes, the file is copied.

Copying Files and Folders

Process	*Media*	*Result*
Click and Drag	Within hard drive	Moved
Click and Drag	To disk	Copied
Click and Drag	From disk	Moved
Option-Click and Drag	Within hard drive	Copied
Option-Click and Drag	To and from disk	Copied

It's easy to copy from one disk to another, but it requires a few more steps (unless, of course, you happen to have two disk drives). To copy from one disk to another, follow these steps:

1. Insert the disk containing the file (or files) you wanted copied.
2. Locate the file on the disk that you want to copy.
3. Drag the file onto your hard drive icon. This copies the file to your drive.
4. **Eject** the floppy disk.
5. Insert the disk to which you want to copy the file.
6. Locate the file you copied just moments earlier and drag it onto the icon of the disk now **mounted** on your desktop.

   Now you can **trash** the file you copied temporarily to your hard drive.

If you want to copy an entire disk to another disk, the process is slightly different. Insert the first disk and drag the disk icon onto the hard drive icon. Your hard drive creates a **folder** with the same name as the disk, and copies the contents of the disk to that folder. When that is complete, eject the disk and insert the second disk (the one you want to copy to). Drag the folder that you just created on your hard drive onto the icon of the second disk on your **desktop** . The folder is copied for you. Now you can trash the folder you copied temporarily to your hard drive.

See Also

Click and Drag; Command; Desktop; Disk; Eject; File; Folder; Hard Drive; Icon; Mounted; Status Bar; Trash

D

Disk Express II

Disk Express II is a system optimization program from Alsoft (P.O. 927, Spring, TX, 77383, 713-353-4090.) designed to defragment your **hard disk** and increase your disk's access speed and overall performance. As you create new files and delete old ones, the information on your hard disk becomes fragmented into various locations. A disk optimizer utility, such as Disk Express II, defragments this information and puts the most frequently used information closest to the drive heads and puts less frequently used files further away. By making these files easily available to the drive heads, your hard disk's speed is enhanced.

Disk Express II can minimize fragmentation by keeping the files you use the most grouped together, so the access time to these files is as fast as possible. Disk Express also enables you to optimize your drive at predetermined time intervals, or you can set it up to do an optimization when your drive's level of fragmentation exceeds the level you've selected as acceptable in Disk Express's preferences.

See Also
Fragmentation; Hard Disk

Disk First Aid

Disk First Aid is a free application from Apple found on your **Disk Tools**

disk, and it's used for diagnosing and repairing damaged **disks** or **hard disks**. Disk First Aid has a distinct icon that looks like an ambulance with a red cross on the side.

Disk First Aid doesn't offer many options; you can choose to verify a disk to see whether it's working properly, or you can choose to repair any problems it encounters during its diagnostic check. If you are running Disk First Aid from your startup disk, it can only verify the disk; it cannot make repairs on the active startup disk. If you do find a disk problem, insert the Disk Tools disk from your set of system disks and run Disk First Aid from that disk to repair your startup disk.

To verify or repair a disk using Disk First Aid, follow these steps:

1. Insert the Disk Tools disk from your set of System Disks.
2. Double-click the Disk First Aid icon to launch the utility.
3. Choose to verify or repair by clicking the appropriate button.
4. Any error message is displayed in the Disk First Aid window.

See Also
Disk; Disk Tools; Hard Disk; Startup Disk

Disk Fit

DiskFit is a commercial **backup utility** from Dantz Development Corporation

(4 Orinda Way, Orinda, CA 94563. Phone: 510-253-3000. On the Web http://www.dantz.com) that enables you to perform a backup of your **hard disk**, or disks on a network. With DiskFit, you can choose to back up your entire hard disk, or you can request specialized backups for items such as applications and documents, or you can designate individual folders to be backed up.

This enables you to designate a folder as your backup folder, and any items you place in that folder are backed up by DiskFit when it runs its backup procedure. And, of course, DiskFit enables you to perform an **incremental backup** of your files that backs up only the files that have been changed since your last backup.

DiskFit backs up your files to disks or any removable storage medium, such as Sysquest cartridges or Zip disks, and the backups are in **Finder** format so you can open files directly from the backed up disk, rather than having to decompress or restore the requested files to your hard disk before opening the files. DiskFit also can create a report listing all the backed up files and which backup disks they appear on.

See Also
Backup Utilities; Disks; Finder; Hard Disk; Incremental Backup; Network

Disk Fragmentation

Data is written to your hard disk in blocks, one after another. These blocks

are placed so the data is easily retrieved by the **hard disk's** drive heads. Over time these blocks of data on your hard disk can become fragmented into various locations. This happens as some files are deleted, new files are added, and what used to be a smooth, contiguous chunk of disk space starts to become a series of smaller fragmented spaces. When this occurs you have disk fragmentation.

This fragmentation can slow the access speed of your hard disk as it searches through your disk to find requested information. By using a disk optimizer utility, it defragments this information and puts the most-frequently used information nearest the drive heads and the less-frequently used files further away. With these files easily available to the drive heads, your hard disk's speed is enhanced.

Here's a table listing some of the most popular commercial disk optimizer utilities:

Optimizer Utility	*Developer*	*Contact Info*
Speed Disk	Symantec (part of Norton Utilities)	10201 Torre Ave, Cupertino, CA, 95104-2132, Phone (800) 441-7234. Web URL http:// www.symantec.com)
Optimizer	Symantec (part of MacTool Pro package)	10201 Torre Ave, Cupertino, CA, 95104-2132, Phone (800) 441-7234. Web URL http:// www.symantec.com)
DiskExpress II	AlSoft	P.O. 927, Spring, TX, 77383, (713) 353-4090.

D

See Also
Hard Disk; Norton Utilities

Disk Icon

Each disk **mounted** on your **desktop** has a corresponding **icon** that represents the type of **disk** it is. Your hard drive usually is represented by an icon shaped like a box. A disk is represented by an icon that looks like a **disk,** and a **CD-ROM** is represented by a circular disk icon that, not surprisingly, looks like a CD-ROM.

The icons that you see mounted on your desktop are either custom icons put there by the disk's manufacturer or Apple's **default** icons. You can add a different icon to your hard drive or even to a disk (if it's not **locked**) by **copying** the icon and **pasting** it in the drive's **Get Info** window. Thousands of full-color, custom icons that cover every model of Macintosh are available in a variety of styles from **online services**. Several cartoon characters also are available as icons.

See Also
CD-ROM; Copy; Default; Desktop; Disk; Get Info; Hard Drive; Icon; Locked; Mounted Disks; Online Services; Paste

DiskImage Format

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See
Decoding/Decompressing Files

Disks and Drives

The terms disk and drive have become almost interchangeable in relation to fixed storage devices. In daily use, there is no particular reason to make much of this, but a quick examination of the ubiquitous floppy reveals a distinction between the two terms that is worth noting.

A floppy disk is the data storage medium itself. A floppy drive is a device capable of reading the data on the floppy disk. It reads this data via a pair of read/write heads that move back and forth across the disk as the disk rotates in the drive.

Although it is not apparent from the outside, the same holds true for Winchester mechanisms. Hard disk drives (or fixed disks as they were once known) consist of both the 'disk'—the hard aluminum platters or disks on which the data is stored—and the 'drive'— the read/write heads and the motor which controls these heads.

The distinction between the two parts of a hard disk drive is easiest to see in removable storage devices, such as the **SyQuest** and **Zip** drives. In both cases, the cartridge, or disk, contains the data storage medium: the chassis into which the disk is placed is the drive that reads the data on the disk.

See Also
Floppy Disks and Disk Drives; Storage; Winchester Disk Drive

Disks, Initializing

In order for the Macintosh's disk drives to read the magnetic iron-oxide dust on the disk it must be organized into some sort of pattern. New disks consist of randomly scattered coatings on their substrates and until they are initialized cannot be read or written to by the Macintosh because it cannot recognize any identifying markings. Initializing a disk places the Macintosh disk layout requirements on to the media making it usable to the Macintosh. These patterns lay out how the data will be stored and tracked on the disk. Norton Utilities various modules know how these patterns should appear, as well as how data should be stored in these areas. The correct layout of the patterns is the key to repairing damaged disks and finding lost files so that they can be recovered. All disk information analysis is based on these markings.

Tracks and Sectors One type of pattern installed is the magnetic divisions used to organize the stored information. These magnetic divisions are called *tracks* and *sectors*. Each computer platform has its own unique track and sector configuration recognizable only to that system. The following figure displays an illustration of a generic disk platter's tracks and sectors.

Tracks are laid down in concentric circles around the platter's circumference. Like tree rings, they get smaller as they get nearer the

center of the platter and larger at its edges. There are 160 tracks on a disk—80 on each side. Because the outer tracks are physically longer than the inner tracks, they can store more data and thus cause the drive to spin the platter more slowly when they are being accessed.

Hard Formatting When the disks are initialized as Macintosh disks each sector's address (physical location) is electronically coded into the sector itself. This is called *address stamping.* Along with this sector preamble data special synchronization bytes are written to tell the disk controller that it is about to read a sector address. The formatting process also lays down *gap bytes,* meaningless filler bytes of data between sectors to create a timing tolerance so that the spinning platters are synchronized with the swinging of the read-write head and arm.

Another piece of data that is written into the sector directly after the address stamp are the *cyclical redundancy check* (*CRC*) bytes. These bytes of data are the result of a checksum calculation based on the value of all of the bytes written to that sector. Whenever the sector is later read from the disk, its CRC bytes are also read and the checksum recalculated. The two values are compared and if they do not match then a read error has occurred. This design is part of what Norton Utilities uses to ensure that the disks are operating correctly.

The laying down of the sector addresses, sync bytes, gap bytes, and CRC bytes is performed by the hardware with minimal instructions from the Macintosh software. This formatting process is called *low-level formatting* or *hard*

formatting. The next task before a disk can be used is to format it logically.

Logical Formatting In order for the Macintosh operating system to find data out of all of the myriad megabytes of information on a disk it is necessary to impose some order by dividing the disks up into areas reserved for specialized identification information as well as for the storage of data. The operating system builds a series of indexes and directories defining what is where, which sectors and tracks are free as opposed to which are already assigned, as well as identifying any damaged sectors that are unusable on the disk. The process of setting up this organization is called *logical formatting*. Since 1986, the Macintosh operating system has organized disks into five main areas: the boot blocks, the volume info blocks, the catalog tree, the extents tree, and the data area. Some Macintoshes also reserve an area for partitioning information.

The result of logical formatting is the creation of a *volume*, or logical disk. Each physical hard disk can hold more than one logical disk, or volume by partitioning. Partitioning is splitting the disk up logically into separate sections. The software used to perform the partitioning writes special bookkeeping information at the front of the hard disk to tell the Macintosh how many volumes are on the disk, the location of each, as well as its size. Floppy disks, removable disks, and most hard disks that cannot or are not partitioned do not have this information.

The volume contains the bookkeeping data in rigidly specified locations on the disk. If the information is missing, is presented in a non-specified

manner, or is in the wrong location, the Macintosh cannot read the disk.

The following paragraphs describe the volume's invisible bookkeeping files and how critical they are to mapping and managing the location of your files:

- **The Boot Blocks** —The first two sectors of every disk volume is reserved for the boot blocks. Boot blocks store information needed by the Macintosh to learn how to read its internal ROM and thereby perform its startup routines. Boot blocks teach the Macintosh how to find documents and applications on the disk, the names of important system files, and Macintosh rules, such as how many files can be opened at once, etc. Boot blocks also contain small programs that are loaded into RAM that in turn load the critical operating system files into RAM that are needed to read the ROM information. These *bootstrap* programs are stored in the second reserved sector on the disk.
- **Volume Information Block** —The volume information block contains the definition of how the disk is structured, i.e., a "road map" to the volume. Located in this reserved area are the locations of other critical bookkeeping information areas, such as the catalog and extents trees. Other information such as the name and size of the volume, how much space is available, the location of the System folder (if this is a startup volume), etc. is also stored in this area. The volume info block also maintains the identification numbers used to label each new folder, assigning the next available ID to the next new folder you

create.

- **Volume Bitmap** —The volume information block operates in conjunction with another invisible file called the *volume bitmap*. This file keeps track of the usage patterns of tracks and sectors on the disk, identifying which areas are free for new use and which are filled. Each time you save a file the File Manager checks the volume bitmap to see if there are enough free sectors to accommodate the file and annotates the map for the new inclusions to indicate that its sectors are no longer free.
- **Volume Directory** —The Macintosh stores data on a volume in the sectors in each track. Information does not remain consecutive, but is read and written into any free sectors that are available. Thus, the Macintosh needs some way to track where the bits and pieces of a document are stored on the volume. This information is kept in a *directory* that is opened during the logical formatting process. This invisible file really consists of two parts on modern *hierarchical file system (HFS)* disks—a *Catalog B-Tree* and an *Extents B-Tree* file. (All modern Macintosh operating systems use the multileveled HFS format for structuring their data. Older Macintosh operating systems use the original single-level structure called *MFS—Macintosh File System*).
- **Catalog Tree** —The Catalog tree contains an entry for every file describing its folder location (the hierarchical structure), and the size and location (starting point and ending point) of the three pieces that

make up a file: the header, resource fork, and data fork. The Catalog file is used when files are stored in contiguous sectors on the disk. Resource forks store the resources used by applications, such as icons, dialog boxes, alert boxes, and other relatively static information. Data forks are used to store the highly changeable data contained in some documents. Files do not have to have all three parts, in fact most files contain only one fork, either a resource fork for applications or a data fork for data files. All files contain header information describing the file's origins and location. The first three pieces of each fork are tracked by the catalog tree. When files become *fragmented* (scattered in bits and pieces across the disk's tracks and sectors), an Extents file is opened which contains information about the location of each file fragment (the rest of the pieces or extents of the forks). HFS directories grow in size, whereas MFS formatted disks use a fixed size directory. Thus, HFS directories do not place a limit on the number of files you can create and store, because they grow as your need grows. This growth takes up room on the disk that is then not available for your work.

- **Desktop File** —Another invisible file created during the initialization of a disk is the *Desktop* file. The Desktop file maintains a catalog of icons, ensuring the that the Desktop displays the correct icon for each type of document and application.

  The Desktop file is not static, but changes as you add and delete files. Because the data in the Desktop file may not always be accurate for the

moment, it is a good idea to rebuild the Desktop periodically. To rebuild the Desktop, press the key combination Command-Option while you turn on the Macintosh and keep holding down the keys until the Macintosh displays a dialog box requesting whether you really want to rebuild the Desktop. A new feature of the newest System, version 7.5.3 is that when you rebuilt the Desktop file, finally, none of the comments that you may have entered into the Get Info box are lost.

See Also
Deleting a File; Disk Drives; Finder; Saving a File; System 7.5;Trash Can

Disks, Interleaving of

Initialization patterns affect how the Macintosh stores its data on the disk, and how it designs its databases to track the location of files on the disks. The Macintosh models differ in how the tracks and sectors are identified on the disk based upon how fast their disks can be accessed. This identification patterning is produced when the disk is initialized or formatted. The system by which the IDs are assigned is called the *interleave factor*.

When you buy a hard disk it usually comes pre-initialized (or formatted) from the factory. If it has not been formatted, each hardware vendor usually provides formatting software to use with their disk drive. If they do not supply the software, use the HD Setup program provided by Apple to format the disk.

D

Each of the various Macintosh model families operate at different computer speeds. Remember that the hard disk contains platters that are continually spinning at 3,600 RPM (revolutions per minute). Read-Write heads float on horizontally moving arms over the platters. The Read-Write arms move at a set speed, as do the platters. Thus, the Macintosh computer must be able to read sectors into memory at the same speed that the mechanical parts of the disk drive are moving. The time it takes to read a sector is important, because you want the computer to be able to read all of the sectors on the disk so they can all be usable. All of the current Macintoshes read a disk as fast as it spins, except the Classic.

The Macintosh Classic and SE are slower at reading than the rest of the Macintosh family. By the time either one gets a sector, reads it into memory, and returns for another chunk of data the disk has spun far enough around that the third sector is in position to be read. Hard drives used with Macintosh Classic and SE are formatted differently to avoid the problem of an idle computer (you don't want the computer to sit and wait while the disk spins all the way around back to the second sector). Hard drives for the Classic and SE number their sectors alternately rather than sequentially. Thus, the first sector is 1, the third sector is 2, the fifth is 3, etc. All of the sectors are used, but the higher numbers wrap around and fill in the skipped sectors. This process of wrapping is called *interleaving*. The ratio of sectors to speed is called the *interleave factor*. The Classic and SE's interleave factor is 2 to 1. The interleave factor of all Macintoshes based on the 68040 or PowerPC chip is 1 to 1. The Macintosh Plus uses an interleave factor of 3 to 1.

D

When you use Apple HD Setup or another formatting software to initialize the hard disk, they know what Macintosh they need to match the formatting to, and perform the formatting accordingly. When you take a hard disk from one Macintosh model to another, reinitialize the hard disk to optimize its speed.

The Macintosh can store vast amounts of data, but this data would not be available if the Macintosh did not have a means to organize the tracking of its location on the various peripheral hard disks attached to the CPU. The Macintosh manages this task by using a protocol or set of rules by which it recognizes communications from these peripherals. This set of rules is called the *SCSI* protocol.

See Also
Disk Drives; Fast and Wide SCSI; FireWire; SCSI

Disk Images, Working with

Apple developed its own utility, Disk Copy, for making exact, reliable duplicates of any **disk**. The file Disk Copy created is called a disk image, because it is not just a copy of the disk but a mirror image of the disks and its contents.

The advantages of DiskCopy are that the disk image created is an exact duplicate of what was copied from the original: all the **icons** and **folders** are in their exact same position with the exact same names and windows open;

the disk image has the exact same name as the disk did, and any invisible files on the disk are also copied into the disk image. These disk image files are used to create exact duplicate disks and are ideal for making **backup copies** of software for your personal use only. Disk Copy is also popular for creating the master file to be burned onto a CD-ROM disc, as it makes an exact copy with all icons and folders in their exact same position.

Disk images can be used only by Apple's Disk Copy or a freeware product called ShrinkWrap that enables you to mount disk images on your hard disk's desktop where your system treats them as though they were the actual disks. You can also use ShrinkWrap to make and copy disk images without using Apple's Disk Copy.

To copy a disk image onto a disk, follow these steps:

1. Double-click the disk image file to launch Disk Copy and open the disk image for you in Disk Copy's copy window.
2. Click the button "Make A Copy" to make an exact duplicate of the disk image.
3. Insert the blank disk you want the disk image copied to in the disk drive.
4. The disk image is copied onto the disk you insert. When the watch icon returns to the arrow pointer, the copying is complete.

To copy a disk's disk image onto your hard disk, follow these steps:

1. Launch Disk Copy and insert into the disk drive the disk you want to copy.
2. Click the button "Read Master Floppy" to create the disk image.
3. Choose "Save Disk Image" from the File menu, which enables you to name the file (if you choose) and select where you want to save the disk image on your hard disk.
4. The disk image is copied onto your hard disk. This can later be transferred to a disk if you'd like, or you can mount the disk on your desktop using the utility program ShrinkWrap.

See Also
Backing Up; Disk; Folders; Hard Disk; Icons

Disk Is Locked Message

If you try to add a file to, or **delete** information from, a **locked** disk, a “Disk is locked” message box appears stating, "The command could not be completed because the disk is locked," as shown in the figure. This means the disk has been manually locked with the locking tab located on the bottom side of the **disk**. Disks are locked to protect their contents from being altered or accidentally erased.

To unlock a disk, eject the disk and turn it upside down. In the lower-right corner you'll see the locking tab. When a disk is locked, you can see through

the hole in the tab. To unlock, you can take your fingernail or the tip of a pen and physically push the tab to the opposite position (covering the opening) to unlock it. You can then reinsert the disk and delete or edit any files you wish on the disk.

See Also
Delete; Disk; Locking; Message Box

Disk Name (Keyboard Shortcut)

When you're viewing items in a Finder **window** and want to know what **disk** the items in the window are on, you can use a keyboard shortcut to find out. Simply press the **Command key** while clicking the window's title in the **title bar** . A **pop-up menu** will show a path to the disk, with the disk's name and icon appearing at the bottom of the list.

To find out what disk a Finder window's contents are from, follow these steps:

1. Hold the Command key and Click on the window's name in the title bar.
2. A pop-up menu will display the window's path and the last name on the list will be the disk's name the files are located on.

See Also
Command Key; Disk; Icons; Keyboard Shortcuts; Pop-Up Menu; Title Bar; Window

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DiskTop

DiskTop started is a **shareware** product that became a commercial utility from PrairieSoft, Inc. (P.O. Box 65820, West Des Moines, Iowa

50265 U.S.A., Phone: (515) 225-3720. email: prairiesoft@applelink.apple.com.) DiskTop was very popular for users running **System 6** because it enabled you to open DiskTop as a **DA** (desk accessory) and perform a wide range of functions normally available only from the Mac's **Finder** (such as copying files, renaming files, deleting files, and so on) while you had an application running.

In **System 7** and beyond, you can go back to the Finder at anytime without having to quit the current application, so DiskTop's use has been somewhat diminished. But before System 7, this was the only way to have access to these functions without quitting.

DiskTop also enabled you functions the Finder alone did not offer, such as a multidisk search function and the ability to change type and creator codes (which require you to use Norton Disk Editor or a similar utility). A demo version (30-day working copy) of DiskTop is available in the Macintosh Utilities forum on America Online and at various FTP sites on the Internet.

See Also

Desk Accessories; Finder; Norton Utilities; Shareware; System 6; System 7

D

Disk Window

If you **double-click** the icon of any **disk,** a window appears showing you the contents of that disk. When you start your Mac and double-click your **hard drive** icon, for example, a window opens to show you the contents of your hard drive. Just below the **title bar** of the disk window, the window displays how many items are in that particular window, how much storage space has been used on the hard disk (measured in **kilobytes**), and how much space is available on the disk.

TIP In 7.5, the contents depends on a setting in the Views CP. When checked, this info shows up in all Finder windows; when unchecked, it shows up in none.

See Also
Disk; Double-Click; Hard Disk; Kilobytes; Title Bar; Views CP

Display PostScript

See
PostScript Level 2

Display Typefaces

See

Typeface Categories

Dithering

When a digital system has limited color or tonal range, dithering is used to create the illusion of more colors or grays. For example, a display monitor with only 256 colors must rely on dithering to create additional colors that might be specified by the user in a software application. Inkjet printers also use dithering to render continuous tone values of color or gray. Dithering uses a cell of pixels (display) or dots (output) that can vary in size: 3 x 3, 4 x 4, but not larger than 8 x 8.

Within these cells, the colors or gray tones available to the system are mixed to create the illusion of another color or tone. This is sometimes called a pattern dither. For example, red and blue dots or pixels in a cell would create the illusion of purple. Different proportions of red to blue would create different shades of purple. In this way, pattern dithering is similar to process color halftones screens, but it is always a function of inexpensive printers or monitors with limited color palettes. A diffusion dither uses the same principle of mixing pixels or dots, but it is done in a random pattern similar to a stochastic screen. For the most part, dithering is not a satisfactory substitute for higher **color resolution.**

See Also

Color Resolution; Desktop Printing; Color Separations; Printing Technology,

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Color; Process Color; Stochastic Screens

Dividers in the Apple Menu and Other Tricks

In **System 7** and higher, you can create dividers to keep groups of items visually separated in the **Apple menu** . This involves creating a new empty folder, pasting a new icon on the folder that is solid white, and naming the folder with a series of dashes that create the visual divider.

To create a divider for the Apple menu, follow these steps:

1. Create a new folder (Command-N).
2. **Double-click** the new folder to open it, then take a screen capture (Shift-Command-3). This places a file on your startup disk called Picture 1. To view the screen capture, launch **TeachText** or **SimpleText** and open Picture 1.
3. Notice that when you open the screen capture, your cursor has changed to a crosshair. Use this crosshair to draw a small rectangular selection in an area of the screen capture that is solid white, with no type or window parts in the way. Then select Copy (Command-C) from the Edit menu.
4. You can then close the screen capture document and return to the

desktop. Select the folder you created earlier, and open the Get Info window (Command-I). Press the Tab key to select the folder's icon in the upper-left corner. Then select Paste (Command-V) from the Edit menu to paste the white box you copied earlier into the folder's icon. By doing this, you make the icon invisible. Close the Get Info box.

5. While the folder is still selected, press Return, which highlights the folders name, enabling you to type in a new name. Type in a series of dashes (----------) as the file's name. Now you have a dashed line with no visible icon. Drag this divider line into the Apple Menu Items folder for use as a divider. To make copies of this divider, select the divider and choose Duplicate (Command-D) from the File menu. This appends the word Copy to the end of your divider's dashes. The system doesn't allow you to have two files in the same location with the exact same, so you have to vary the number of dashes for duplicate dividers.

A popular Apple menu organization scheme is creating **aliases** for your applications and putting a space before the name of each application's alias. This puts all your applications at the top. Some users put a space followed by a bullet (Option-8) to make the applications stand out. When you add the divider line you created, it falls after your applications, visually separating your applications from your DAs and control panels below. Incidentally, a file whose name starts with two spaces appears before a file whose name starts with just one space. You can use multiple spaces before a file's name to let you group files together in any order you'd like.

You can control where these dividers appear in the Apple menu by adding a character as the first letter. The Apple menu sorts items in a list as follows: Numbers come before letters, so any filename starting with a number would appear before filenames with letters. The top most item's name would start with a space, followed by items with names that start with: !, ", #, $, %, &, ', (,), *, ÷, ., and /.

After you have created an "invisible" icon (by pasting a white box into the folder's icon field), there are a number of other uses you might consider. First off, you might want to paste a copy of this white box in your Scrapbook, so you can create an invisible icon anytime by copying and pasting from the Scrapbook. If, for example, you want a number of files to appear in a very small window, you can paste this white box over the current icons for these files, leaving just their names visible. This way you can push them up against each other because all that is visible is their names. You can open these documents, even though they have invisible icons, by double-clicking their name. Some people use these filenames with an invisible icon to create little reminder notes to leave on their desktop, as no icon appears, just the reminder.

Another use for the invisible icon trick is to create aliases for frequently used documents and put them all together right out on your desktop. You can put quite a few in a very small space, and have them just a double-click away.

Back to the Apple menu: Another popular Apple menu trick is to make an alias of your Apple Menu Items folder (which resides within your System

Folder) and put that alias on the Apple menu itself. This makes it easy to add and delete Apple menu items without having to dig through the System Folder. You just select the Apple Menu Items alias from the Apple menu and the folder opens, giving you quick easy access to its contents.

You can also add aliases of control panels to the Apple menu for quick access. If, for example, you change monitor depth often (from thousands of color down to 256 to play games), you can put an alias of the Monitors Control Panel on the Apple menu where you can access it without having to go into the Control Panels folder itself.

See Also
Aliases; Apple Menu; Double-Click; TeachText; SimpleText; System 7

DNS

An acronym that stands for a number of possible terms related to *domains* on the **Internet** —computers on the Internet are assigned names related to their domain, such as educational institutions, government, the military, commerce, and so on.

DNS can stand for:

- Domain Name System
- Domain Name Service

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- Domain Name Server

Domain names on the Internet are related to the **IP address**ing system. Every computer or organization connected to the Internet is assigned an IP address. An IP address is composed of four numbers, each less than 256. Larger organizations, such as universities, may have a number of IP addresses. IP addresses can be difficult if not impossible to remember, so the domain name system was developed.

A *domain name* is a textual alias for an IP address based on the domain name system. Like an IP address, the components of a domain name are separated by a period. For example, an organization might have an IP address of 199.;197.29.0, but a domain name of

mycompany.com

A domain name is more than just an alias. It also serves as the name for the organization connected to the Internet. Each domain might also contain one or more subdomains that represent branches of the organization, such as:

marketing.mycompany.com

admin.mycompany.com

A domain name can exist in more than one sector of the Internet, for example:

www.mycompany.com

D

ftp.mycompany.com

A *domain name server* is a computer asigned to keep track of addresses in a given organization or *domain*. This **server** routes requests to specific addresses.It translates between the numeric addresses and the domain names that real people remember and use.

The *domain name system* or *service* is the system of distributing information worldwide across the Internet so that no one computer, person, or organization has to keep track of everyone in the world. Instead, computers are issued standard names with suffixes related to their domain. These suffixes, which come after the last dot or period in the domain name, are known as *top-level domains*.

The original six top-level domain names, which are still widespread on the Internet, are listed in the following table.

Top-Level Domains

Domain	*Description*
com	commercial
edu	educational
org	organization, usually nonprofit
mil	military
net	network

gov	government

As the Internet grows, a new solution has become necessary. The new top-level domains are based on countries, so each country is assigned its own two-letter domain. The old domains are so widespread that they still work as well.

Examples of New Top-Level Domains

Domain	*Description*
us	United States
uk	United Kingdom
se	Sweden
ca	Canada
jp	Japan
au	Australia

How to Obtain a DNS A domain name is a recognizable alias for the **IP address** assigned to any computer set up as a **host** or server of documents on the **World Wide Web** or other parts of the **Internet** .

As the Internet grows more popular and commercial interests with **Web site** s proliferate, it becomes more important for businesses or other organizations to obtain an easy-to-remember domain name. Customers or

visitors will enter that name in a **Web browser** or other **client** software in order to access the group's Web site.

A group or individual wishing to set up a Web server and obtain a domain name must register with a group called Network Solutions, Inc., which maintains a WHOIS "white pages" database of domain names on the Internet in order to prevent duplication and deal with name disputes.

Network Solutions charges a registration fee and an annual fee for obtaining a domain name.

For more information go to http://rs.internic.net/registration-services.html or send email to HOSTMASTER@INTERNIC.NET.

See Also
Internet; IP Address; Server; URL; World Wide Web

DocServer

See
Frontier

Documents

Documents are **files** created within an application. A document can be a text file, graphic, **spreadsheet** , **database** , and so on. Each document has a name

and an **icon** that visually denotes it as a document, rather than an application. A good way to remember the difference between documents and applications is: Applications are created by software companies, but documents are created by you.

See Also
Database; Files; Icon; Spreadsheet

Documents Folder

If you own a **Performa** brand Macintosh, you may be using the Documents folder to store documents you have created. The Documents folder (available only on System 7.0.1p or 7.1p, which was specifically designed for Performa models) is designed to help beginning Macintosh users find the files they create by automatically **saving** them to one **folder** on the desktop. The Documents folder actually is a part of Apple's **launcher.** It also is designed to put applications and frequently used documents in a floating launcher **palette** where users can **launch** any program or document with just one **click** —no digging through **folders,** no looking for **files**, and so on. The launcher's Documents folder also makes life easy for users when they want to open a file from within an application. Each application's **Open command** takes the user to the Documents folder, so they don't have to search around.

See Also
Click; Command; Desktop; Files; Folder; Launch; Launcher; Open; Palette;

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Performa; Save

Document Icons

Each document created within an application is given an icon. This document icon has a similar look and feel of the application icon, but document icons look more like a small page or small document. A dog-eared upper-left corner is the distinguishing feature between application icons and document icons, as shown in the following figure.

See Also
Active Window; Cursor; Desktop Level

Document Names

You assign a name to a document when you **save** the document for the first time. Any document name can be changed by **clicking** the name of the file and typing a new name. If you want to change just a few letters, perhaps to fix a typo in the name, place your cursor where you want to make the edit and type a new letter or **delete** letters. You also can use the **arrow keys** on your keyboard to move through the letters in the document name. Document names can be up to 31 characters long and made up of letters, numbers, and simple punctuation. Another way to quickly rename a document is to click the document's icon and press the **Return key**. The name of the file is

highlighted so that you can type a new name immediately.

When you create a new document in an application, it is named Untitled and will not be saved until you give it a name. Any untitled document will be erased when you **Quit** the program.

See Also
Arrow Keys; Click; Delete; Highlight; Quit; Return Key; Save

Document Type Definition

Document Type Definition (DTD) is an official definition for a language, protocol, or other aspect of **Internet** operations placed on file with the **Internet Engineering Task Force** . The current HTML 3.0 draft DTD, for instance, can be reviewed on the Internet so developers and users can learn about it and respond with suggestions.

See Also
HTML 3.0; IETF; Internet Architecture Board; Internet Society; Internet

Docutech

Media coverage of short-run printing tends to focus on color systems like Agfa's Chromapress. But there are plenty of short-run jobs out there in black and white, and Xerox's Docutech system has taken over 85 percent of that

market.

Docutech is similar to a high-speed copier or laser printer. It uses toner to produce black and white pages, but unlike a typical office printer it produces as many as 135 pages per minute. It has front-loading paper trays, built-in document scanners and optional bindery attachments.

See Also
Chromapress; E-Print; Short-Run Printing

Dogcow

The dogcow is a strange and fascinating creature often seen roaming around the Macintosh world. The surest way to spot the dogcow is by opening the LaserWriter "Page Setup" dialog box, where she does her best to reflect the chosen page setup options, even doing back-flips if needed.

The dogcow, whose name is Clarus, has a long history on the Macintosh. She made her first appearance as a character in **Susan Kare**'s Cairo font that shipped with the original Macintosh. Like any good Macintosh icon, the dogcow gladly volunteered her services to the LaserWriter driver.

Clarus's prominence in the Mac world didn't take off until late 1987. Two of Apple's developer Technical support (DTS) engineers, Mark Harlan and Scott "Zz" Zimmerman, were discussing exactly what sort of creature it was that lived in the page setup dialog. Was it a dog or a cow? Egged on by Harlan, Zz

finally decided it was a both: a dogcow. Dogcow mania was born.

At the 1988 Worldwide Developers conference, DTS gave away dogcow buttons in the debugging labs. In April 1989, a dogcow "Tech Note" was included in Apple's monthly mailing of technical information to developers. The April Fools joke was an instant hit, spreading the popularity of the dogcow even further. Before long, there were dogcow T-shirts, mousepads, sweatshirts, and a wide variety of other paraphernalia.

Naturally, the dogcow does not "moo" like a cow, nor "woof" like a dog, but rather makes a sound that combines the two: "Moof!" As for the sex of the dogcow Harlan wrote, "Of course she's a female, as are all cows; males would be referred to as dogbulls, but none exist because there are already bulldogs, and God doesn't like to have naming problems."

The definitive reference to the dogcow—"History of the Dogcow, parts 1 and 2"—was printed in ***develop***, the Apple technical journal, in issues 17 and 18.

Believe it or not, the dogcow logo and "Moof!" are trademarks of Apple Computer. There is even a "Nest of Dogcattle" page on Apple's developer support Web server devoted to the Dogcow:

http://dev.info.apple.com/dts/dogcow.html

The Website includes the original Tech Note and the full text of the develop article, as well as a digitized "Moof!" sound.

See Also

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develop; Moof!; Susan Kare

Domain Name Server

See
DNS

Domain Name System

See
DNS

Doom II

Although **id Software** recently made the original Doom available on the Ultimate Doom CD-ROM, **Doom II** hasn't had any problem making it on the Mac market without a predecessor. Doom II is a monster- killing fest in which you play a futuristic marine stranded on an abandoned space port. Doom II is **networkable** , you can team up or play against friends with a variety of weapons to choose from.

Although the big guns are the most effective, Doom II revels in violence, even offering a chain saw option where you simply run up to green spiky monsters and hack them to bits. As in all good **First-Person Perspective**

Shooters, the action is fast paced. Doom II's graphics are great on a **Power Mac**, and the game can really rid you of built up aggression as you glide down the myriad hallways dodging enemy fire. Like **Marathon**, Doom II's interface is simple, showing your ammunition level, health points and which guns you have at your disposal. The keyboard is a little **PC**-oriented (Doom II is a port after all), but this minor setback doesn't detract from the game-play.

See Also
Descent; Hexen: Beyond Heretic; Marathon; Violence in Games

Dorling Kindersley

See
Eyewitness

DOS Translations Utilities

See
Windows and DOS Translation Utilities

Dot Gain

Dot gain describes the phenomenon of **halftone** dots getting larger in diameter when printed on paper or other substrate. On a traditional offset

printing press, dot gain is caused by the pressure of the blanket when it transfers the ink from the plate to the paper. It can be controlled through adjustments on the press. The type of paper can also affect dot gain and must be considered in the adjustments. Dot gain mostly affects middle tones in the 40 percent to 60 percent range and makes the printed image appear darker than expected. Some dot gain is inevitable, and the quality of the press has a lot to do with it. Generally, dot gain on a big six-color press will be much less than on a small duplicator. Dot gain compensation is often performed prior to film output in **Color Electronic Prepress Systems (CEPS)** and in **Adobe Photoshop** on the Macintosh.

See Also
Printing Presses, Offset; Printing and Binding Terminology

Dot-Matrix Printing

See
Printing Technology, Dot-Matrix

Dots Per Inch

See
Printing Terms

D

Dot Pitch

See
Monitors, Image Quality

Dot Screen

See
Halftones

Dot Sit

This is the verbal pronunciation of the filename extension that tells you the file has been compressed using the commercial or shareware versions of Raymond Lau's StuffIt compression utility by Aladdin Systems (http://aladdinsys.com). If, for example, you were to describe the following filename to someone, "Graphics.sit," you say "Graphics Dot Sit" to let them know the filename is Graphics and it has been stuffed (or compressed) using StuffIt.

Double Prime (Keyboard Shortcut)

The double prime shortcut is shift-apostrophe while any curly quote or typographer's quotes features are disabled. There is some disagreement

whether this symbol should be italicized (Command) to be a correct Prime symbol, so you may see the Double Prime symbol used both ways.

Double-Click

You can open a document, open a window, or **launch** a program by double-clicking its **icon.** A double-click is two rapid clicks of the **mouse** in quick succession. Whereas a single click selects an icon, a double-click sets it in motion. The double-click has the same effect as **clicking** an item and then going to the **File menu** and choosing **Open.** If the icon is a window, it opens, displaying its contents. If the icon is a document, the program that created it launches and the document you selected opens. If the icon is the application, it launches.

> TIP You can adjust the speed at which the Macintosh recognizes a double-click in the **Mouse Control Panel.**

See Also
Click; File Menu; Icon; Launch; Mouse; Mouse Control; Open; Panel

Double-XX

Is a small program (less than 80K) that contains a **HyperTalk** interpreter and **XCMD** interface. You can use it to construct programs using XCMDs and XFCNs. In a sense, it's **HyperCard** without the cards, fields, buttons, and other

interface elements. Why would you want to use Double-XX instead of HyperCard? Primarily, because of its small size. HyperCard is almost 1 megabyte.

Double-XX doesn't contain any interface elements, such as windows or dialog boxes. If you need them, you have to add XCMDs that can perform that function. WindowScript, also from, Hezier is an example of an XCMD that could be used for this purpose. A license fee of $100 is required for any commercial application distributed using Double-XX.

Heizer Software
300 Cedar Lane
Largo, FL 34640
Price: $149
Fax: (813) 559-0614
Phone: (800) 888-7667 or (813) 559-6422
Web: http://www.heizer.com

See Also
Director; HyperCard; SuperCard; XCMD

Down Arrow Key

The Down Arrow enables you to **select** items below a selected item in a list. If, for example, you're in an **Open dialog box** , the first item in the list is **highlighted** (selected) by **default.** If you want to select an item further

down the list, you can use the down arrow to move to the item you're looking for. In a word processing or page layout application, the down arrow key moves your cursor down to the next line of text, enabling you to navigate downward within the document.

There are a number of modifier keys you can use with the arrow keys. Here's a table of the most common keystrokes using the arrow keys.

Arrow Keystrokes

Sequence	*Result*
⌘-Left Arrow	Collapses Expanded Folder
⌘-Down Arrow	Open Folder/Open Next File
⌘-Right Arrow	Expand Folder
⌘-Up Arrow	Go to Previous Folder
⌘-Option-Up Arrow	Close to Previous Window
⌘-Shift-Up Arrow	In Open/Save Dialog it Selects Desktop
⌘-Option-Left Arrow	Collapses All Expanded Folders
⌘-Option-Right Arrow	Expands All Nested Folders

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Shift-Right Arrow	Selects Character to the Right of Text Cursor
Shift-Left Arrow	Selects Character to the Left of Text Cursor
Shift-⌘-Right Arrow	Selects Word to the Right of Text Cursor
Shift-⌘-Left Arrow	Selects Word to the Left of Text Cursor

See Also
Arrow Keys; Default; Dialog Box; Highlight; Open; Select

Downloading Software

See
Anonymous FTP

Downsampling

Downsampling converts a digitized audio sample to a lower **sampling rate** . A sound, for example, can be recorded at 22**Khz** and then downsampled to 11KHz. The sampling rate is the number of samples (a sample refers to measuring the level of the audio signal) per second. The higher the digital sampling rate, the higher the frequency of the audio signal that can be recorded.

The sampling rate effects the size of the audio file; for simple narration it is

often possible to use a lower sampling rate than is used for the music. While it is possible to simply record the audio at the lower rate rather than perform the downsampling, there are at least two reasons why you should consider recording at a higher rate and then downsampling.

First, if you need to add any effects or otherwise process the sound, the effect works best if you use the most detailed sample you have. Also, if you are sampling at 11KHz, the software measures the audio signal half as frequently as the 22KHz recording. During downsampling from 22 to 11KHz, the software takes the two adjacent samples, combines them, and averages them. Performed over the entire length of the sound, this process tends to produce a much closer approximation of the actual signal than simply digitizing at the lower rate.

Most sound editing applications, such as **SoundEdit** and **Digit DIgitTrax** , support downsampling.

See Also
Sampling Rate; Sound Digitizing

DPI

See
Resolution Measurement, Printing Terms

D

DR (Dynamic Recompilation)

See
Emulator

Dracula Unleashed

See
Hollywood Games Connection

Drag and Drop

Drag-and-drop is a Macintosh feature that lets you drag part of a document's content from one area and drop it into a different area. It's an easier and faster way of cutting and pasting or copying. You can drag-and-drop selected text between documents, you can drag-and-drop documents onto icons of applications for immediate launching, and you can drag-and-drop between Desk Accessories such as the Scrapbook and the NotePad. Dragging and dropping has opened a new world of quick and easy movement of text and graphics. And now with Apple's new QuickDraw GX, you can put an icon of your printer on your desktop and drag-and-drop documents you want printed onto the printer's icon and it'll print the files.

You can use drag-and-drop within many applications for rearranging items

such as text blocks. If, for example, you want to move a few lines from your opening paragraph to the last paragraph of a letter, highlight the text, drag it to the new location, and drop it. You can even see an outline of the text block as you move it through your document.

See Also
Click, Copy, Desktop, Desk Accessories, Icons, Launch, NotePad, Paste, QuickDraw GX, Scrapbook, Highlight

Dragging

To drag a **file** means to physically move the file with the **mouse.** To perform this task, simply **click** the file, hold down the **mouse button,** and move the mouse in the direction you want to go. When you reach your destination (another **folder** or a **disk**), release the mouse. You'll notice that when you drag a file over a folder, that folder **highlights** to let you know you selected it. To drop the file you're dragging into that folder, release the mouse button.

If you want to **copy** a file to a disk, click the file, drag it over the disk icon, and release the mouse button.

See Also
Click; Click and Drag; Copy; File; Floppy Disk; Folder; Highlight; Mouse; Mouse Button

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Drawing Applications

Vector graphics —or **object-oriented graphics** —are most often created by drawing programs. These applications define images mathematically, in terms of lines, curves, and fills that make up discrete objects within a drawing.

That means that images created by drawing applications have clean lines, smooth curves, and even fills. It's easy to create drawings with lots of repetitive elements, and images can be scaled to any size, smaller or larger than the original, without any decrease in quality.

All this makes drawing programs the software of choice for creating logos, technical illustrations, and maps. But today's draw programs have new features that open up artistic possibilities and blur the lines between vector graphics and **bitmapped graphics** . Like **page layout** and **paint** packages, some drawing packages also support **add-on software** .

Two basic categories serve to define drawing programs: **QuickDraw** and **PostScript** . The high-end packages favored by professional illustrators use the PostScript **page description language** , while less complex programs aimed at home and business users tend to use QuickDraw. These are the languages that desktop printers speak—PostScript for most laser printers, and QuickDraw for lower-cost inkjet printers. A QuickDraw printer can't correctly output a PostScript image, while a more expensive PostScript printer can output images created using either language.

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These two categories of draw program do have features in common, starting with tools for creating geometric objects (rectangles and squares, circles and ovals, straight lines and curves) and text. Users can group objects, scale them (in one direction or two, uniformly or not), rotate them, and align them with each other. Rulers, grids, and guides help in arranging drawings.

One of the hallmarks of higher-end packages is their object-management features. Layers allow users to keep groups of objects together, hiding, showing, or locking them as required; for example, a project that includes tracing a scanned image is easier if the scan is on its own layer, so it can be easily hidden to check the progress of the drawing. Grouping, on the other hand, keeps objects in the same position relative to each other, so they can be moved as a unit. Alignment and distribution tools are paramount for precision drawings.

Making curves becomes an art unto itself when using **Bézier curves,** featured in higher-end drawing packages. Although it takes a while to master their use, these curves allow for the creation of complex shapes with a minimum of points. Fewer points means smoother curves and fewer problems outputting the final artwork.

Support for different color systems is a sure sign of a capable drawing package. Most support **process color** , named for the four-color process used in commercial printing, and Pantone **spot color** , while some support other spot color systems such as **Focoltone** . Some allow objects to be colored with a blend of two or more colors. For professional color reproduction, trapping

and color separation are important features.

Other handy features include autotrace tools (which automatically traces bitmapped images to create vector objects), the ability to convert text to outlines that can then be stretched or otherwise edited, and word processing features. As the lines between application types blur, illustration packages include the ability to import text, spellcheck it, hyphenate it, kern it, and add tabs, along with paragraph **styles** that change text attributes with one click of a mouse.

Known for its plethora of features, Canvas can combine vector and bitmapped graphics in one illustration. Although it's complicated to learn and use, it leads the pack in incorporating useful (and sometimes bizarre) features, like an "envelope" tool that distorts objects.

At the top of the drawing heap are Adobe **Illustrator** and Macromedia **Freehand**, two professional-level programs that are engaged in a perpetual features war. While each is suitable for creating everything from technical diagrams to artistic color illustrations, the differences between the two packages can spark strong partisanship among illustrators.

Freehand is strong on precision, with numerical controls for positioning, editing, and moving objects, while Illustrator requires users to "eyeball" placement and sizes. Illustrator has a built-in chart tool (information entered into a mini-spreadsheet is automatically converted to a chart), while Freehand supports different-sized pages within one document. Until recently, Illustrator could only import bitmapped images in **EPS** format,

while Freehand has been able to handle **TIFF** and **JPEG** as well. But Illustrator can create blends from several colors, while Freehand can only blend two colors, and its layers feature is better implemented than Freehand's.

As with most software, which package is best depends on the project at hand. Many users will find that a lower-priced program has just the right features and is easier to use, while others will want the control offered by high-end software. Compatibility is also an issue; professional desktop publishers need graphics files in formats that can be read by word-processing or page layout packages.

Lesser-Known Drawing Applications Anyone who spends time around Macintosh desktop publishers may think that **Illustrator**, **Canvas**, and **Freehand** are the only inhabitants of the world of draw programs. But this area offers alternatives for nearly every sort of user.

If your needs are quite specific—say, a program that can produce Gantt charts—there may be a package that will work better for you than a high-end program. Similarly, if you're just at the experimental stage, not yet ready to take the plunge into the world of professional-level drawing applications, several less expensive programs are available that can give more than just a taste of what vector-based graphics are all about.

For business users, dedicated **charting and graphing** packages may come in handy. These applications, like Claris Impact, DeltaGraph Pro, and KaleidaGraph, will free users from worrying about lining up boxes and rules

and keeping styles consistent, and they offer built-in style sheets to create professional looking charts and graphs quickly.

Those who are looking for a flexible drawing application that offers ease of use and automation should consider Claris Draw. This program is the successor to one of the first Mac programs, MacDraw, which along with MacPaint helped to popularize the Macintosh when it was first released in the mid-'80s. Today ClarisDraw combines drawing, painting and page layout tools, and it can automatically maintain alignment, size, and connections within groups of objects. It's also known for its large library of **clip art**, which users can drag and drop into their documents and then alter as they wish.

Bringing "smart" tools to another level is **SmartSketch**, which—as its name implies—works like a sketch pad. The user draws with a pencil and deletes lines with an eraser, and the program does the hard work of translating the artwork into **vector graphics**, smoothing curves and straightening lines as it goes. As a drawing is built, SmartSketch constantly recalculates where anchor points should fall so that objects can be easily aligned with others. Users can click anywhere along the edge of an object and drag to reshape—no need to create and move anchor points manually.

The Symmetrigon and Connectigon are the trademark features of IntelliDraw, which offers **Bézier curves** but implements them differently than other drawing applications. Making symmetrical shapes is simplified with the Symmetrigon, and the Connectigon creates shapes that connect

other objects and stretch to stay connected when the other objects are moved. Other features include a variety of ways to blend different shapes and place objects with respect to other objects.

Taking advantage of Apple's **QuickDraw GX** technology, LightningDraw GX adds sophisticated typographical and color features to its simplified interface, similar to that in SmartSketch. Surpassing the high-end programs, LightningDraw GX allows users to make colored objects "transparent" so that other colors behind them show through, modified by the color in front. Type features take full advantage of the new GX fonts, which offer many special and alternative characters and allow users to customize fonts. If these features intrigue you, GX is for you—but be warned: It eats RAM for lunch.

Expert Draw and DeskDraw are about as inexpensive as they come, yet the two offer features that just a few years ago were strictly professional-level, such as the ability to place text on a path (which can be any shape) and blend one shape into another. System 6 users can even install DeskDraw as a DA in the Apple Menu, and both programs are sparing in their memory requirements.

Moving up a step on the price/features latter, there's CA-CricketDraw III, which costs a bit more but does more, too. Users can have hours of fun extruding flat objects into simulated 3D, and tech-heads can edit PostScript code directly.

Like Canvas, SuperPaint is a hybrid program that can work with both vector and bitmapped elements in the same image.

D

See Also
Add-On Software; Bézier Curves; Bitmapped Graphics; Clip Art; EPS; Focoltone; Freehand; Illustrator; JPEG; Object-Oriented Graphics; Page Description Language; Page Layout Applications; Paint Applications; Postscript; Process Color; QuickDraw; Spot Color; Style Sheets; Tiff; Vector Graphics

Drawtools Shape

See
Xtras

Drew Virus

See
MacMag Virus

Drivelight

Drivelight, from Symantec, (10201 Torre Ave, Cupertino, CA, 95104-2132, Phone (800) 441-7234. Web site at http:// www.symantec.com) is part of the **MacTools Pro** collection of diagnostic/repair, data protection, data recovery, and system enhancement modules. The Drivelight module places a small **icon** in the upper corner of the **menu bar** that blinks when any

mounted disk has activity. You can set preferences on how and where you'd like this activity light to appear by selecting your options from the Drivelight Control Panel.

See Also
Icons; MacTools Pro; Menu Bar

DriveSavers

DriveSavers is a commercial data recovery firm (400 Bel Marin Keys Boulevard, Novato, CA, USA 94949, Phone: 800-440-1904, on the Web at http://www.driversavers.com) that specializes in restoring files from severely damaged hard disks.

DriveSavers has the latest hardware and software technology for extracting data from disks that would otherwise appear to be damaged beyond repair. If you have a major drive **crash** and have critical information on that disk that you didn't **back up**, you might want to consider this type of service. Not only does DriveSavers recover the information from your damaged disk drive, but in many cases they can also repair the **hard disk**.

See Also
Backup; Hard Disk; Head Crash

D

Drop Cap

See
Printing Terms

Drop Frames

This term is used two ways. When coding **NTSC** video to **SMPTE**, a technique called *drop frame* maintains the correct numbering of the sequence (see the entry on SMPTE).

When digitizing or playing back digital video, sometimes the video cannot play the video back at the correct speed. This usually happens if the hardware isn't fast enough to capture or play the sequence. Digital video software, such as QuickTime, attempts to keep the sequence playing at the correct speed by dropping, or skipping, frames. While you want this to happen during playback (it means almost any hardware can play the movie in some form) you do not want to suffer dropped frames during the recording process.

See Also
Compressor; None Compressor

DropStuff

D

See
StuffIt Expander

Drum Scanners

Drum scanners are the largest, most expensive, most complicated category of scanner. Drum scans are almost always of significantly higher quality than scans of the same artwork created with desktop devices—for many professionals, drum scans are the only scans of sufficient quality for print.

Typically, drum scanners are owned by service bureaus and printers' pre-press departments, and are operated by trained operators. In most small- and medium-sized production environments, designers send art to the service bureau to be drum scanned and receive the completed scan on disk, rather than doing drum scans in-house.

Drum scanners are fairly large—about the size of a filing cabinet laying on its side. The "drum" is a metal cylinder on an axle. The artwork to be scanned is wrapped around the drum, and the scanner spins the drum at high speed, bouncing light off the artwork to measure the artwork's color and tonal values.

Advantages Drum scanners use advanced optics. The human eye sees light in a non-linear fashion: a tiny change in brightness in a dark area of a photograph seems different from the same change of brightness in a light area. Drum scanners use photomultipliers, which "see" light as the eye does;

Desktop scanners, which use an array of charge-coupled devices (CCDs) record brightness in a more literal, flat way. As a result, drum scanners can capture subtle changes in tone. The drum scanner's high-quality optics usually provide better-focused scans than desktop devices.

Drawbacks Obviously, only flat artwork, such as photographic prints, can be wrapped around a drum. Drum scanners are expensive: basic real drum scanners cost something like $20,000 in 1996 and they require many hours of expensive training to learn to operate them.

See Also
Flatbed Scanners; Handheld Scanners; Office Scanners; Slide Scanners

DSP (Digital Signal Processor)

A processor designed specifically to sample and convert digital audio and video signals. DSPs were used in the **AV Macintosh** models (**660AV** and **840AV**) to provide video digitizing and 16-bit audio capability. With the arrival of the **Power Macintosh,** Apple decided to do away with the additional cost of the DSP and use the extra processing power of the Power PC chip to perform these tasks.

Before its demise in the Macintosh line-up, some manufacturers did make use of the DSP in the AV Macs. Adobe provided a patch, called **AV DSP Power** , for some **Photoshop** filters, enabling Photoshop 2.5 to take advantage of the processing power of the DSP in the AV Macs. The sound recording and editing

application Macromedia **Deck II** also works with the AV Macs.

Several manufacturers also offered **NuBus** cards for Photoshop that contained DSP chips. Add-on cards, that include multiple DSPs, are available for high-quality sound recording. These are primarily of interest to sound professionals who need to record multiple 16-bit sound tracks simultaneously.

See Also
AV Macintosh; Digidesign; Photoshop

Dual Scan Displays

The dual scan display is a type of **passive matrix** liquid crystal display (LCD) used in some PowerBooks. Although not of the quality of **active matrix displays** , dual scan displays produce screen images that are superior to those created by ordinary passive displays. A dual-scan display draws the image on the top and bottom half of the screen at the same time, thus achieving an effective refresh rate nearly twice that of a standard passive-matrix display.

See Also
Passive Matrix Displays; PowerBook Displays

D

Dummy

In the graphic arts, a dummy is a preliminary example of a publication constructed by hand to show pagination and placement of elements on the pages. A dummy is usually quite simple and may consist only of pencil notations on folded paper stock, but it is an important communications tool that can help in estimating printing costs more accurately.

Duo

See
PowerBook Duo Series 100 and 2000 Series

Duo Docks

See
PowerBook Duo Docks and MiniDocks

Duotone

A duotone is a combination of two **halftones** of the same image sometimes printed in two different colors. The purpose of a duotone is to increase the density of the image or create a special color effect. Increasing the density of a printed halftone gives it a richer look with more contrast in tonal values. A

duotone can more nearly capture the full tonal range of a good photograph. When two halftones are made for a duotone, one can enhance shadows while the other can enhance highlights. The two halftones may be printed in black, or in black and a color, or in two colors. Duotones can significantly increase the cost of a two-color printing job because they require more careful press work than ordinary halftones. Tritones (three halftones) and Quadritones (four halftones) are sometimes used to achieve even denser and richer-looking printed images.

Duplicate Command

This command, found on the File menu, enables you to make a duplicate of any files or folders in the **Finder**. If, for example, you have a document that you want to copy, select Duplicate (⌘-D) and the Mac makes an exact duplicate of that file and appends the word "copy" to the end of the file's name to let you know it's a copy of the original. This copy appears in the active window. You may remove the word "copy" from the name of the duplicate, but the operating system does not enable you to have two items in the same location with the exact same name.

The Duplicate command does not copy the information to the **Clipboard** for storage and does not erase items already in the Clipboard.

To Duplicate an item at the Finder, follow these steps:

1. Select the file (or files) you want to duplicate.
2. Select Duplicate (or ⌘-D).
3. A duplicate of the selected item appears in the active window with the word "copy" added to the name of the document or item.

See Also
Clipboard; File Menu; Finder

Drumbeat: U-Boat II

See
Sim Games

DTD

See
Document Type Definition

DTP

See
Desktop Publishing

D

DTR

See
Flow Control

Dumb Terminal Programs

See
Modem/Software

Dungeons & Dragons

See
Curse of Dragor, Might & Magic, Role-Playing Games

Dungeon Master II: The Legends of Skullkeep

Dungeon Master II: The Legends of Skullkeep from **MacPlay** is an example of less being more. In this case, less **multimedia** enhancement contributes to more reliable and more extensive game-play. Many companies have destroyed an otherwise perfectly good game by inserting special effects at the expense of action and story line. For example, MacPlay's own Voyeur,

packed with video content, really destroys the interesting concept behind the game.

You simply don't get to do enough in-between "quick-cut" video scenes. Dungeon II proved that MacPlay learned its Voyeur lesson. They left out the video, big-name actors and fancy interfaces and swapped them for real time action, a strategy edge and a quick pace. Monsters move around, attack and steal things regardless of whether you are watching or not, making the entire experience that much more immersive. Though not a great multimedia extravaganza, Dungeon Master II is simply a good **Role-Playing game** .

See Also
Curse of Dragor; Might & Magic; Role Playing Games

DV

See
Digital Video Cameras

DVD

DVD (Digital Video Disc) is a new CD format under development that will hold multiple gigabytes of information, up an entire motion picture in digital form.

D

See Also
CD-ROM

DXF

A generic, cross-platform **3D** file format originally developed by Autodesk Inc., of San Rafael, CA, DXF (Drawing Interchange File) is supported by a wide variety of programs and is probably the most common method for exchanging 3D files. Unfortunately, this file format supports only basic geometric information. Textures are not supported. DXF is a somewhat inefficient way to transport files, because the files are typically much larger than a 3D program's own file format. This means that you might be unable to import complex models into your program unless you have a lot of memory.

With the introduction of Apple's **QuickDraw 3D** , more programs may adopt the **3DMF** file format. The 3DMF file format is much richer (can contain more information about a model) than the DXF format. This would make it easier to move models between programs.

MetaTools
6303 Carpinteria Ave.
Carpinteria, CA 93013
Fax: (805) 566-6385
Phone: (805) 566-6200
Web: http://www.metatools.com

D

See Also
3D; 3DMF

Dycam 10-C

This camera is the same basic body as the **Chinon ES-3000** . Refer to that camera for more details about the camera. The primary difference between the Chinon and the Dycam is the software. Dycam uses its own software, which provides similar capabilities as the Chinon software. The Dycam camera has a thread in the front of the lens that can be used to attach wide angle or zoom lenses. Because the camera is a **range finder** , if you are using such attachments, you can only see the pictures by downloading them to the computer.

See Also
Chinon ES-3000; Digital Still Cameras; SLR; Still Video Cameras

Dye Sublimation Printing

See
Printing Technology, Color

Dylan

D

A **dynamic language** developed by Apple.

Dylan, short for DYnamic LANguage, was designed by Apple's **Cambridge Research Laboratory** to be the next generation of programming languages.

Most languages force programmers to choose between the fast prototyping and development time of a **dynamic language** and the fast execution speed and low memory requirements of a more traditional static language. Dylan marries these two worlds. As a dynamic language, Dylan can be **compiled** *incrementally*, meaning that small changes in the source code can be compiled independently of the rest of the program and can even be linked into a running program! Also, Dylan uses a sophisticated memory handling scheme that takes care of most of the hassles of **memory management** .

Apple stopped work on Dylan before its Apple Dylan **IDE** was finished. Fortunately, Apple released the unfinished product as the Dylan Technology Release (available through **APDA**). The technology release is unsupported and is not commercial release quality, but it can give you a great taste of things to come in the world of development tools. The Technology Release is a 68K application that also runs on the Power Mac in emulation, provided the **Modern Memory Manager** is turned off. Applications generated by Apple Dylan run fine on 68K Macs and Power Macs alike. A PowerPC version of the Apple Dylan Technology Release is in the works from Digitool, Inc. (http://www.digitool.com/).

Although Apple created the Dylan language, it is not the only one working

on implementing it. Several freeware implementations of Dylan are available, including Mindy (Mindy Is Not Dylan Yet) and Marlais. Neither of these environments can develop full-fledged Macintosh applications, but they're a great way to learn and explore the language. In addition, Harlequin (http://www.harlequin.com/full/dylan.html) is working on a commercial Dylan environment called DylanWorks. Carnegie-Mellon's Gwydion Project (http://legend.gwydion.cs.cmu.edu/gwydion/index.html) is also working on an implementation of Dylan for UNIX.

See Also
APDA; Dynamic Language; IDE

Dynamic Language

Dynamic programming languages enable you to program interactively by enabling you to quickly incorporate new or changed code into your program. **LISP**, **Dylan**, and **Smalltalk** are well-known dynamic languages.

If you make a small change to a program that was written in a traditional static language, such as **C**, **C++**, or **Pascal**, you must recompile that section of the code and link that code into the rest of the code before you can try out the change by running it. In a dynamic language, a small change requires just that bit of code be recompiled before it is inserted into the program. In fact, many dynamic languages enable you to make changes as the program runs, adding updated code to the program on the fly. This can make it much easier

to iterate through the design and development process and to develop early prototypes.

This changeable nature means that dynamic languages must be able to handle a variety of tasks while the program is running (“at runtime”) that are taken care of by the compiler in a static language. The speed and size overhead of this extra functionality is a major drawback to many dynamic languages, making them poorly suited to most commercial software projects. With this extra overhead, however, comes a variety of features that can make dynamic programs much more robust than their static counterparts.

Dynamic languages provide dynamic type information and error checking at runtime. As a result, many of the errors that programmers face in static languages can be dealt with easily and won’t bring a program to a screeching halt.

Similarly, dynamic languages typically hide many of the gory details of **memory management** from the programmer. Because the vast majority of all bugs in typical static language programs are caused by memory-related errors, this can make dynamic programs easier to write and debug, and less prone to errors after they’re written.

Apple’s Dylan language was designed to combine these advantages of a dynamic language with the execution speed and low-memory footprint of a static language.

See Also

D

Dylan; LISP; Smalltalk

Dynamic Range

Dynamic range describes the capability of a scanner to distinguish a range of colors when digitizing an image. High-end scanners associated with **CEPS** (Color Electronic Prepress Systems) are much more sensitive to the range of colors in the full spectrum than are desktop scanners. Scanners with a high dynamic range can recognize the difference between two colors very close together in hue, but low dynamic range scanners might see the two colors as the same. Determining factors for dynamic range in a scanner are pixel depth, sensitivity of the CCD array, and the optical system.

See Also
Color Resolution; Pixel Depth; Image Scanning

Dynamic Recompilation

See
Emulator