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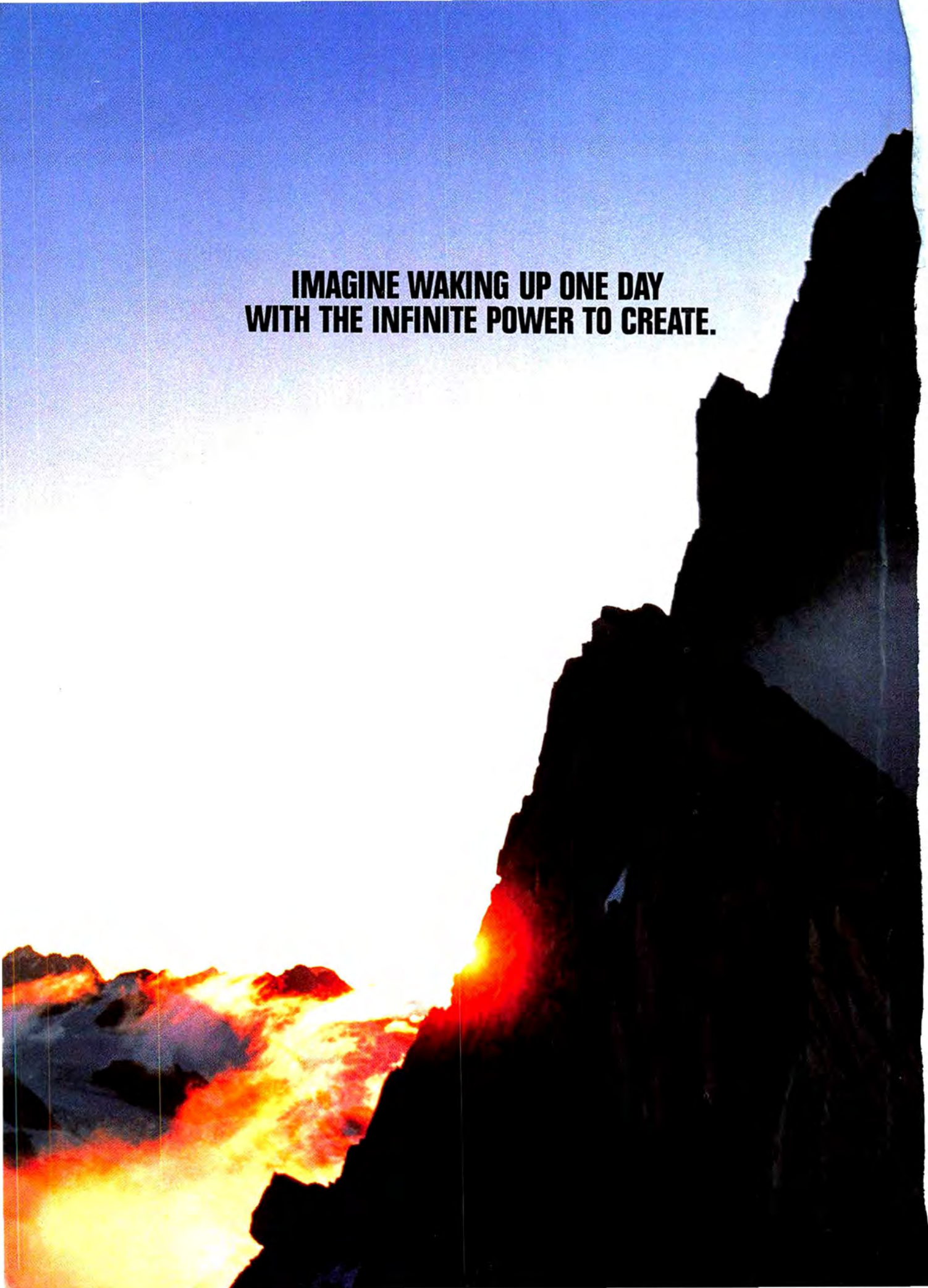
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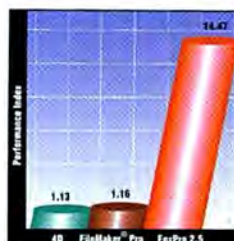
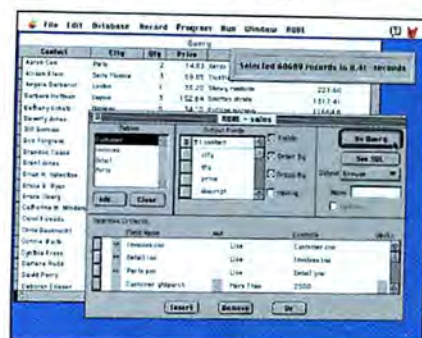
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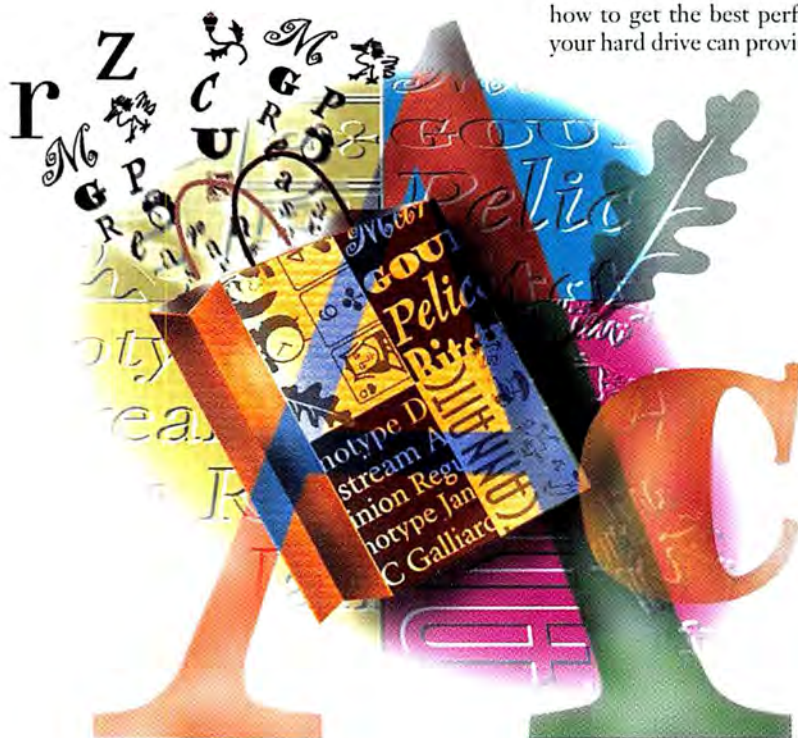
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Photo by Paul Franz-Moore



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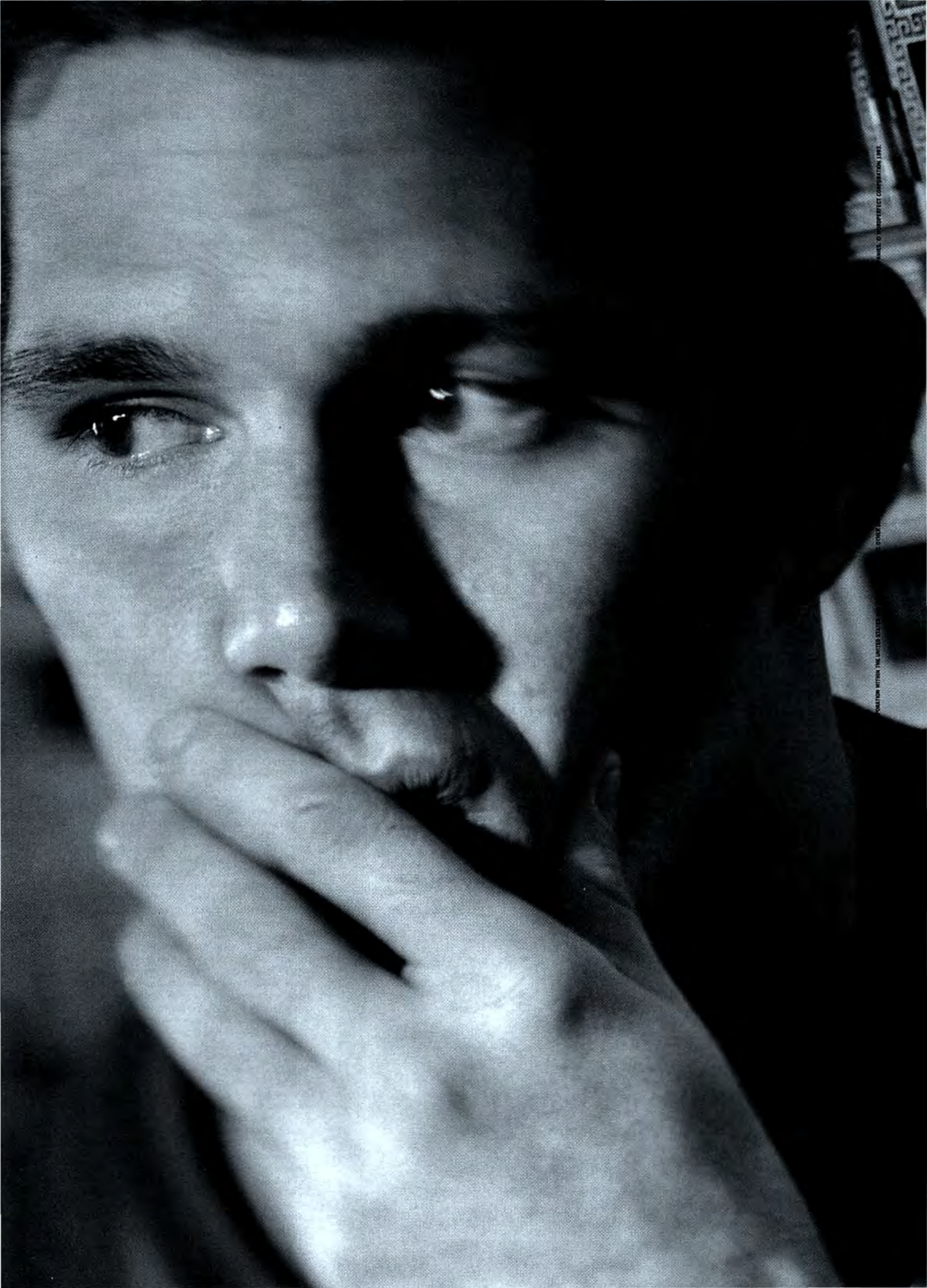
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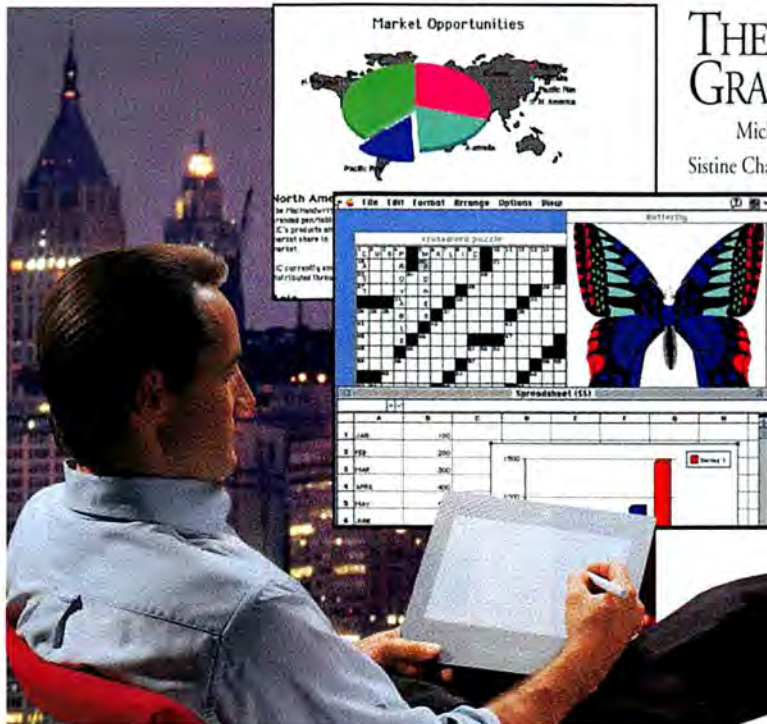
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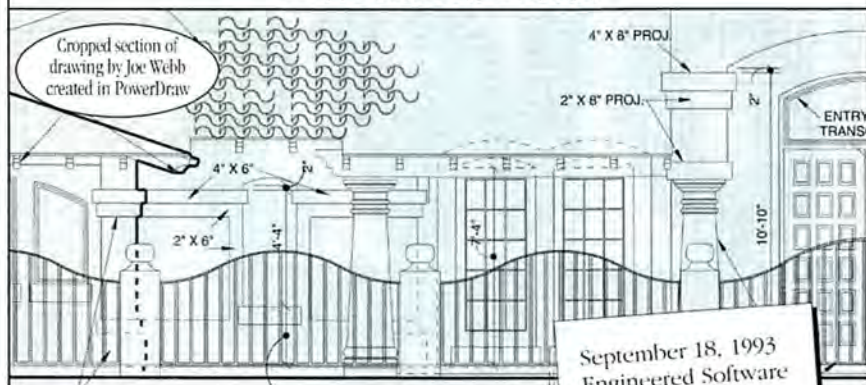
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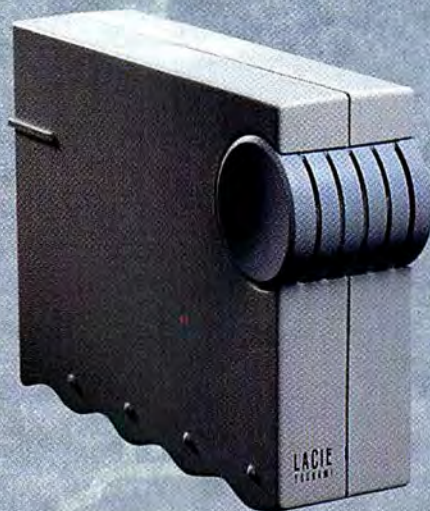
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Three Generations of PowerPC Macs

Bridges to a new interface

YES, IT'S ODD TO START thinking about the second and third generations of a product before the first even arrives. But with PowerPC Macs it makes sense because the new processor is the foundation for interesting future technologies that promise to revitalize the Macintosh.

The buzz surrounding the PowerPC Macs has undeniably created one of the most exciting product buildups since the introduction of the Macintosh, but the first generation of PowerPC machines is best understood as a bridge between the Macintosh's past and future. (See the feature "PowerPC Preview" and the *News* item "Developers Back PowerPC," in *Macworld*, February 1994. Also see "Apple Unveils First PowerPC Product," *News*, in this issue.) Not until the second or third generation of PowerPC Mac models are we likely to see a complete picture of the Mac's leap forward. The PowerPC chips (the initial 601 and three more in the works) will be only one factor defining the different generations of PowerPC Macs.

First Generation—The Bridge

Apple has devoted a lot of resources to making the first PowerPC-based Macs highly compatible with existing hardware and software so that people who already use Macs can simply upgrade their computers without worrying about upgrading everything else. It's clear that Apple is focusing the design of the first generation of PowerPC models on compatibility first and new features second. You could call this the "It's a faster Mac, stupid" strategy. The idea is to convince customers that PowerPC Macs provide more power, while preserving the huge existing base of compelling software and hardware so users don't have to start over from scratch.

The PowerPC Macs will run most software written for today's Macs, as well as new applications written to take advan-

tage of the PowerPC Macs' higher performance. Apple says that the interface of the first PowerPC Macs will look and feel like that of existing Macs because the new machines will run a version of System 7 that appears identical to today's System 7.1. Apple has also pointed out that most hardware currently sold for Macs works with prototype PowerPC Macs and should continue to work on the final versions. The first PowerPC Macs will use NuBus technology, so presumably you will be able to remove NuBus boards from your existing Mac and put them in the new PowerPC models. Given Apple's statements about compatibility, it's also

application. You might get an incarnation of Word or WordPerfect that's not only a sensational word processor but also an image editor capable of challenging Photoshop (you'll be able to gussy up that embedded 24-bit image without going to a separate application). As a bonus, these word processors might have fully integrated relational-database-management tools so that readers can search and sort for all the detail and data behind a report as they read it. Of course, you'll need more memory and a bigger hard drive, but that passes for progress.

OK, this clunky prospect is also a bit ambitious. The first applications written for native PowerPC operation will probably be ports of existing versions, perhaps with some new features that would have come out in any case for the current 68K-based Macs. When vendors have had more time and experience with the PowerPC models, they'll develop software that uses the extra breathing room provided by the PowerPC.

Probably just a few new applications will offer novel features only made possible by the PowerPC's extra performance. It will take some time for most developers to write software that builds creatively on the PowerPC's brute strength. The most likely areas for these innovations will be graphics and sound, which today devour any available processing performance with gusto. For example, you might find more applications handling 3-D objects or rendered surfaces. The PowerPC's superlative floating-point performance offers a special opportunity to developers. In the past, most applications other than CAD and math packages rarely used floating-point math opera-



likely that you will be able to attach existing scanners and storage devices, as well as networking hardware.

Second Generation—Better Apps

So, great—PowerPC Macs come out, no muss no fuss. You don't have to retool your habits or rebuild your arsenal of software and hardware, but you have got one heck of a fast computer for bigger and better new applications. Hypothetically, when you feel like it, you could upgrade to the PowerPC version of your favorite

continues

tions. With the advent of impressive floating-point capability, developers will be able to make more use of floating-point math, squeezing even more performance from the new processor architecture. If history is any indicator, imaginative developers will discover exciting new approaches that will reenergize the Mac.

Generation X—PCI and FireWire

Hardware performance also depends on how quickly data can be moved around

the entire system including internal memory, add-on boards, and any attached devices such as hard disks, scanners, and printers. The PowerPC Macs will soon run into bottlenecks if Apple doesn't upgrade the architecture around the chip. Apple has already made hardware announcements that bode well for the long-term health of PowerPC Macs.

First, Apple has said that later PowerPC models will include the PCI bus. The PCI bus is a new standard for add-on

boards that will also be supported by most new Windows machines. PCI is about three times as fast as the Mac's NuBus. In theory, PCI can transport 130MB per second compared with the NuBus's theoretical limit of 40MB per second. In real-world applications these buses operate at only about a third of the maximum theoretical speed. The increased performance should be a boon to multimedia applications because video and sound cards will have a higher speed limit for driving the onerous amounts of data these applications require.

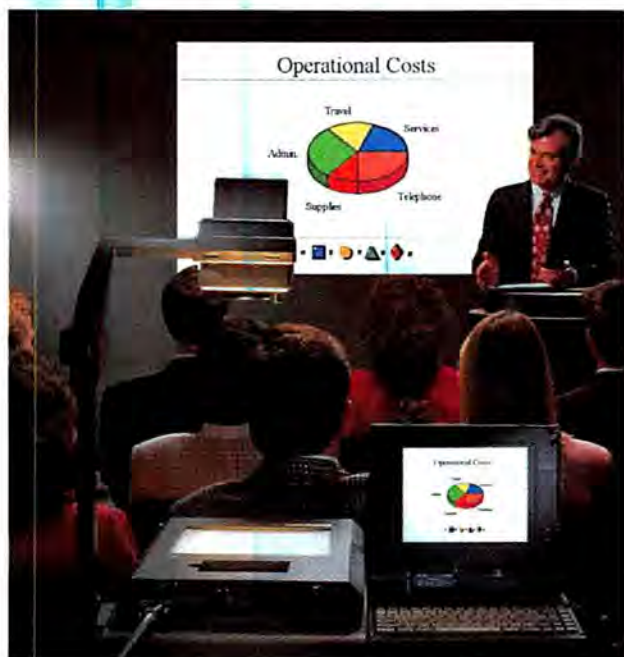
Second, Apple is developing a peripheral I/O bus technology called FireWire. Apple has not announced it will use FireWire PowerPC Macs, but I'd be surprised if FireWire didn't appear on some future generation of these machines. (See "Will FireWire Replace SCSI?" *News*, in this issue.) FireWire will provide a single I/O bus to replace SCSI, ADB, and serial ports. FireWire should be three to four times as fast as SCSI, and future versions might operate more than ten times as fast as SCSI. FireWire can also ship larger amounts of data at once with less chance of delay, important for applications that move video and sound between the processor and peripherals. Besides providing speed and a uniform way of connecting I/O devices, FireWire will eliminate the need for terminators and ID switches. FireWire's connector is only one sixth the size of most SCSI connectors.

Third Generation—New Interface

By the time Apple builds a more expansive hardware architecture around the PowerPC, we should see richer and more interesting applications that will incorporate sound, voice, video, 3-D images, and rendered graphics. But why stop there? Apple is also likely to rethink the venerable Macintosh user interface to make use of this richer environment. The result could be a more approachable user interface with much more dimension, motion, and texture. Also, a new interface could give use to critical new applications.

A new interface and innovative applications are the key to the PowerPC's importance for the Macintosh world. For the Mac to rise to the next level, Apple must provide an environment where a big leap forward is possible. Apple's new price competitiveness is great, but Apple must once again raise the bar and redefine what it means to use a personal computer. With new applications, FireWire, PCI, and a complete new hardware architecture, future generations of the PowerPC offer the potential to do just that, and should completely revitalize the Macintosh for years to come. **m**

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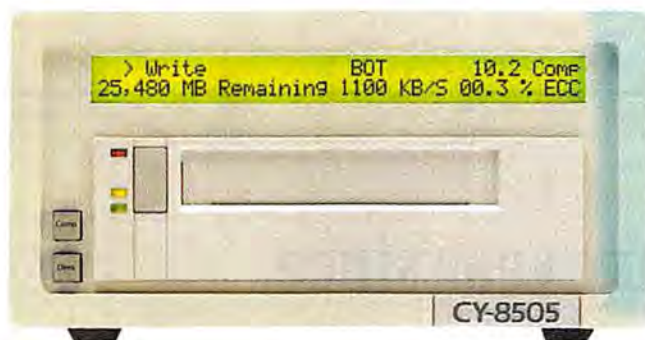
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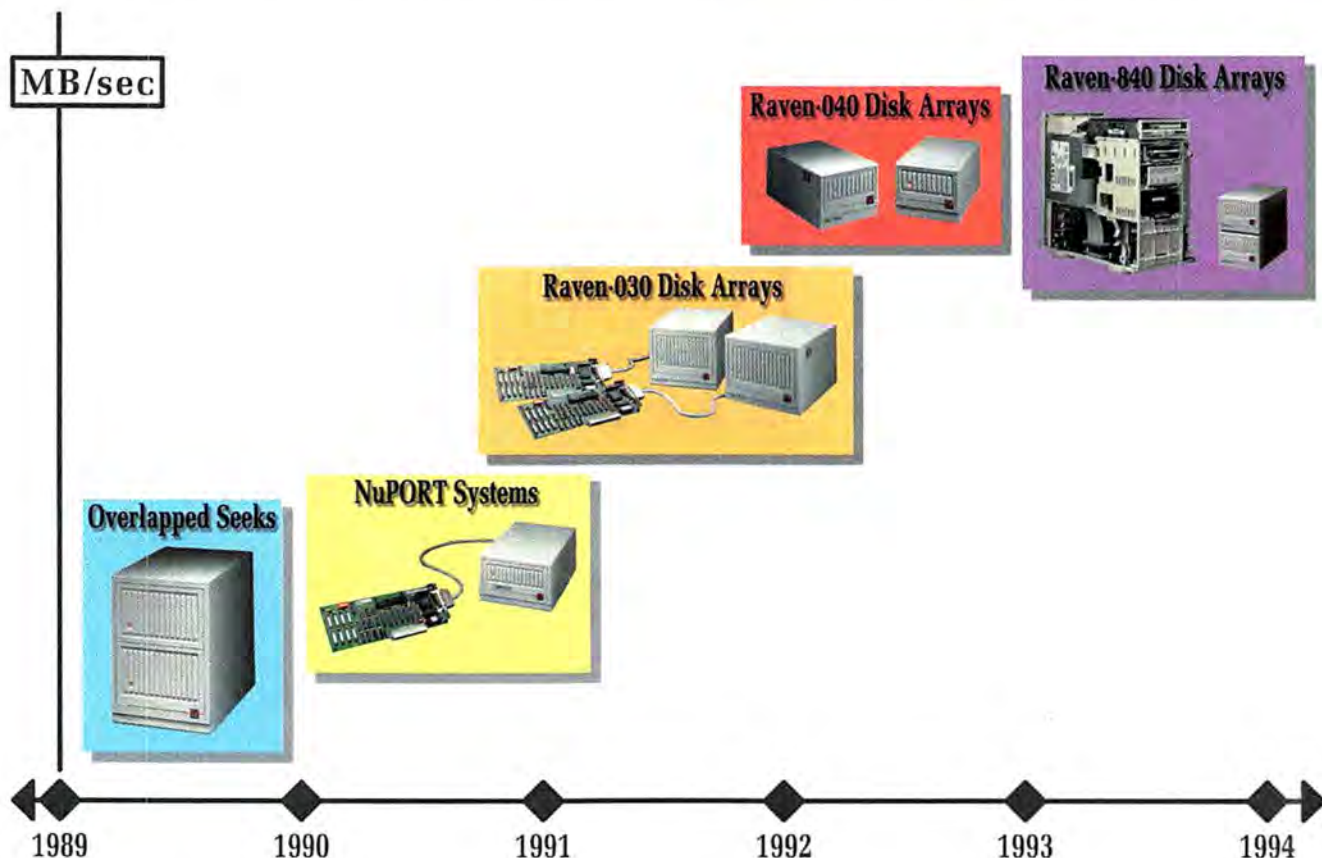
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Letters

Thrilla in Manila

NOTHING FIRES UP A QUARK USER faster than reading yet another comparison between PageMaker and QuarkXPress ("PageMaker vs. XPress: The Rematch," December 1993). As a service bureau operator, I find that you need PageMaker customers for their huge print-time bills and Quark customers for your mental health.

Steve Roth's article makes me believe that he and I are using different Quarks. Quark does not insist that boxes be opaque. It requires that the user set the defaults for box background color to none rather than 0 percent black. All boxes are then created transparent, unless the user specifies that a particular box have a background color or tint. It's also extremely simple to give a box a background tint of 30 percent blue and a border of 80 percent purple. These colors can then be trapped and printed out as either spot or process breaks—try that in PageMaker.

Furthermore, you can rotate in-line graphics; you can separate color EPS files into spot-color plates if the EPS file was set up that way; you can use previous print settings if you save them; you can have paragraph-specific tracking; and you can apply styles both from the palette and with keyboard commands.

Finally, if you want to print in the background, Quark finishes before you refill your coffee cup. PageMaker takes days to spool the file, requires huge amounts of RAM and hard disk space because of its stupid font-downloading system, and gets confused when you make a new Chooser selection for the next job.

M. M. Settle
San Marcos, California

Your letter forces me to attack QuarkXPress and defend PageMaker—something I'm loath to do because I use both programs daily, as I have since each was first available in beta. Nevertheless, here goes.

When you're working with the Content tool and you select a box, QuarkXPress makes the box



opaque, obscuring any overlapping boxes—whether they're in front or behind. This behavior is unrelated to either the default or the box background settings. You can rotate the contents of in-line graphic boxes, but you can't rotate the boxes themselves. For graphics that don't have a 1:1 aspect ratio, this means extra gymnastics.

The table item about separating color EPS files onto spot-color plates was a bit unclear. With PageMaker, you can apply a spot color to a full-color EPS, and then print a whole EPS graphic to that spot-color plate. QuarkXPress doesn't offer this admittedly minor feature. QuarkXPress retains many print settings for a publication if you save the document after printing, but it doesn't save all of them.

As for paragraph-specific tracking, QuarkXPress has two separate features, both of which are called *tracking*. Go figger. The one that you can apply on a paragraph level and include in styles is more accurately called *range kerning* (which is what it's called in PageMaker). This feature applies a set amount of kerning to each of the character pairs in a range of text. QuarkXPress also has true tracking, but it's not applicable on a paragraph level. Finally, you can apply styles from the Styles palette, but you cannot from QuarkXPress's Measurements palette.

PageMaker's font-downloading scheme is abysmal for anyone who manually downloads fonts to printer memory—I said that in the article, albeit less strongly. Use the Update PPD Addition with fonts

on your imagesetter's hard disk to avoid those long print times and huge spool files.—Steve Roth

Eds. Note: The upgrade price for QuarkXPress should have been listed as \$150.

You Gotta Fight

HAVING JUST READ STEVEN LEVY'S article, "Duo Trouble," in December's *The Iconoclast*, I believe it's time for someone to come up with favorable comments on the PowerBook Duo. I use a Duo 230 with the Duo Dock when I'm in my office. On the road, I use the Apple MiniDock to connect to a Sharp LCD projection system. The Express Modem flawlessly sends and receives faxes. I have just completed a four-month product rollout that has met tremendously positive response, and I give a lot of credit to the Duo.

James Downey
Acton, Massachusetts

ICAN'T BUY INTO STEVEN LEVY'S idea that the Duo and Duo Dock will soon be extinct. While I'll admit Apple bungled aspects of the execution, I see no problem with the concept. Apple's biggest mistake was to not bundle all Duo CPUs with a Duo Dock. To get the full Duo benefit, you need both pieces. That's led too many to fumble with this simple truth: The Duo is an office desktop system you can take for a walk; it's not a notebook with desktop attachments.

Eric Schlense
via Internet

IAM COMPELLED TO WRITE IN DEFENSE of the Macintosh Duos. Mr. Levy fails to consider the type of Macintosh user for whom the Duo is ideal: the person who works both at the office and at home. I delight in the ability to stop work on a manuscript at the end of a workday and, after a few hours at home with my

CORRECTIONS

■ The "Are Bigger Drives Better?" sidebar in "Optical Options," December 1993, should have stated that 650MB ISO cartridges start writing data on the inner edge of the disk and move outward. The cartridges are still slower than ECMA 1.3GB cartridges.

■ In the January 1994 "Global Village Ships V.32terbo" News story, the OCR software that comes with the Mercury line is from Calera, not Caere.

■ Alpha Media's phone number is 310/315-3470 ("Clip Art's Greatest Hits," January 1994).

family, pick up where I left off on the very same computer. No shuttling documents or worrying about crucial files being absent.

Sure, it's nice that the machine is a PowerBook (that is, usable on battery power in remote locations), but most often my Duo is in the dock in my office or plugged into the MiniDock at home.

Roger Papke
Jacksonville, Florida

You Got Your CPU in My Magazine

I HAVE ALWAYS ENJOYED THE HUMOR you inject into *Macworld*, but you outdid yourselves with the December 1993 ad from Intel, which tries to convince Macintosh users to switch from their Macs to Intel-based PCs. Perhaps I should start looking for ads from the National Cattlemen's Association in future issues of *Vegetarian Times*.

Steve Ingram
Poultney, Vermont

WHAT IS A COMPANY LIKE INTEL doing in a magazine like *Macworld*? That's a very good question.

I looked around and found a good package price for a Quadra 610 (8/160). With a 14-inch Trinitron monitor and a standard keyboard, the price was \$1999. Then I pulled out a recent PC mag and compared the Quadra to a Dell Dimension 33MHz 486 system. The Dell offering was only \$1799, but the monitor wasn't nearly as good as the Trinitron, it came with only 4MB of RAM, had no built-in networking, and I'm sure that Windows 3.1 and DOS 6.0 would be a disappointment for most Mac users.

The only advantages I could see were two disk drives and six 16-bit ISA slots. The slots would have to be used to add

boards to make up for all the things the Mac's built-in ports and circuitry already do (costing you more money), and the extra drive is for 5¼-inch disks.

I think Apple may have closed Intel's and Microsoft's window of opportunity into the Mac market.

Glenn Millam
Louisville, Kentucky

Sticking Up for MacWarehouse

JUST READ THE LETTER IN YOUR December issue lambasting MacWarehouse. I must tell you that my experiences with that company are quite contrary to Mr. Kozlowski's. I have ordered from MacWarehouse many times over the last two years with consistently good results. Orders have always arrived on time and complete.

Terry Lyle
Warren, Pennsylvania

X-ray Mystery Solved

HAVE YOU EVER WONDERED whether you can send your floppy disks though the X-ray unit or the metal detector at the airport without having your data scrambled?

In a paper recently published in a medical journal called *Radiology*, we describe tests in which we subjected floppy disks to extremely high doses of X-rays and magnetic fields. The exposure levels for both the rays and the fields were hundreds to thousands of times higher than one would encounter at the airport.

Based on our experimental data and also on the physics of magnetic media, we conclude that airport metal detectors and X-ray scanners have no effect on digital data stored on floppy disks.

Joel Gray, Ph.D.
Professor of Radiologic Physics
Mayo Clinic
Rochester, Minnesota

Dr. Gray also writes, "Any magnetic field sufficiently strong to erase magnetic media would also have an adverse effect on cardiac pacemakers and, potentially, on other implanted, active medical devices that contain reed switches, which are sensitive to fields of 5g or stronger." Yikes!—Ed.

File Transfer

IN HIS DECEMBER 1993 ARTICLE "Cross-Platform File Transfer," Galen Gruman completely missed an invaluable
continues

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interplatform file-compression utility. Ziplt by Tommy Brown, available on CompuServe, can compress Mac files while retaining all Macintosh information, yet it is fully PKZip compatible. It also works with data zipped on Unix-based systems. I routinely use Ziplt for uploading and downloading files to and from Microsoft's Excel PC library in the company's CompuServe forum. At \$10, this piece of shareware is tough to beat.

Raymond Bolton
Tiburon, California

HP Eats Envelopes

I RAN DOWN TO THE STORE AND bought the Hewlett-Packard 4ML. It works great and doesn't take up much space, but . . . it's not real friendly when it comes to printing envelopes. When you use the envelope macro in WordPerfect 2.1.3, the 4ML assigns each line of an address to its own envelope (or sheet of paper) and tries to consume up to 12 envelopes for an address and a return address. The same print envelope command sent to our Apple LaserWriter NTR does what it's supposed to do. A call to the HP hotline revealed that there is a known "software conflict," but no immediate solution. HP says the 4ML is "built specifically for your Macintosh." Oh, well. I hope that HP can print the envelope to send me the fix.

J. F. Schweitzer
Albuquerque, New Mexico

More Data

YOUR REVIEWS WITH DETAILED comparisons between CPUs are enormously useful, but it would be more useful if you could include, in reviews of PowerBooks, speed and power statistics for at least one desktop Mac for comparison purposes. Some of us use PowerBooks as our main desktop computers, and such comparisons are currently impossible because of your method of calculating stats relative to earlier models within the PowerBook category. By the same token, perhaps a sample PowerBook should be included in desktop system comparisons.

Kirk Hollingsworth
New York, New York

The Unbearable Guy-ness of Being

I HAVE COME TO ENJOY THE LIGHT-hearted and inspirational writings of the Wise Guy. All the better for him, and

some of us, that he can enjoy the work he does. And too bad that some uptight people don't get it.

I would like to thank Guy for providing insight into the success of two people in a garage (*Wise Guy*, December 1993). Although I'm not a software developer, I appreciate the creativity of this Macintosh community and hope to have my own entrepreneurial success one day. Thanks for sharing.

Joe McDougall
Van Nuys, California

No More Index Cards

IN YOUR COLUMN ON WORD PROCESSORS (*Working Smart*, November 1993), I was surprised to see no mention of the feature that finally convinced me to switch from WordStar's zippy WriteNow to Microsoft Word: outlines. Outlines help you organize your writing, and maybe even your thinking. Before I had a computer, I used piles and piles of index cards in three colors, carefully arranged, with tiny words on all four corners—it was so tedious. You can't imagine how overjoyed I was to see Word's outliner make light work of even the most complicated documents.

Also, your method for removing extra carriage returns in downloaded text requires that you look at every carriage return, deciding whether it should be removed or not. Often, however, there are two returns between paragraphs and only one at the end of each line within the paragraph. Using Word, you can (1) search for `^p^p`, and replace it with `RETURN` or `XXXXX` or some other word that you know never appears in the document; (2) search for and replace `^p` with a space, yielding one huge, long paragraph; and (3) search for and replace your dummy `RETURN` with a `^p`.

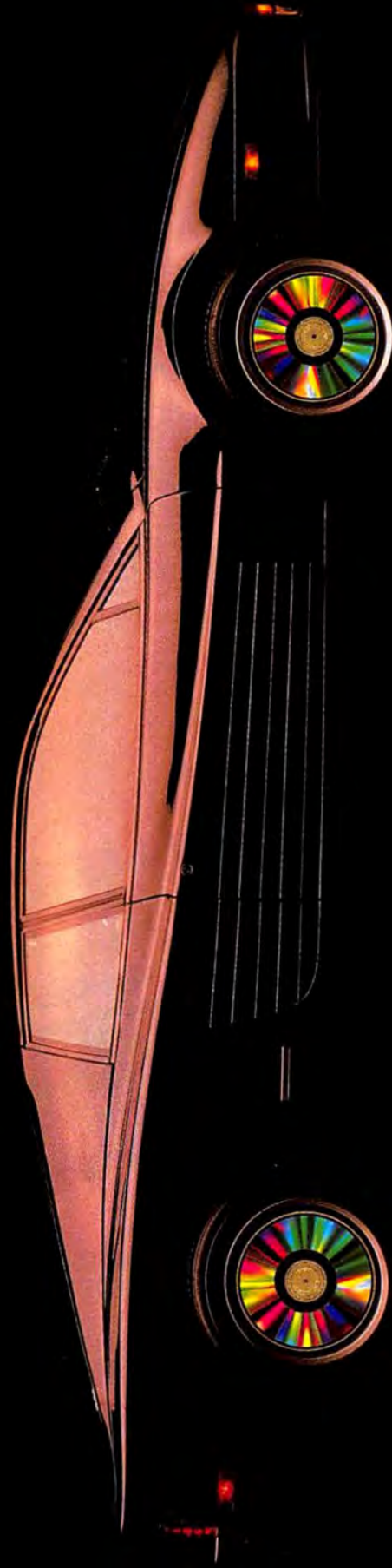
Amy Rothstein
Waltham, Massachusetts

Some of the editors around *Macworld* use this technique with `¶` (option-7) or `π` (option-P) instead of `RETURN`.—Ed. **m**

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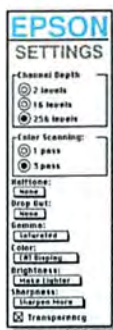


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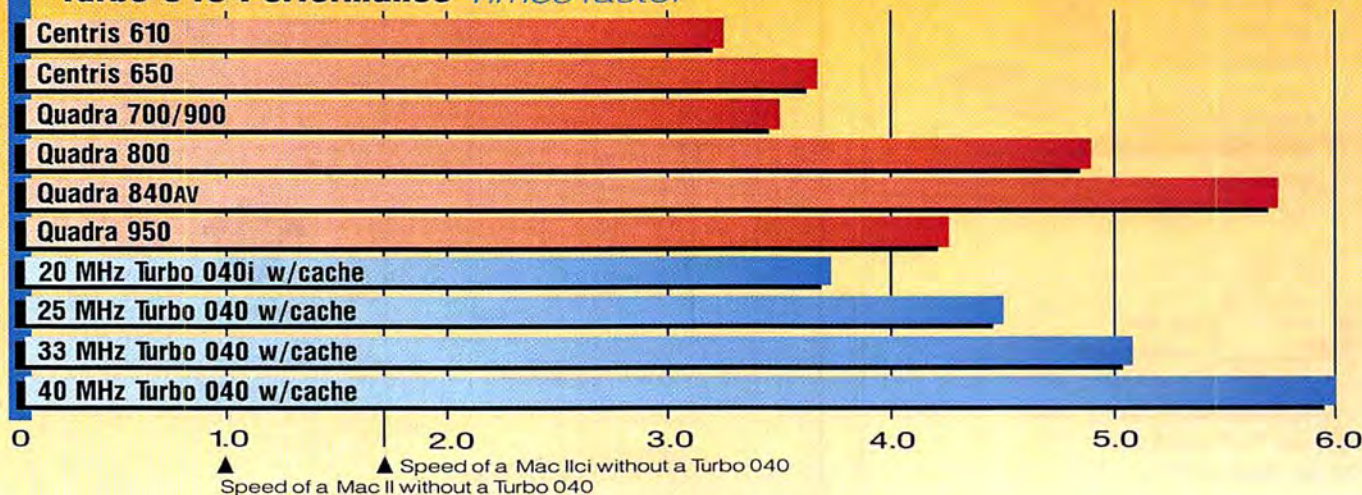
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MacBulletin

PowerPC Update Several companies detailed their PowerPC plans in January at the Macworld Vision '94: PowerPC conference and Macworld Expo.

- **Apple's Plans** AV capabilities will be optional in the PowerPC Macs, although the current AV Macs' speech-recognition technology will be part of all PowerPC Macs, said Apple vice president Randy Battat. Apple will not use the DSP chips found in current AV Macs, relying instead on the PowerPC 601's speed. Battat conceded that could mean a slight slowdown for some AV operations. Also, Apple said its PowerPC upgrade boards won't work with current AV Macs. Apple hopes to offer PowerPC upgrades for the 68040-based PowerBooks (expected later this year), Battat said.

- **Upgrades** DayStar Digital is working on upgrade boards for the Quadra 605, for which Apple has not announced an upgrade, and for most of the Mac II series. DayStar, 404/967-2077.

- **Low-Cost Upgrades** When the first PowerPC Macs are released, several vendors will offer upgrades for the cost of the disks and shipping charges (\$15 to \$35): WordPerfect's WordPerfect 3.0, Fractal Design's Fractal Design Painter X2, and Frame Technology's FrameMaker 4. WordPerfect, 801/225-5000; Fractal Design, 408/688-8800; Frame, 408/433-3311.

- **Windows Compatibility** Even before its first version of SoftWindows for PowerPC ships, Insignia Solutions is working on a new version that will run Windows applications that require Windows 386 Enhanced mode. The first version, due out when the first PowerPC Macs ship, supports only Windows Standard mode. And Apple plans to make versions of its 486SX-based PC-compatibility board for several Macs, including PowerPC Macs (see *News, Macworld*, February 1994). Insignia Solutions, 415/694-7600.

- **Native Software** More vendors have announced availability around the release of the PowerPC Macs: Gryphon Software will offer Morph 2.5. Diehl Graphsoft will ship MiniCAD 5. Novell will have Novell Directory Services for PowerPC Macs, the first step to full NetWare services and interoperability between Intel-based PCs and Macs. Neon Software will have two native PowerPC network-management programs: LANsurveyor and NetMinder Ethernet. Gryphon, 619/536-8815; Diehl Graphsoft, 410/290-5114; Novell, 801/429-7000; Neon Software, 510/283-9771.

- **PCI Adapter** Second Wave says it is working on a PCI-to-NuBus adapter that will let people plug existing NuBus cards into later-generation PowerPC Macs, which will use the new PCI bus. Apple plans to start using that bus in early 1995. The product would be a PCI card connecting to an external chassis that could hold multiple NuBus cards. Second Wave, 512/329-9283.

- **Hewlett-Packard Joins Taligent** Adding another stamp of approval to Apple and IBM's Taligent joint venture, Hewlett-Packard has bought a 15 percent stake in the company. HP said it will join Apple and IBM in using Taligent's upcoming object-oriented, platform-independent operating system, now in development.

- **SuperMac Lays Off Staff** Saying it was attempting to improve its competitive position by consolidating its worldwide product development and other operations, in late December SuperMac Technology laid off 15 percent of its work force, or about 75 full- and part-time workers.

- **Compaq to Stop Making Printers** Compaq Computer announced that in the first half of 1994 it will withdraw its printer line but will continue to offer tech support, service, and consumables for its existing Pagemarq printers. Compaq, 800/345-1518. **m**

News

EDITED BY TOM MORAN

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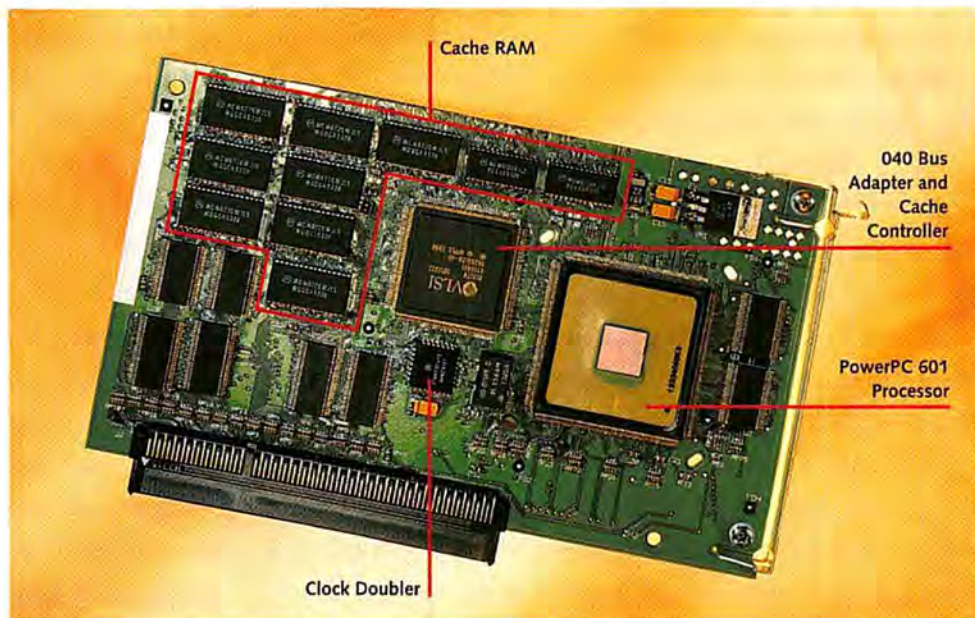
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Apple Unveils First PowerPC Product

As part of Apple's effort to maintain sales of existing Macs while raising confidence in the impending PowerPC line, the company announced a PowerPC processor upgrade board that will work in several current Mac models. Shown for the first time in January at *Macworld Expo* in San Francisco, the add-in board fits in the Mac's 040 Processor Direct Slot, contains a 66MHz PowerPC 601 chip, and can work in the Quadra 610, 650, 700, 800, 900, and 950, as well as the Centris 610 and 650. Of those machines, only the Quadra 800, Centris 610, and Centris 650 are currently publicly scheduled by Apple for a logic-board upgrade. Apple said it expects the board to list for less than \$700.

Apple had previously announced that it would offer logic-board upgrades for the Mac IIvx and IIvi; Performa 600; Quadra 610, 650, 660AV, 800, and 840AV; and Centris 610, 650, and 660AV. Currently no logic-board upgrade for the Quadra 605, 700, 900, and 950 has been announced.

By introducing the board now, Apple seeks to assure buyers of those 680X0-based



Apple announced its first PowerPC hardware product, an upgrade board that contains a PowerPC 601 microprocessor and can work inside a wide range of 68040-based Macintoshes.

Macs that they won't be left out of Apple's PowerPC future. The upgrade should also help Apple convince developers that there will be plenty of PowerPC Macs to justify converting applications to native PowerPC code, or developing new native applications.

The performance of a Mac with the Apple board

installed will be roughly two to four times better than without, when running native PowerPC software, Apple said. The board will let the user boot up from either the PowerPC chip or the 68040 on the motherboard, to take advantage of existing applications if they run better on the 040. However, Apple said it expects almost all current Mac

applications to run at a reasonable speed in emulation mode under System 7.1.2 on the PowerPC 601 board. You have to reboot to change processors, and you can't use both processors at once, because both use the same DRAM on the motherboard.

The upgrade board will use a method called clock-doubling, which means the

Apple's Online Mall

EWORLD ASCENDS

At Macworld Expo in January, Apple announced eWorld, an online service designed as an electronic mall where users can access Apple technical support and purchase products and services from third parties. Planned for release in April, eWorld will link Newton, Internet, and AppleLink users. Apple will bundle eWorld on the hard drives of select Macs at first, and eventually on every Mac.

eWorld presents images of nine buildings resembling a village. The mall includes computer, business, community, and E-mail centers, and areas for entertainment and information. eWorld will also provide Macintosh technical support.

eWorld will replace Apple's AppleLink service by the end of 1994. The AppleLink phaseout will be gradual because the current eWorld software doesn't provide the security and privacy for BBSs that AppleLink offers.

Apple will offer partnership opportunities for vendors and organizations on eWorld, letting groups sell products, provide customer service, and set up private areas. Apple hopes to have at least 100 information providers (IPs) at *continues*



Apple's eWorld online service uses the visual metaphor of a village to guide users through its various offerings.

601 processor will run at twice the bus rate of the motherboard in the Mac it's installed in. Depending on the Mac model, the 601 will run at somewhere from 40MHz to 66MHz. Clock-doubling enables the board to work with a wider range of 040 Macs, while using the RAM on the motherboard makes the board's price affordable for a wider range of users, according to Apple. However, when the Apple upgrade board is accessing data or instructions in the motherboard's RAM, that information must go over the Mac's bus and undergo a bus translation, an operation that's slower than accessing RAM right on the same board. To help speed things up, Apple has placed 1MB of L2 cache SRAM on the PowerPC processor upgrade, which the company said should make up for a lot of the time that may be lost in bus translation. The Apple board has no serial port or other interface: it uses all the interfaces that come with the Macintosh, according to Apple.

A different approach is taken by DayStar Digital in its more powerful and more expensive PowerPC accelerator board (as yet unnamed). The DayStar board uses the same new PowerPC Macintosh ROMs as the Apple board (licensed from Apple). Instead of doing clock-doubling, DayStar is using an asynchronous approach; the processor runs at its own speed regardless of the speed of the Mac it's installed in. That means DayStar can offer versions that run at 60MHz, 66MHz, and 80MHz, the last being the clock rate of the fastest 601 chip widely available. (At Comdex/Fall 1993, IBM showed a hand-picked 601 processor running at 95MHz.) In contrast to the Apple board, the DayStar device will have SIMM slots for up to 128MB of 72-pin, 60ns RAM that will map contiguously to the RAM on the Mac's motherboard, so the add-in board can use the RAM in both locations. The board will ship for

less than \$1500 (with no RAM) at the same time as the introduction of the PowerPC Macintoshes, according to DayStar. The DayStar processor upgrade board can upgrade the Quadra 650, 700, 800, 900, 950, and Centris 650. Versions of the DayStar processor upgrade for all color Macs should ship sometime this year, DayStar said.

DayStar also said that its higher-end board will be better suited to the people most likely to want PowerPC upgrades immediately: users of power-hungry applications such as Adobe Photoshop. A DayStar representative said that Photoshop is a cache-buster, meaning it pushes very large image files through the cache, sometimes leaving little room for the instructions the cache is intended for. At press time, an Apple representative said that Apple had not specifically tested Photoshop with the Apple upgrade board, but that the 601 cache works differently than the caches operating inside 040 Macintoshes.

Apple said it will ship its upgrade board at the introduction of the PowerPC Macintoshes, which is still publicly projected to happen in the first half of 1994. The company said it plans to have more PowerPC add-in boards in stock at introduction than it has had at past introductions of logic-board upgrades. DayStar is also working on an unnamed application-specific PowerPC coprocessor board, the first in its nPower architecture, which will be designed to support multiple processors. DayStar will provide filters and functions within Photoshop, and expected to announce other applications (which must be altered to work with nPower). The nPower product will not have Apple ROMs. —T.M.

RasterOps' High-End Video Bundle

RasterOps' MoviePak2 Pro Suite is a \$4999 digital video-editing solution. It includes the 24XLTV 24-bit color display adapter and graphics accelerator; the MoviePak2 60-fields-per-second JPEG video compression card; the Video Expander II, for output to videotape; Adobe Premiere 3.0, with Export-to-Video plug-in and Abbate's VTK Pro external device control plug-in; Alsoft DiskExpress II v2.2; and MediaGrabber 2.5 digitizing software. RasterOps, 408/562-4200.

Tempo Expands AppleScript Support

Affinity Microsystems' macro recorder, Tempo II Plus version 3.09, adds a script runner that can read and change variables in AppleScript scripts. Version 3.09 does floating-point calculations on variables; retrieves and dials phone numbers from any application; and adds new macros, including a Photoshop batch processing macro. Tempo II Plus lists for \$179.95. 303/442-4840.

FWB RAID Software

FWB's RAID ToolKit family of software can stripe or mirror data (RAID Levels 0 and 1) to partitions on any two like drives, as well as logically link multiple partitions so that they appear as a single volume. The Mac OS version of the ToolKit software is available for \$799; the A/UX version costs \$999. 415/474-8055.

Hard Disk ToolKit Competitive Upgrades

A non-Apple SCSI disk-formatting utility gets you \$100 off FWB's Hard Disk ToolKit. Trading in your software gets you the ToolKit for \$99. FWB is accepting PLI QuickSCSI and MicroNet NuPort cards in exchange for a \$499 price on the Fast and Wide SCSI-2 Jack-Hammer NuBus card, regularly \$799. 415/474-8055.

launch, though the company declined to name specific organizations. Eventually, Apple hopes to let IPs provide data through remote servers.

The pricing for eWorld compares to that of other online services, and will be significantly cheaper than AppleLink. Monthly charges will be \$8.95, including two hours of nonprime usage. Hourly charges for nonprime usage (from 6 a.m. to 6 p.m.) are \$4.95; add \$2.95-per-hour for prime time; 9600-bps access will not cost extra, though premium areas such as travel services will.

eWorld will have an Internet mail gateway at start-up, and Apple expects to offer full Internet access later. NewtonMail will be supported immediately, and AOCE will come later. Apple Computer, 408/996-1010.

—JOANNA PEARLSTEIN

Price of PostScript Plummet

LOW-COST LASERS

For those who'd like a PostScript Level 2 laser printer for a home office or small business, the news just keeps getting better. NEC has announced its Silentwriter Model 640, a 6-pages-per-minute, PostScript Level 2



The Apple Personal LaserWriter 320 (left) and the NEC Silentwriter Model 640 represent the new breed of inexpensive PostScript Level 2 laser printers.

printer for a street price of \$800; and Digital Equipment Corporation (DEC) recently sharply cut the price of its existing 4-ppm DEClaser 1152, which now lists for \$699. Not to be outdone, Apple expected to ship in January its Personal LaserWriter 320, a 300-dpi, RISC-based, 4-ppm PostScript Level 2 printer with a suggested price of \$959.

The 320 replaces the LaserWriter NTR and LaserWriter Select 310 printers. It has 39 TrueType fonts, a TrueType rasterizer, LocalTalk, a 100-sheet cassette for multiple page sizes, and FinePrint for sharper text and graphics.

The LaserWriter 320 has no power switch. Instead, it remains in sleep mode until it receives a print job (Apple claims it wakes up instantaneously). In sleep mode, the 320 uses about 10 watts of

power; in print mode, about 150w—meeting the EPA Energy Star specifications for low energy consumption.

The LaserWriter 320 ships with 2MB of memory, upgradable to 4MB or 8MB using Apple's proprietary 2MB (\$150) and 6MB (\$350) RAM cards. When upgraded to 8MB, the 320 supports Apple's PhotoGrade grayscale image-output-enhancement technology.

NEC's 6-ppm Silentwriter Model 640 comes with an AppleTalk interface, 17 resident Adobe Type 1 fonts, and 35 downloadable TrueType fonts, as well as resident Type 1 and TrueType rasterizers. The 300-dpi printer includes 3MB of RAM and uses NEC's proprietary Sharp Edge Technology. A 68000 processor embedded into a custom chip serves as the 640's controller.

The 640 also adheres to

the EPA Energy Star specifications; after 15 minutes the 640 goes into stand-by mode, using less than 20w. The Silentwriter Model 640 was scheduled to ship in January.

The DEClaser 1152 (see *Reviews, Macworld*, May 1993), includes AppleTalk, serial, and parallel ports; PostScript Level 2; an emulation of HP PCL; 17 resident fonts; and 2MB of RAM expandable to 4MB. The printer's ports are all active, and it can sense whether a file is PCL or PostScript and switch languages.

Apple Computer, 408/996-1010; DEC, 508/493-5111; NEC, 508/264-8000.

—JAMES A. MARTIN AND DAN MUSE

Timesaving Tools from Atticus

UTILITIES FOR POWERBOOK AND DESKTOP

Two time-savers from Atticus Software can speed file searches and make using a RAM disk practical. Atticus Vista makes a copy of each directory found on your disk, CD-ROMs, or any user-specified volume, and places the copies in an ordinary folder on your desktop. When you want to find a file, you just use the directory folder, instead of shuffling through piles of flop-



Apple Personal LaserWriter 320 Comparison

Best result for each test.

Times are in seconds. Shorter bars are better. Products are listed in decreasing order of overall performance.

	Multiple Fonts	Courier	TrueType	MacDraw Pro	FreeHand 3.1	PageMaker 4.2a
Texas Instruments microLaser Turbo	156	168	87	176	424	92
Apple Personal LaserWriter 320 ¹	177	330	80	203	779	129
Apple Personal LaserWriter 320 ²	185	331	82	238	789	171
Apple LaserWriter NTR	286	319	118	214	546	188
GCC Technologies BLP Elite	396	306	220	301	1339	184
DEC DEClaser 1152	485	338	202	406	1264	258
Apple LaserWriter 310 ³	360	266	210	343	1513	1679

All printers were tested using a Mac IIci with a cache card installed, 8MB of RAM, and an internal Quantum 80MB drive.

¹ FinePrint and PhotoGrade off. ² FinePrint and PhotoGrade on. ³ With PageMaker 4.2 instead of 4.2a, LaserWriter 310 completed the PageMaker test in 384 seconds (which would place it second to last in the overall ranking).

Fast Talkers

V.FAST CLASS MODEMS ANTICIPATE V.34

Can't wait until summer for the V.34 (V.Fast) modem standard? Some companies have announced V.Fast Class modems, based on an interim Rockwell chip set, that send and receive data at 28.8 Kbps.

Supra plans to ship the SupraFaxModem V.FC in the same case as the current V.32bis model at an estimated street price of \$399. Practical Peripherals' entries include its PM288PKT pocket fax modem and the PM288-LCD external fax modem, which features a three-line LCD display for status messages. Multitech has announced the Multimodem II at \$899, including simultaneous voice technology. If you have a Multimodem at both ends of a connection, you can talk to the receiving party

while your data transmits. Multitech promises a free upgrade to the final V.34 standard. Zoom Telephonics plans a 24-Kbps fax modem, retailing at \$269; the full-blown 28.8-Kbps version will cost about \$349. All these fax modems will comply with V.42, V.42bis, V.32, and V.32bis on the data side, and with V.17 and Group III for faxes.

What happens to V.FC when V.34 becomes real? With the exception of Multitech, most contacted companies either indicated that they will not have an upgrade path or they refused to commit to a time frame or cost for an upgrade. This is disappointing but understandable, given that there are still several months to go before the V.34 should be final. Another thing to note is that 68020-based Macs and older models can lose data at speeds over 19.2 Kbps. Multitech, 612/785-3500; Practical Peripherals, 805/497-4774; Supra, 503/967-2400; Zoom Telephonics, 617/423-1072.

—CAMERON CROTTY



The SupraFaxModem V.FC (left) and the Practical Peripherals PM288LCD.

pies. Once you find the desired file, you can just double-click on it, and your Mac will prompt you for the appropriate disk. Vista can see inside files archived with StuffIt and Compact Pro (except self-extracting archives), will list each file individually, and allows you to launch individual files without disturbing the rest of the archive.

RAMDiskSaver is a combination control panel and

background application that automatically and regularly backs up your RAM disk to your hard disk. You can set when you want backups to occur, restore your RAM disk anytime, and even make the RAM disk your start-up volume for superfast computing. Atticus Vista and Atticus RAMDiskSaver are currently available for \$69.95 each. Atticus Software, 203/324-1142.

—CAMERON CROTTY

Drives on the Run

REMOVABLE HARD DRIVES

The latest additions to Mega Drive Systems' Mercury line of removable hard drives are 1.6GB and 2.1GB large, sport Fast SCSI-2 interfaces and 1MB internal caches, and can deliver sustained data-transfer rates of up to 10 Mbps. Users can expect average seek times as low as 5ms. The two drives list for \$3039 and \$3839 respectively and are currently available. A Mega Drive Mercury bay or MR/RAID disk array is required. Mega Drive Systems, 310/247-0006.

—CAMERON CROTTY



Mega Drive's Mercury 2.1GB removable hard drive plugs into a custom enclosure.

Will FireWire Replace SCSI?

HIGH-SPEED DATA TRANSFER

Apple, Texas Instruments, and other key industry players are nearing a final version of FireWire, a very-high-speed serial data bus that could replace serial ports, ADB, and SCSI in future Macintoshes, other personal computers, peripherals, and consumer devices. FireWire will be fast enough for simultaneous real-time transfer of multiple large QuickTime files, for instance, yet its cables and connectors will cost less than current

continues

In Brief

Lapis Cuts Prices

Lapis has cut prices by up to 28 percent across the board. Prices on the ProColorServer line of graphics cards are now \$50 to \$200 lower, and the company's gray-scale displays are now \$80 to \$150 lower. Lapis also cut the list price on its DisplayServer Cards by \$100, to \$249. 510/748-1600

QMS Eases Printer Upgrades

The 1725 SLS 17-ppm, 600-by-600-dpi (true-resolution) network laser printer stores its operating code on a 40MB internal hard drive rather than in firmware. That means users download software upgrades over a network rather than swapping ROMs. Priced at \$5999, the printer has PostScript Level 2, PCL 5, and HP-GL/2; 12MB of RAM; and LocalTalk, serial, and parallel ports. 205/633-4300.

CD-ROM Utilities

Casa Blanca Works is shipping DriveCD, a \$79.95 collection of CD-ROM utilities with drivers for several popular CD-ROM drives, a sound player control panel, and caching software that speeds data retrieval. The control panel supports Apple's SCSI Manager 4.3 and SCSI-2. Until March 1, 1994, Casa Blanca Works is offering a \$29.95 competitive upgrade for owners of any CD-ROM driver. 415/461-2227.

Now Compress Update

Now Software has updated Now Compress to version 1.0.1, fixing all known bugs, increasing the speed of the Inspector Window, and adding AV Mac compatibility. In addition, users can now decide whether they want to pass compressed or uncompressed files to a network backup program. The upgrade costs \$6 on disk from Now Software, or it's free on America Online, CompuServe, and GEnie. 503/274-2800.

THE AMCoEX INDEX OF USED MAC PRICES

Machine/RAM/Hard Drive	Average Sale Price	Monthly Change
PowerBook 100/4MB/40MB	\$700	-\$25
PowerBook 140/4MB/40MB	\$975	-\$25
PowerBook 180/4MB/80MB	\$1750	-\$50
PowerBook Duo 230/4MB/80MB	\$1250	\$0
Mac Classic/2MB/40MB	\$475	-\$25
Mac SE/30/2MB/40MB	\$700	-\$50
Mac LC II/4MB/40MB	\$550	-\$50
Mac IIsi/3MB/40MB	\$600	-\$50
Mac IIfx/4MB/80MB	\$900	-\$200
Mac IIfx/4MB/80MB	\$975	-\$325
Centris 650/8MB/230MB	\$1700	\$0
Quadra 900/8MB/160MB	\$2600	-\$250

Index provided by the American Computer Exchange of Atlanta, Georgia (800/786-0717). It reflects sales during week of December 20. Configurations include keyboard and exclude monitor and display board for noncompact models.

materials. In Apple's version of the IEEE's proposed P1394 Serial Bus Draft Standard, FireWire will initially support data transfers of 100 Mbps, with later, backward-compatible versions sending up to 400 Mbps. One reason for the higher speed is that the transfers are isochronous, which means that a device such as a hard drive might send a burst of data every 125 microseconds, with that time interval reserved by the FireWire chip set for that device until the transfer is done. That means multiple devices can send data apparently simultaneously without a lot of arbitration overhead.

FireWire eliminates the need to set device IDs à la SCSI, allows for connecting and disconnecting devices without shutting down, and supports many different connection configurations besides the daisy-chaining of SCSI. The new standard is meant to work with many different kinds of devices at once, possibly including consumer video products.

The IEEE P1394 standard is supported by Apple, IBM, TI, Maxtor, Western Digital, and

Adaptec. TI and NCR separately announced that they will make FireWire chip sets.

Apple demonstrated a near-final version of FireWire at Comdex in November, where an Apple representative said it was "a good guess" that FireWire might be included in the second generation of PowerPC Macintoshes.—T.M.

Desktop Color LCD Monitor

SHAPE OF THINGS TO COME

Now coming down the runway is CTX International's sleek thin-panel monitor. The LMT-5030 is a 9.4-inch, active matrix, color LCD screen for the desktop Macintosh in your life. It produces 4096 colors on a 640 by 480



CTX International's LMT-5030 flat-panel color display can fold up and hang on a wall.

screen and includes digital controls for horizontal and vertical position, tint, brightness, and contrast.

The display sits on an included desk stand, and you can wall-mount the complete package or detach the stand and mount the display alone. Currently available for \$3395 from CTX International at 909/595-6146.

—CAMERON CROTTY

RAID Stack

FAST, MODULAR STORAGE

Procom is shipping its Personal Array line of disk-array subsystems, which come with two Fast SCSI-2 drives in a single case (total capacity 480MB to 2.6GB) and a software extension that supports RAID Levels 0 and 1 for striping and mirroring, respectively.

With striping enabled, the arrays offer average seek times as low as 5ms and sustained data-transfer rates up to 10MB per second. The cases accommodate up to five additional SCSI modules, which snap onto the original Personal Array. Extra modules can be incorporated into the RAID system or can be operated as separate SCSI drives. All modules get their power from the Personal Array. A more advanced version of the array, the Personal RAID, will include a third drive; a NuBus SCSI-2 controller card; and software that supports RAID Levels 3, 4, and 5. Pricing for the Personal Array ranges from \$1595 to \$4995, and from \$3295 to \$8995 for the Personal RAID, depending on the original configuration. Both Personal Array lines are currently available. Procom Technology, 714/852-1000.

—CAMERON CROTTY

BUGS & TURKEYS



When using PageMaker 5.0's story editor, hitting the help key disables the toolbox and some other functions. Aldus recommends quitting and restarting to clear your CPU's cache. The company hopes to fix the problem in the next maintenance release.



Logitech MouseMan users have reported a conflict with Macs that require System 7.1. The MouseMan INIT is necessary to use the mouse, so users can't start up their machines with extensions turned off; and because of the INIT's size, users can't boot their machines with a floppy. Logitech plans to release a fix to the problems in January. The company said the problem resulted from changes in Apple's mouse protocols.



Every time America Online creates a new service, Macintosh users are billed for the time it takes to download related artwork—even if the user never accesses the new service. Windows users on AOL download the art only when they first choose to access the new area.



Symantec's ACT combines names into one field—Contact—whether the information is typed in or imported from separate fields, and one name field—Contact—is all you'll get if you export. For those who like first and last names in their exports, Symantec plans to add the capability to future versions.

Macworld will send you a Bug Report T-shirt if you are the first to inform us of a serious, reproducible bug that we report in this column, or a Turkey Shoot T-Shirt if we shoot your turkey in this space. See *How to Contact Macworld*.

With MacWrite Pro

you can do all the things you can do with competing programs, except for spending a whole lot of money. Yes, this happens to be a wordy headline, but then again, this program's so simple to use, it's

easy to get carried away. And when you get carried away, you tend to ramble on with complete disre-



Here it is in a nutshell: for merely half the price of most other programs, MacWrite® Pro 1.5 brings you all the features and capabilities you need in a word processing program. (In a smaller nutshell, it's "value.")

With text, tool and style palettes, the things you do most often are just a mouse click away. Create tables and integrate graphics with nary a sweat drop on your unfurrowed brow. Once you get up to speed (which shouldn't take too long, given the intuitive nature of this program)

you may want to try the new time-saving table of contents feature. Or set up multiple columns of varying widths. Or take advantage of the features of Apple® System 7 Pro. There's QuickTime™, AppleScript™ and PowerTalk™, which lets you send messages to others without even leaving the document you're working on.

We've got lots more to tell you, but we've run out of space. So call 1-800-544-8554, ext. 262 for more information.

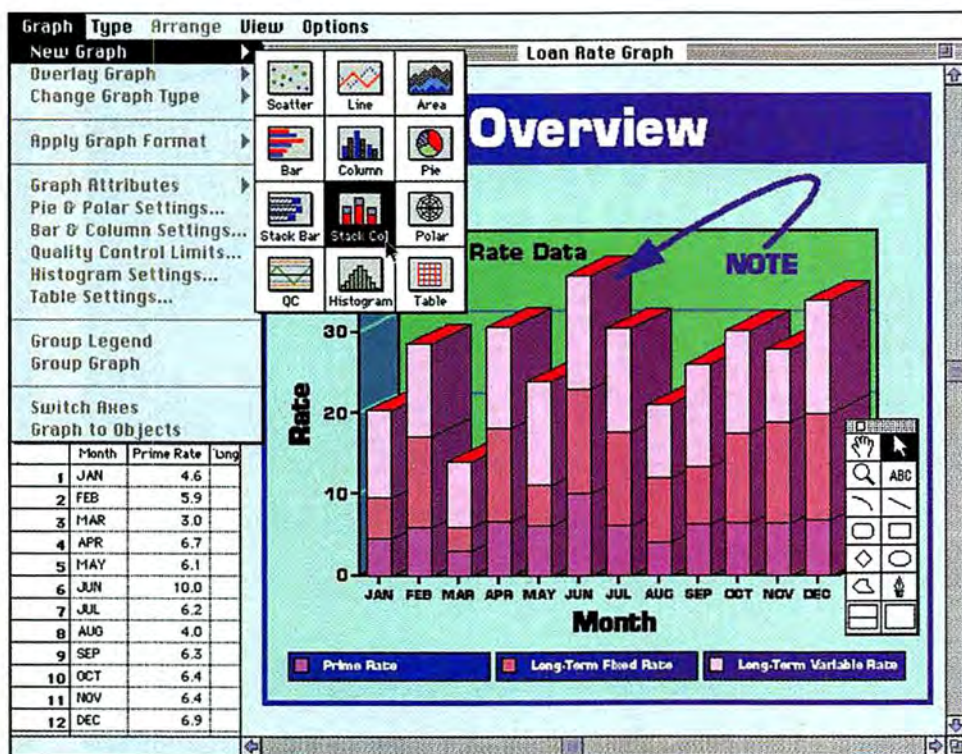


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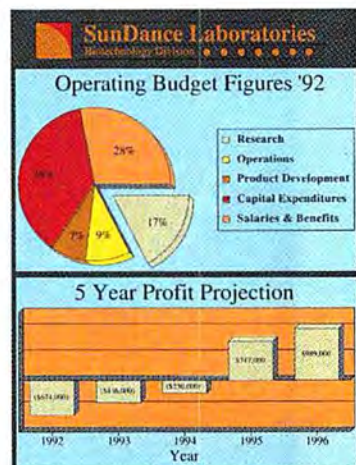
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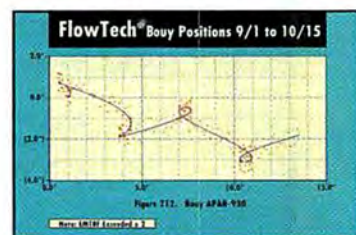
*\$99 price expires 5/31/94. Not valid with any other offer. †Add-on products include Correct Grammar,™ Dyno NotePad,™ and Micro Expressionist.™ ©1994 Claris Corporation. All rights reserved. Claris and MacWrite Pro are registered trademarks and the MacWrite Pro design and Simply powerful software are trademarks of Claris Corporation. Apple is a registered trademark and QuickTime, AppleScript, and PowerTalk are trademarks of Apple Computer, Inc. All other trademarks are the property of their respective owners.



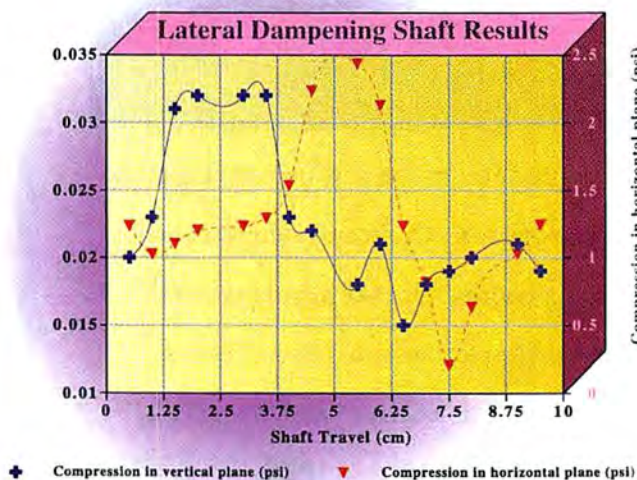
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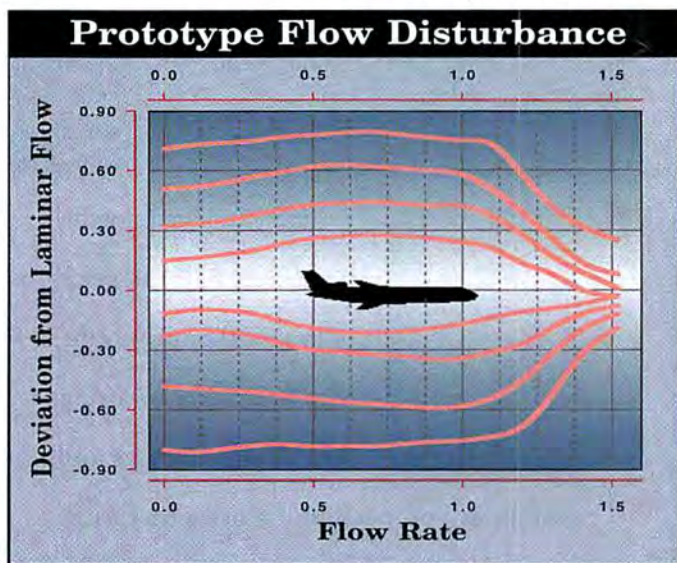
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You can plot unsorted data.

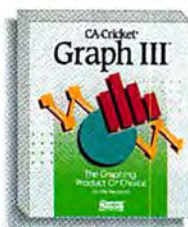


The software gives you high resolution, styled line choices like these.



It's easy to import graphics - simple or complicated - like you see here.

With Plots Like These, New CA-Cricket Graph III Is Sure To Be A Bestseller.



CA-Cricket® Graph III™ is back, and now it's better than ever.

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Circle 10 on reader service card

New Products

THE LATEST MACINTOSH RELEASES

by Cameron Crotty

THIS SECTION COVERS MACINTOSH PRODUCTS FORMALLY ANNOUNCED BUT NOT YET EVALUATED BY MACWORLD. UNLESS OTHERWISE STATED, THE MINIMUM REQUIREMENTS FOR OPERATION ARE A MAC PLUS, WITH 1MB OF RAM, RUNNING SYSTEM 6. ALL INFORMATION AND PERFORMANCE CLAIMS ARE SUPPLIED BY THE PRODUCT VENDOR AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY MACWORLD. ALL PRICES ARE SUGGESTED RETAIL. PLEASE CALL VENDORS FOR INFORMATION ON AVAILABILITY.

HARDWARE

APS HyperDAT

If you're worried about your data, get it on tape. This DDS-2 tape drive fits up to 10GB on a single, 120-meter DAT tape and features sustained data-transfer rates of up to 28MB per minute. The drive is available in both internal and external versions and ships with a 120m cartridge, a SCSI cable, and Dantz's Retrospect backup software. External \$1699; internal \$1649. APS Technologies, 816/373-5800, 800/235-2752; fax 816/478-6506.



APS HyperDAT

CD/Maxtet

More CD-ROMs than the mind can imagine. The CD/Maxtet starter unit contains seven CD-ROM drives, which, when connected to your network server with the company's driver/cache software installed, only take up one SCSI ID number. The drives sport average access times of 180ms with up to 330 KBps sustained data-transfer rates and are multisession Photo CD compatible. You can connect up to six units to a single host server, making a total of 42 CD-ROMs simultaneously available across your network. \$6595. Optical Access

International, 617/937-3910; fax 617/937-3950.

Color Fusion

Now LC, Color Classic, and Performa owners can run large color displays. This PDS card provides accelerated 24-bit color on monitors up to 16 inches (832 by 624 pixels), and 16-bit color on monitors up to 21 inches (1152 by 870 pixels). \$799. Xceed Technology, 313/727-4085, 800/923-3348; fax 313/727-3437.

FontPac

How much would you pay for a 120MB external SCSI hard drive? But wait, there's more. This hard drive comes with 240 Bitstream PostScript Type 1 fonts preinstalled and a SCSI cable. You just plug the FontPac into the SCSI port on your printer, install the screen fonts on your Macintosh, and you're ready to go. \$599. NewGen Systems Corp., 714/641-8600, 800/756-0556; fax 714/641-2800.



Genicom 7610

Genicom 7610

This 10-ppm, 600-by-600-dpi true-resolution laser printer is PostScript, HPGL, and PCL 5 compatible; ships with 83 memory-resident fonts and 2MB of RAM (expandable to 34MB); and handles paper sizes up to B5. It also includes autosensing and auto-emulation-switching parallel and serial interfaces, and it can be configured to run on Ethernet or LocalTalk via add-on cards. \$1599. Genicom Corp., 703/949-1000, 800/443-6426; fax 703/949-1392.

Impact RGB Color Classic

It's tiny, it's beautiful, it's got color, but it's just too darn slow. We're talking about the Color Classic, but the Impact line of cards provides both CPU acceleration (via a 32MHz 68030) and expanded video support (up to 24-bit color on 16-inch monitors with the RGB/21 product). All versions of the card are shipped



Impact RGB Color Classic

with 32K of cache memory and can optionally be equipped with an FPU. The line also supports the LC, LC II, and Performa 400. RGB/12 \$549; RGB/16 \$649; RGB/21 \$749; FPU \$70. Extreme Systems, 206/575-4223, 800/995-2334; fax 206/575-3928.

JetDirect EX

Take nearly any printer with a standard Centronics parallel port, add a JetDirect EX interface to it, and you've got a networkable printer that can be connected directly to a LocalTalk, Ethernet, or Token Ring network (individual versions for these networks are sold separately). All models support most popular network operating systems, including Apple EtherTalk, Novell NetWare 3.11 and 4.0, Microsoft LAN Manager, and Windows for Workgroups. The JetDirect EX is also manageable via SNMP. Ethernet \$499; Token Ring \$699. Hewlett-Packard, 208/323-2551, 800/752-0900; no fax.

LFR-X

Coming in at the middle of the company's LFR line of film recorders, this product can handle either 35mm film or Polaroid instant film, depending on the installed camera back (both backs are included). The product can record images at up to 4000-lines-per-inch resolution in 33-bit color—each 4000-lpi image takes about 90 seconds to record. The product can connect to the Macintosh via SCSI or AppleTalk. \$8495. Lasergraphics, 714/753-8282, 800/727-2655; fax 714/727-2653.

MacXtend I and II

This line of short-range modems allows Macs to communicate with compatible terminal servers, other computers, or serial devices equipped with a matching short-range modem. The Model 1007 MacXtend I provides connections at distances up to 17 miles over unconditioned twisted-pair wire. The Model 1017 MacXtend II connects devices up to 9 miles apart, while providing trans-

former isolation, protecting the connection and devices against ground potential differences and AC/DC over-voltages. Model 1007 (MacXTend I) \$70; Model 1017 (MacXTend II) \$95. Patton Electronics, 301/975-1000; fax 301/869-9293.

PageBlast Universal FMC

If you've got a color ink-jet printer and one of these boxes, you can send and receive plain-paper color faxes, with resolution limited only by the resolution of your printer. The unit includes a 14.4-Kbps fax modem and 4MB of RAM, and connects directly to the printer for unattended fax reception and spooling. The package ships with the company's UltraScript MacFax and Switchbox fax software, and connects to your Mac through the SCSI port for fast transfer of images. 2MB min. memory; requires Mac SE. \$995. PRDS, 510/226-8930, 800/334-1997; fax 510/226-8631.

Panther for Macintosh

This SCSI Quarter Inch Cartridge (QIC) tape-backup system comes in a range of capacities, from 250MB to 2GB, with sustained data-transfer rates of up to 18MB per minute. The package ships with Dantz's Retrospect Remote backup software, all necessary cables, and one data cartridge. 250MB \$1349; 525MB \$1495; 1.2GB \$1745; 2GB \$1895. Tandberg Data, 805/495-8384; fax 805/495-4186.



PLI DAT 10GB

PLI DAT 10GB

A tape drive like this one can leave you with something to remember your data by. The product is DDS-2 compatible and stores up to 10GB of data on a single 120-meter DAT tape, at sustained data-transfer rates of up to 732 Kbps. It ships with Dantz's Retrospect Remote and is also compatible with DDS, DDS-DC, and DDS2-DC. Internal model requires mounting kit, which is sold separately. External \$2131; internal \$1744; mounting kit \$50. PLI, 510/657-2211, 800/288-8754; fax 510/683-9713. *continues*

ProColorServer 24 and 24x

Graphics cards designed to fit LC-style PDS slots. The ProColorServer 24 provides 24-bit color on monitors up to 16 inches, and 8-bit color on monitors up to 21 inches; the ProColorServer 24x bumps you up to 16-bit color on monitors up to 21 inches. 24 \$449, 24x \$499. Lapis, 510/748-1600, 800/435-2747; fax 510/748-1645.

SelectPress 1200

At 1200-by-1200-dpi true resolution, this PostScript Level 2 laser printer handles paper sizes up to 12 by 19 inches with full bleed, or tabloid-size pages with registration and crop marks. The printer is PCL 5 and HPGL2 compatible and comes standard with simultaneously active serial, parallel, LocalTalk, and Ethernet ports. It also comes equipped with a 160MB internal hard drive (with 135 preinstalled PostScript fonts), 24MB of RAM (expandable to 40MB), and a SCSI port for connecting additional drives. \$7499. GCC Technologies, 617/275-5800, 800/422-7777; fax 617/275-1115.

Simply TV

Regular computer monitors are still relatively expensive, but for a cheap display, it's hard to beat a TV. The Simply TV card plugs into the LC PDS slot on machines like the Quadra 605, LC 475, Performa 460 and 470 series, Performa 550, and the Color Classic. It sends your Mac's video out through either a composite RCA jack or an S-Video port. The card supports 640 by 480 NTSC (PAL avail-

able) and features digitally locked color, which prevents colors from fading into each other during sharp transitions. \$439. E-Machines, 408/541-6100, 800/344-7274; fax 408/541-5770.

Smart Label Printer Pro

Laser printers and ink-jets are great, but have you ever tried to feed one itty-bitty label into that office behemoth? This small thermal printer inks labels, and nothing but labels, in as little as six seconds. An integrated software package, available as a desk accessory, includes text-manipulation and printing tools. An autopaste feature lets users print selected text directly to a label without leaving an application. \$299.95. Seiko Instruments USA, 408/922-5800, 800/888-0817; fax 408/922-5835.

SOFTWARE

Axis, The Gamecheater

We know. You're tearing your hair out over all those games you got for Christmas. Admit it: you're weak, and you need help. This control panel gives you extra health, lives, strokes, or whatever (everything except self-respect), while you're playing games like Prince of Persia, Lemmings, Hellcats Over the Pacific, and Spectre. \$59.95. Baseline Publishing, 901/682-9676, 800/926-9677; fax 901/682-9691.

Binuscan

Even big, bad graphics professionals need help now and then. This Adobe

Photoshop plug-in interprets scanned images and automatically sets highlight and shadow points; balances the color; adjusts the hue, saturation, contrast, and brightness; and corrects for your output device. The software features a batch processing mode, as well as optional manual control over input corrections, noise suppression, color-cast removal, unsharp masking, and output corrections. 8MB min. memory; requires Mac II, 24-bit color, Photoshop 2.01. \$3995. Monaco Systems, 508/749-9944; fax 508/749-9977.

Business Blueprint

Planning is one key difference between being a small-business success and a small-business statistic. This set of Microsoft Excel spreadsheets helps users create business plans for periods of up to three years, complete with employee data, projected financials, and historical financials. Linked informational charts illustrate cash flow, profitability, revenue by product, and cash status. Users can also create their own charts. Requires Excel 4.0. \$149. Spreadware, 619/347-2365; fax 619/347-6045.

CD-Q

Any application that can support Adobe Photoshop-style plug-ins can acquire Photo CD images with this software. The product will perform cropping, unsharp masking, gray-component replacement, black-level adjustment, and color correction in RGB, HSV, or CMYK color spaces. You can also create CMYK separations on the fly as you acquire

an image. \$145. Human Software, 408/741-5101; fax 408/741-5102.

CheckPost

Ninety percent of work philosophy could be summed up by the following statement, "Get it right the first time." This software takes PostScript document files and imitates imagesetter output on your laser printer, alerting you to any problems that may be encountered during the download. The printout also lists the document's fonts so you can make sure that they're available before going to the imagesetter. The software imitates Agfa, Linotronic, Monotype, and Varityper imagesetters and can be set up to imitate others. \$249.95. Working Software, 408/423-5696, 800/229-9675; fax 408/423-5699.

ColorDesign

Given a set of basic colors, patterns, and shapes, this software creates random graphic images at the click of a mouse. You can control symmetry, layering, and blending of objects; and you can overlay textures onto the finished work. Graphics can be saved as PICTs and imported into other programs. 4MB min. memory; requires Mac II, color, 13-inch monitor. \$79.95. Momentum Software, 703/953-1973; no fax.

Creative Whack Pack

Helping you delve into new creative strategies, each card in this 64-card electronic deck contains ideas and strategies for fostering new ideas, figuring out

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ways to uncover new information, and evaluating and implementing ideas. Each card consists of a picture that illustrates the strategy, an expository anecdote, and a set of questions that, when answered, help the user apply the strategy to a specific problem. \$49.95. Creative Think, 415/321-6775; fax 415/321-0609.

CrissCross'em

Stand aside, *New York Times*. This software creates puzzles from its included word lists, or lists that you type in your favorite word processor. Then, you get to solve the puzzles in the same program. Click on a clue and the corresponding board position will light up. Plus, a peek feature lets you get instant hints—forgive us, Eugene Maleska. \$29.95. Synaptic Software, 415/381-2545; no fax.

Distant Suns

Tool around the Solar System with this astronomy software. The package renders 3-D visions of planets, and includes QuickTime movies of space-exploration highlights. You can calculate ephemerides, lunar phases, planet positions, and star charts, as well as set your viewpoint anywhere within the bounds of the Solar System. A CD-ROM version adds the Hubble Guide Star Catalog, the NASA SkyMap Catalog, and 1500 color and black-and-white still photos, plus it plays original music for each planet. 2MB min. memory. \$99.95; CD-ROM \$149.95. Virtual Reality Laboratories, 805/545-8515, 800/829-8754; fax 805/781-2259.

DoDot

Grab anything you can see with this screen-capture and graphics-conversion software. Users can capture rectangular areas, windows, dialog boxes, pull-down menus, and arbitrary shapes. Keyboard shortcuts are available, plus a timer option. Images in 1-bit to 24-bit color can be saved automatically or manually in several formats. The program also converts between TIFF, DCX, PCX, JPEG, BMP, and other bitmap file formats. 4MB min. memory. \$69.95. Halcyon Software, 408/378-9898; no fax.

Egyptian Hieroglyphics

Now you can write like the pharaohs of old with this set of TrueType picture fonts depicting ancient Egyptian phonogram and ideograph hieroglyphics. The package ships with keyboard layout diagrams, character maps, and a pronunciation guide. Type 1 versions available on request. \$49.95. Deniart Systems, 416/941-0919; fax 416/941-0919.



Egyptian Hieroglyphics

The Even More Incredible Machine

So you've got this cat, and you need to get the cat to the other side of a chasm, but all you have is a teeter-totter, a bowling ball, and a conveyor belt. If you can solve this problem, you will probably do well with this puzzle game. Players must piece together Rube Goldberg-style contraptions whose final movements achieve a stated goal. 2MB min. memory. \$49.95. Dynamix, 503/343-0772, 800/326-6654; fax 503/344-1754.



The Even More Incredible Machine

FotoMagic

A set of eight filters for producing photographic effects. They include ColorExpander, which controls the gamut (number of colors) of an image; ColorFilters, to selectively brighten or darken a color or color range; ColorNoise, for randomizing colors; ColorRanger, which divides an image into colorized ranges to produce multichromatic effects; and ColorReversal, which converts negative film into a positive image with highlight, shadow, and exposure control. Requires Photoshop 2.0. \$195. Ring of Fire, 408/992-0400; no fax.

IntelliHance

This family of filters lets users enhance scanned and Photo CD images by adjusting contrast, sharpness, brightness, and saturation. The base product includes tools for despeckling (noise removal). The professional version supports cast removal, color correction, and prevention of shadow plugging and highlight loss; the pro version can also compensate for dot gain and other advanced printing parameters. Requires Photoshop 2.0, System 7. IntelliHance: gray-scale \$69.95; RGB \$99.95; CMYK \$149.95. IntelliHance-Pro: gray-scale \$395.95; RGB \$495.95; CMYK \$695.95. DPA Software, 214/517-6876; fax 214/517-2354.

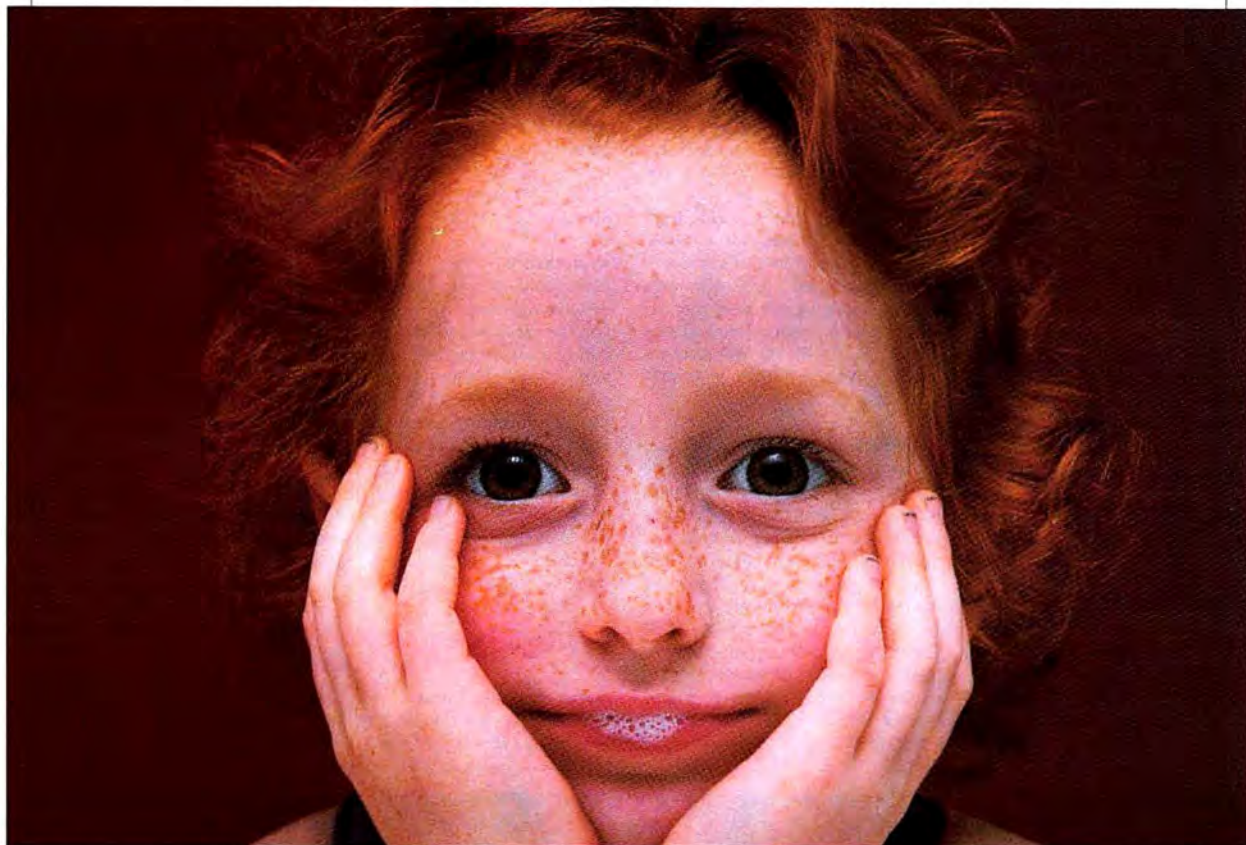
macBible

For study or reference, this line of Bible software lets users read and search ten different translations and supplementary works (all sold separately). The latest version features linked parallel translations for side-by-side comparative studies, a concordance view, complete font control, and a text window for taking notes. Available modules include the King James Version, the New Revised Standard Version with Apocrypha, the Greek New Testament, and the Hebrew Old Testament. Each module can stand alone or be linked with other modules. 2MB min. memory. \$129.99 per module. Zondervan Electronic Publishing, 616/698-6900, 800/727-7759; fax 616/698-3439.

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New Products

MacPrompter

Bill Clinton may be able to ad-lib complex speeches to important people, but then, he's the president. You, on the other hand, could probably use software that turns your Mac into a TelePrompter. This package scrolls text at variable speeds, is controllable from the keyboard or mouse, and supports TrueType fonts with plenty of text-formatting options. You can use standard text files, and for last-minute changes, there's QuickEdit. Requires 68040 or accelerated 68030 Mac. \$395. Grozik Associates, 414/355-4460; fax 414/ 355-4460.

Object Master for Think C and C++

This programming environment works with the Think Project Manager. Software developers get tools to aid them in object-oriented code development, such as a Class Tree window. Users can expand and collapse the class tree, color-code classes, and open and print multiple windows showing different components of the tree. The product also includes a full-featured source-code edi-



Object Master for Think C and C++

tor that can check syntax without compiling; can automatically mark functions, methods, and classes; and allows custom styles for different code elements. 2MB min. memory; requires Think C, Symantec C++, or Metrowerks C compiler. \$255. ACI US, 408/252-4444; fax 408/252-0831.

SimCity 2000

There's nothing like the taste of power to get your blood moving. Of course, it's tough to crush the citizenry beneath your booted heel when it'll up and leave if the quality of life dips too low. This is SimCity as you've always known it, plus subways, tunnels, water systems, highways, schools, libraries, and hospitals. You've got greater control over the budget, and you'll need it to keep competing interests happy and keep your city afloat. 4MB min. memory; requires 8-bit color, Mac II, System 7.0. \$69.95. Maxis Software, 510/254-9700, 800/336-2947; fax 510/253-3736.

Synchronize 3.0

Synchronicity. To The Police it was a hit tune that meant a pile of money, but to you it means having the right versions of your files on both your desktop Mac and the one you lug around. The latest version of this file-synchronization utility automatically connects to server drives over networks or with Apple Remote Access, maintains an activity log, optionally resolves aliases, synchronizes deleted files, and can include or exclude selected folders. \$29.95. Qdea, 612/779-0955, 800/933-9558; no fax.

Take a Break Crosswords, Volumes 1 & 2

Dashing through the crossword puzzle is great, until you get stuck and have to wait until tomorrow's newspaper to get a hint. This software adds new options to the old word game; for instance, players can find out immediately if an answer is right or wrong. Your Macintosh will automatically keep score, and you can increase the challenge by adding a time limit. Three difficulty levels and over 750 puzzles will keep certain pencil-pushers busy for a long, long time. Hmm. Three letters—maybe an eon? \$49.95 each volume. Dynamix, 503/343-0772, 800/326-6654; fax 503/344-1754.

UnderWare

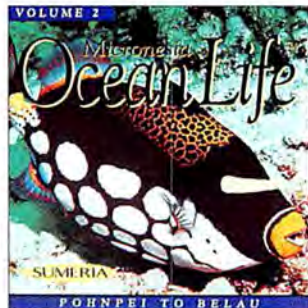
More goofy stuff to do with your Mac— isn't that why the darn thing was invented? This software package does typical duty as a screen saver and desktop-pattern installer, but it also runs its animated modules (or After Dark-compatible modules) underneath your windows and icons. A system-activity monitor checks for background activities such as network access or print jobs, so the software doesn't interfere with your work. 4MB min. memory; requires Mac II, System 7. \$59.95. Bit Jugglers, 415/968-3908; fax 415/968-5358.

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OceanLife 2: Micronesia

OceanLife 2: Micronesia

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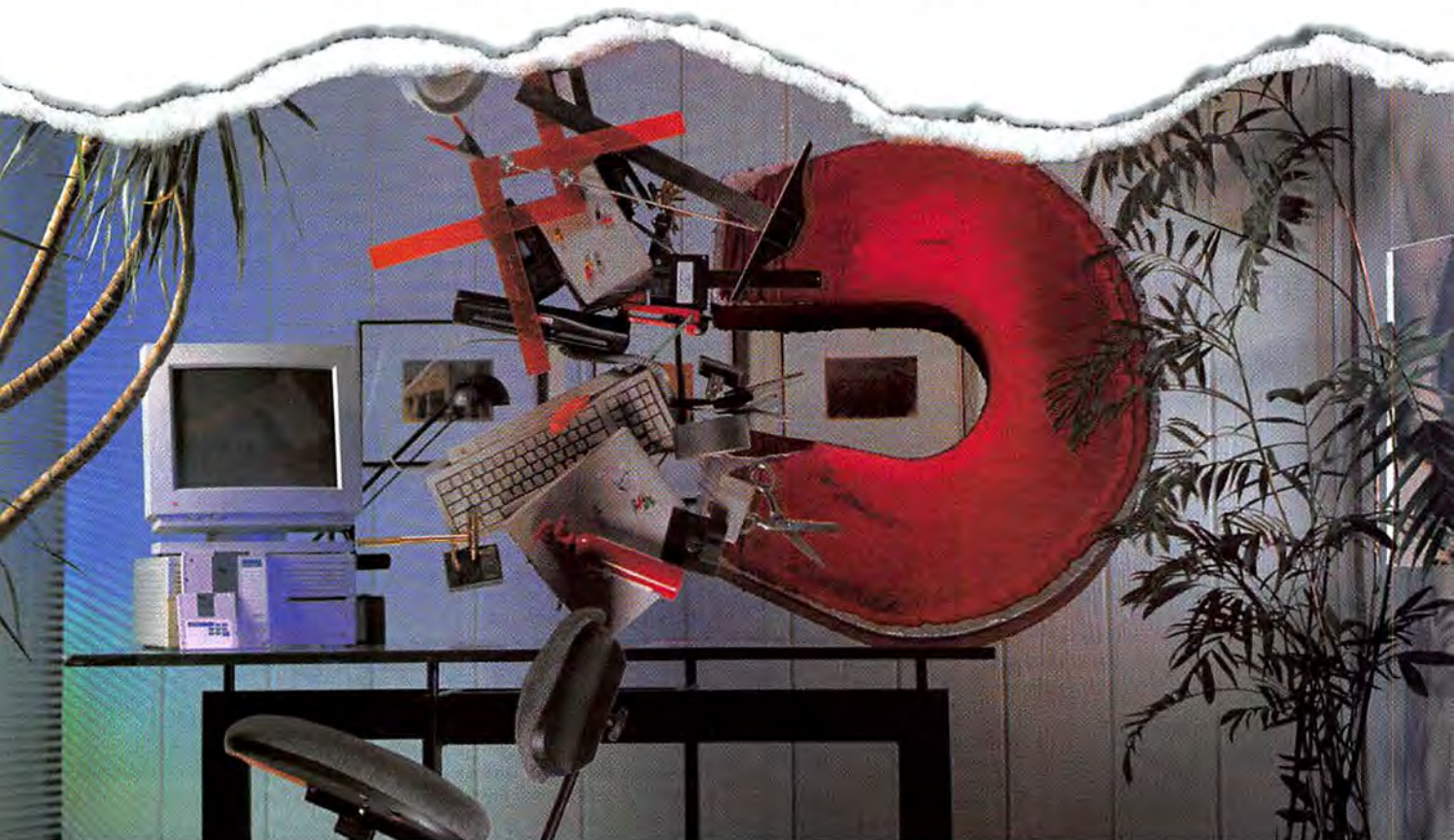
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mis•hap

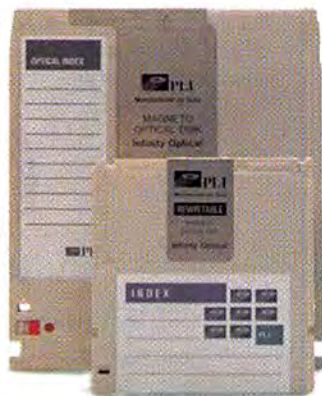
\mis-hap\ *n* **1**: an unfortunate accident resulting in data loss and media failure



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1-800-436-8000



1-800-255-6227

Circle 36 on reader service card

New Products

ACCESSORIES

Disc-Saver Restorer

Don't jump off the bridge just because your favorite CD-ROM has a scratch in it. Just rub a few drops of this stuff into the surface, let it dry, wipe it off, and according to the manufacturer, your disc will be as good as new. It may take a few applications to repair badly damaged discs. \$14.95. Pleasant Associates CD Corp., 603/429-1412; fax 603/429-1457.

ProPresenter Plus

This package consists of a receiver unit, which plugs into your Macintosh's ADB port, and a 21-button remote control. If all you want to do is move forward and backward through a slide show in most major presentation packages, you need no additional software. With the included software, however, you can program each button to perform keyboard or mouse command sequences up to 32 instructions long. \$169. Presentation Electronics, 916/652-9281, 800/888-9281; fax 916/652-9286.

Tempo 3.1

OK, so you aren't exactly listening to The Who on your Macintosh. Then again, maybe you are. In any case, serious audio applications require serious audio hardware. This set of magnetically shielded, powered speakers sports a single master volume control, and connects to your Mac or other line-level output device via a standard 1/8-inch miniplug. \$149.95. Boston Acoustics, 617/592-2000; fax 617/592-6148.

Universal Notebook Guardian

Lasso this 6-foot steel security cable to a stationary object and slide the business end into your PowerBook's floppy drive, and any prospective thief will have a tough time walking off with your precious portable. The all-metal anchor unit grabs the metal chassis surrounding the disk drive and locks with a key. As an extra bonus, prying visitors can't swipe your data by copying it onto a floppy, or perform an unauthorized boot with a system disk. \$39.95. PC Guardian, 415/459-0190, 800/288-8126; fax 415/459-1162.

BOOKS

4 Colors/One Image

CMYK can sound like a magical incantation to those of us raised in an RGB world. This full-color book is a guide to the fundamentals of four-color reproduction, covering such topics as printing, screens, resolution, color theory, scanning, tone correction, separations, and calibration. The book also explores specific techniques for use in Adobe Photoshop, QuarkXPress, and EFI Cachet. Written by Mattias Nyman. 88 pages. \$18. Peachpit Press, 510/548-4393, 800/283-9444; fax 510/548-5991.

The Illustrator 5 Book

Adobe Illustrator 5 is a major upgrade from version 3.2, and this hefty book describes every tool and feature that's available. The author, Macworld con-

tributing editor Deke McClelland, includes tips and hints along the way, as well as plenty of illustrated, step-by-step techniques for manipulating type, editing in Preview mode, using pressure-sensitive tablets, and applying plug-in filters. 664 pages. \$29.95. Peachpit Press, 510/548-4393, 800/283-9444; fax 510/548-5991.

Real World Scanning and Halftones

Everybody thinks that they know how to work a scanner, but mention the word *halftones*, and most mortals cringe in terror. This book explains not only how to get high-quality scans, but also the concepts behind the step-by-step instruction. The book provides detailed coverage of digital halftoning and explains the mechanics of optical character recognition. Written by David Blatner and Macworld contributing editor Steve Roth. 296 pages. \$24.95. Peachpit Press, 510/548-4393, 800/283-9444; fax 510/548-5991.



Real World Scanning and Halftones

The Software Developer's and Marketer's Legal Companion

You may have put in five or ten years in the software business, but do you know how to write a nondisclosure agreement that will stand up in court? What about copyright or patent law—are you sure that your invention is properly and legally protected? This book is a lay person's guide to most major legal issues that surround software, including copyright, trade secrets, trademarks, employee confidentiality, distribution, and publishing agreements. An included disk contains templates for letters, agreements, and checklists, plus all the forms necessary for copyright and trademark applications. Readers get basic advice without paying \$200 an hour, and they also learn when they do need to consult an attorney. Written by Gene Landy. 548 pages. \$34.95. Addison-Wesley Publishing, 617/944-3700, 800/358-4566; fax 617/942-1621. **m**

To have your product considered for inclusion in *New Products*, send an announcement with product name, description, minimum memory, peripherals required, pricing, company name, and phone number to New Products Editor, Macworld, 501 Second St., San Francisco, CA 94107. Macworld reserves the right to edit all product announcements.

The Apple Report On PowerPC

Macintosh Compatibility and Upgrades

PowerPC will easily outrun Intel's acclaimed Pentium microprocessor, but will do so at a fraction of the cost.

By taking advantage of superior RISC technology, PowerPC requires half the number of logic transistors as Pentium. And fewer transistors make for smaller, cheaper, more energy-efficient chips.

Macintosh with PowerPC will use System 7, so it will run the thousands of applications currently available for the Mac.*

Upon the arrival of Macintosh with PowerPC, dozens of new programs designed to take advantage of its speed will also be available.

MS-DOS and Windows users will be able to run all their programs on the PowerPC platform from Apple.*

Macintosh with PowerPC has received rave reviews from developers who report workstation-level performance running applications designed just for the PowerPC processor.



PowerPC™ is coming. The revolutionary RISC-based microprocessor family created jointly by Apple, IBM and Motorola. It

will be the engine that Apple uses to generate the first truly radical improvements in mainstream computing systems. Improvements in power, price/performance and functionality. It will also serve as the heart of the next generation of Macintosh® personal computers, coming in the first half of 1994. In anticipation of its arrival, Apple will be running a series of information-rich reports keeping you abreast of all the exciting new advancements you can expect from Macintosh with PowerPC.

Compatible with the Mac you're working with now.

Macintosh with PowerPC will bring a new level of performance to your desktop. Yet you can continue to work with all your current files, applications and peripherals in



exactly the same way you work with them now. It's compatible with all the Macintosh computers and software you already own, protecting any investment you've already made with Apple.* There's no retraining. No rethinking. No re- anything.

A more powerful Macintosh.

PowerPC processors will first be incorporated into several mainstream and high-end Macintosh models, providing you with up to 2 to 4 times the performance

of Motorola's 68040 or Intel's 80486 chips using comparable applications designed for PowerPC.

Down the road, PowerPC will continue to fuel succeeding generations of Apple Macintosh computers, delivering equally impressive results.

On-ramp to the future.

So should you buy a Macintosh today or a Macintosh with PowerPC tomorrow? Well...yes. Apple is offering upgrade paths that will allow you to easily move from today's Macintosh computers to Macintosh with PowerPC. Ultimately, it will become the on-ramp to the future of personal computing. A future, you'll be pleased to discover, that also includes the security of compatibility with the past. Because Macintosh with PowerPC is still about giving you the most important power of all. The power to be your best.*



Sit down and work on a Macintosh with PowerPC, and you'll quickly find that it's still a Macintosh. As easy to use as ever. As forgiving as ever. As human as ever.

Apple has already announced plans to ship upgrade products concurrently with the initial introduction of Macintosh with PowerPC systems.

Upgrades have been announced for the Macintosh Quadra® 610, 650, 660Av, 700, 800, 840Av, 900 and 950, the Macintosh Centris™ 610 and 650, the Macintosh IIfx and the popular Macintosh Performa® 600. More will follow.

Naturally, upgrade prices will vary by model. You can expect them to start at under \$1,000.

For more information about Macintosh with PowerPC, call 1-800-732-3131, ext.150, in the U.S. We'll send you a copy of our informative, free booklet, "PowerPC Technology: The Power Behind the Next Generation of Macintosh Systems." If you're reading this in Canada, call 1-800-665-2775, ext. 910.

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Which means you can get your information three times faster than you can with standard readers, see smoother animation and video.



NEC MultiSpin 3Xp and 3Xe

Our new MultiSpin CD-ROM readers are not only fast but interactive, with stand-alone audio controls and an LCD display on the front panel. So you don't have to rely on your computer to tell you what's going on (or not going on) with your reader.

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For more information, call 1-800-NEC-INFO. Or for details via fax, call NEC FastFacts™ at 1-800-366-0476, request document #23768. We'll answer all your questions about CD-ROM. And you'll actually get to have an honest conversation for a change.

NEC



Reviews

Macintosh Quadra 605

Macintosh Computer

PROS: Least-expensive 040-based Mac; excellent price-to-performance ratio; expandable built-in video drives; wide range of monitors; LC III-style PDS for expansion; system disks included; door on floppy drive prevents dust build-up. **CONS:** No FPU; nonstandard case design; microphone not included; only one ADB port; manual-inject floppy drive; rudimentary Cache Switch control panel; no ADB power-up or soft shutdown; PowerPC upgrade not promised.

COMPANY: Apple Computer (408/996-1010).

APPLEPRICE: 4/80 \$979; 8/160 \$1269.



NEVER BEFORE HAS APPLE offered so much performance for so little money. The Macintosh Quadra 605 is essentially an 040-based LC III that pummels the former champ, the Mac IIci, but treats your wallet with kid gloves. Apple has a new pricing scheme that realistically reflects street prices (keyboard and monitor not included).

Apple claims to have simplified its product line so that consumers can more easily identify the Mac that best fits their needs, but wait until you discover that the Quadra 605 masquerades as the LC 475 and Performa 475 and 476 in slightly different cases, sold through different channels, with different bundled software and hardware configurations. This review focuses on the Quadra 605.

The Quadra 605 case is another variation on the LC design. At less than 9 pounds, the Quadra 605 measures 12.2 inches wide, 15.3 inches deep, and 2.9 inches high. The rear panel has 8-bit stereo sound-out and sound-in ports (microphone not included), a 50-pin SCSI connector, two serial ports, one ADB (Apple Desktop Bus) port, and a video connector.



The Quadra 605's built-in video circuitry can drive all current Apple monitors as well as most VGA and SVGA monitors. Both configurations come with 512K of video RAM (VRAM) installed in the two video SIMM slots, enough to produce 256 colors on monitors measuring up to 16 inches diagonally, and 16 colors on 19- to 21-inch displays. By replacing the existing VRAM with two 512K modules at a cost of about \$70, you achieve the maximum of 1MB of VRAM, which can display 32,768 colors on 16-inch monitors, and 256 colors on larger displays. If that doesn't suit your needs, you can always fill the single LC III-style Processor Direct Slot with a dedicated video card, at the expense of future expansion possibilities such as Ethernet.

The Quadra 605 has 4MB of RAM on the motherboard with a single 72-pin RAM SIMM slot that supports modules

with 4MB, 8MB, 16MB, and 32MB. Anyone buying the 4/80 configuration is likely to want more memory right away, because once the System software consumes its 1.7MB, there's very little room left for third-party extensions and applications. I recommend spending the extra \$300 or so for the 8/160 configuration. Adding the extra memory and hard drive storage space after your initial purchase will almost certainly cost much more.

As mentioned, the Quadra 605 comes with either an 80MB or 160MB, 3.5-inch, third-height, internal hard drive. Apple has multiple suppliers (including IBM and Quantum) for these drives, so you can expect slight performance variations. The internal hard drive comes with QuickTime 1.6, HyperCard Player 2.1, and System 7.1 already installed, and a set of six system disks is included in the package in case you ever need to reinstall.

The Quadra 605 has the same 1.4MB, 3.5-inch internal SuperDrive used in the PowerBook family, with a hinged door that should decrease dust intake. Veteran users will lament the necessity of manually pushing floppy disks all the way in rather than relying on the old auto-inject feature, which pulls in partially inserted disks. However, if it helps keep the cost down, it's a change I can live with, especially since Apple retained the much more important auto-eject feature.

The heart of the Quadra 605 is a 68LC040 beating at 25MHz. This variation of the 040 lacks a built-in math chip, or floating-point unit (FPU), and there's no empty socket to receive one down the line. But lack of an FPU isn't likely to be a major drawback. Customers with heavy rendering, modeling, and scientific-analysis needs are likely to opt for a more powerful computer anyway. Which isn't to say that the Quadra 605 is a lightweight. Quite the contrary; it's a scrappy little fighter.

In the common core-performance tests conducted by Macworld Lab, the Quadra 605 outperformed the Mac IIci. Although both platforms have CPUs rated at 25MHz, the Quadra 605's 040 is nearly twice as fast as the 030 in the IIci. Even without an FPU, the Quadra 605 went toe-to-toe with the IIci in the sci-

entific tests and came out the winner by unanimous decision.

One drawback of the 040 is that some software still conflicts with the CPU's built-in instruction and data caches. Apple's Cache Switch control panel lets you toggle the caches on for maximum speed and off for greater reliability. (Contrary to what Apple says, you needn't restart the Mac for the new setting to take place. Instead, hold down the option key when you switch modes and you should be able to continue working.) Even so, Apple's Cache Switch is a far cry from control panels bundled with third-party 040 accelerators, most of which automatically switch to the appropriate cache mode when you launch problem applications.

Summing Up

So, when all is said and done, how attractive is the Quadra 605? That depends on whether you are a first-time buyer or are upgrading. As a IIci owner I appreciate the dazzling speed increase, but my enthusiasm is tempered by a few other items. Neither my 30-pin SIMMs nor my half-height hard drive can be installed inside the Quadra 605. OK, I can sell the former and get an external case for the latter, but there are other things I'd miss. Like the ability to turn on the IIci by pressing the power switch on the key-

board or with a phone call using a Farallon Remote Wake-Up cable. Also, instead of turning the Mac completely off, choosing Shut Down from the Finder's Special menu presents the old "You may now switch off your Mac safely" alert box on the Quadra 605. Perhaps the biggest argument against upgrading now is that there's enough spunk left in the IIci to carry me until PowerPC-based Macs are available later this year.

While upgrading to a Quadra 605 might not be an easy decision, it's hard to go wrong buying one as your first Mac; its shortcomings are rather insignificant. With the Quadra 605, Apple now offers first-time users a system whose performance and price match that of a standard entry-level 486SX-based Windows PC. Macworld Lab tests show a 486SX PC is only about 5 percent faster than a Quadra 605. The 4/80 establishes an interesting entry-level price point, but the 8/160 Quadra 605 is the better buy, at only \$1269. Whether it's the right Mac to buy is hard to say without knowing your individual needs. Lastly, you may want to consider spending a few hundred dollars more for a similarly equipped Quadra 610 featuring a full-blown 68040 with built-in FPU, a memory ceiling of 68MB, and room for an optional internal CD-ROM drive.—OWEN W. LINZMAYER



Macintosh Quadra 605: How Fast Is It?

CORE PERFORMANCE INDEX

Times as fast as a Classic (Classic = 1.0).

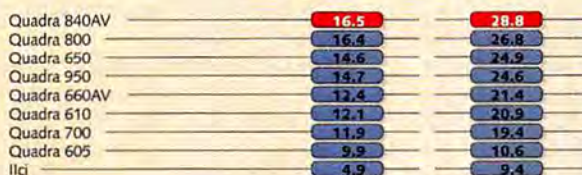
Use these standard ratings of overall performance, based on a core test suite, to compare systems across classes.

Common

Typical business tasks in Microsoft Excel and Word that use the Mac's processor, drives, and video display.

Scientific

We added to the common tasks several scientific calculations (which use floating-point math).



*Results for Infini-D rendering not factored in due to lack of FPU.

BUSINESS-SYSTEM PERFORMANCE TIMES

Times are in seconds. Shorter bars are better.

Use these results to compare the performance of systems for different types of real-world tasks within each class. For each type of system, results can be compared with other Macworld Business-System Performance Times or Entry-Level-System Performance Times.

Processor

Several tasks in Adobe Photoshop, Aldus Free-Hand, Microsoft Excel and Word, Claris FileMaker Pro, and QuarkXPress.

Drive-Access

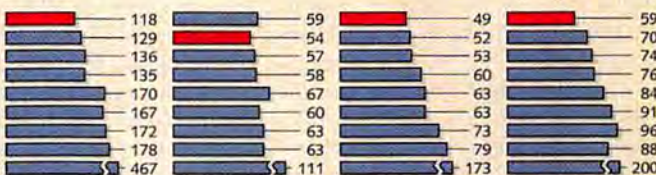
File-opens in Adobe Photoshop, Microsoft Excel and Word; and disk-based sorts in Claris FileMaker Pro.

Video-Display

Vertical scrolling in Microsoft Excel and Word, and QuarkXPress.

Floating-Point

Scientific recalculations (which use floating-point math) in Microsoft Excel, and 3-D rendering in Infini-D.



ENTRY-LEVEL-SYSTEM PERFORMANCE TIMES

Several tasks in Claris FileMaker, ClarisWorks, Deneba UltraPaint, and Microsoft Excel and Word.

File-opens in Microsoft Excel and Word, and disk-based sorts in Claris FileMaker.

Horizontal and vertical scrolling in ClarisWorks, and Microsoft Excel and Word.

Scientific recalculations (which use floating-point math) in Microsoft Excel and ClarisWorks.



Aldus FreeHand 4.0

PostScript Draw Program

PROS: Great page-setup controls; supports tabs and tables; offers automatic copyfitting; drag-and-drop color assignment. **CONS:** Inspector palette packs in too many unrelated options; weak documentation. **COMPANY:** Aldus Corporation (206/622-5500). **LIST PRICE:** \$595.



FREEHAND HAS LONG BEEN ONE OF the most powerful draw programs on the Mac. Versions 1.0 and 2.0 offered more features than any draw programs in their time. But FreeHand 3.0's emphasis on questionable interface enhancements allowed Adobe Illustrator 3.0 to surpass it in many respects—especially in the realm of text—and let Deneba's Canvas 3.0 take the leading role in features.

But all misgivings I had with FreeHand 3.0 are forgotten with version 4.0, a program that is every bit as powerful as Illustrator 5.0. While FreeHand continues to serve up its share of bewildering interface peculiarities, its new page-design and text-editing functions make it more than worth the price of admission.

The New Desktop Publisher

When you first use FreeHand 4.0, you may wonder why its new page-layout features aren't included in Aldus PageMaker. Here are two products from the same company, and yet the draw program does a better job of handling small-document design than the page-layout program. FreeHand lets you create as many pages as will fit on a 54-by-54-inch pasteboard (roughly 30 letter-size pages). You can move each page independently, make it a different size and orientation than its neighbors, duplicate whole page designs, view all pages at once, drag a page element directly from the first page in the document to the last, share guidelines between multiple pages, and create unusual page spreads consisting of 4 or even 6 pages abreast. Furthermore, you can link and relink text blocks between pages in any desired order, automatically copyfit by changing type size and leading, and divide text blocks into rows and columns. PageMaker doesn't have any of these features, and only a couple are found in QuarkXPress. Granted, FreeHand lacks style sheets, it can't check your spelling, it can only import text in RTF format, and you have to manually number pages. But for the consummate short-document

designer, it can't be beat. FreeHand 4.0 lets you experiment by providing you with immediate access to top-notch text and graphics tools; the only elements you ever have to import are the photos.

FreeHand's text features have likewise been enhanced. The program can automatically hyphenate, a feature on a par with its counterpart in Illustrator. You can also adjust paragraph spacing, specify the lengths of the shortest lines in a block of nonjustified text, and wrap text around graphics and define the amount of standoff between the two. None of these functions are implemented as fully in Illustrator. FreeHand also supports tabs and facilitates the creation of tables,



Inspecting the Inspector The samples of FreeHand's Inspector palette, along the top of this figure, contain more options and affect more aspects of a document than the three palettes at the bottom, which let you create, edit, and organize colors.

just the thing for annotating a document with lists and data. (Ironically, FreeHand can't translate your data into graphs, as Illustrator can, and Illustrator doesn't handle tables. If either of the two did both, it might be onto something.)

There are a few minor problems, however. First, FreeHand's text tool is frequently slow to react on 68030 and slower machines. On these machines, if you click with the text tool and immediately begin to type, FreeHand has a tendency to ignore the first two or three characters. Next, many of FreeHand's operations apply only to text blocks drawn with the text tool. If you create text inside a standard rectangle—often an easier approach—these operations are unavailable. You can't change text alignment or leading from the keyboard as you can in Illustrator. And FreeHand's copyfitting functions only work inside single text blocks. For example, FreeHand can change the size and leading of text so it exactly fits in the confines of a text block—which may or may not include multiple columns—

but it can't fit the text in multiple linked blocks, a problem when working with the kinds of complex and irregular designs at which FreeHand otherwise excels.

Paths and Palettes

FreeHand supplies several new options for combining paths into new shapes, many of which function like Illustrator's Pathfinder filters and the Combine functions in Canvas. You can unite two paths into a single shape, retain the intersecting portions only, subtract the rear path from the forward one, and remove intersecting segments in a single path. FreeHand provides less than half as many combination functions as Illustrator, but they don't depend on a math coprocessor as Illustrator's filters do.

FreeHand 4.0's interface relies heavily on palettes. On the plus side, you can now drag colors from palettes and drop them onto objects to change the colors of strokes and fills. You can even drag colors into gradations and copy colors between palettes.

On the minus side, FreeHand's palettes are strangely organized and the options strangely apportioned. Altogether, there are nine palettes, eight of which tackle discrete operations. The ninth is the Inspector palette, a hodgepodge that pastes in roughly as many functions as the menu bar, including text formatting, fill and stroke attributes, object positioning, image correction, page setup, and miscellaneous preferences settings. As with Illustrator's mixed-up Filters menu, it'll probably take you a few days to find, let alone learn to use, the more than 100 options included in the Inspector palette.

My least favorite aspect of FreeHand 4.0 is its documentation. The manual itself is an example of style over substance, beautifully designed but lacking even basic explanations of many options. The *Commercial Printing Guide* is the only bright spot, accurately targeting what the reader needs to know.

Aside from the documentation, FreeHand 4.0 is an outstanding program. But is it better than Illustrator 5.0? In many ways, yes. FreeHand has better page-design functions, it supports tabs and tables, it offers multicolumn text blocks, it provides better copyfitting, and it imports and exports more graphics file formats. Illustrator, on the other hand, provides special-effects filters, significantly superior gradient fills, custom views and guidelines, and better display options. I have never seen a time when the two PostScript giants were more evenly matched. Suffice it to say that for now I'll be using both programs, but I'd be happy with either.—DEKE MCCLELLAND

WordPerfect for Macintosh 3.0

Word Processor

PROS: Innovative interface with expandable menus and context-sensitive button bars; significant new features, including table and equation editors. **CONS:** Cross-platform support is mediocre; Interface has a modest learning curve. **COMPANY:** WordPerfect Corporation (801/225-5000). **LIST PRICE:** \$495.



NEW VERSIONS OF WORDPERFECT draw big crowds in DOS and Windows PC circles. In the Macintosh world, however, Microsoft Word rules, and other word processors are left to fight over the crumbs. WordPerfect wants a bigger slice of the pie, and with WordPerfect for Macintosh 3.0 (WP 3.0) the company hopes to chip away at Word's dominant position. No matter how good its intentions—or its features—WordPerfect fights an uphill battle against Word. Fortunately, WP 3.0 lends a strong back to the fight.

WP 3.0 is one of the first applications to support System 7 Pro, Apple's latest version of its operating system. In fact, at the Apple System 7 Pro rollout in early October 1993, attendees walked away with a copy of System 7 Pro in one hand and a copy of WP 3.0 in the other. WP 3.0 features early implementations of AOC (Apple Open Collaboration Environment), including PowerTalk (the client portion of its mail-enabling technology), AppleScript (its system-level scripting language), and WorldScript (for multiple-language documents). (For more information on AOC, see "AOC—Apple's Plan for Groupware," *Macworld*, November 1993.)

While WP 3.0's support for System 7 Pro shows that WordPerfect is serious about Macintosh—something that has not always been obvious in the past—its innovative interface with context-sensitive button bars and expandable rulers is the heart and soul of the product. It convinced me that yes, there is life after Word. WP 3.0's interface reform also adds several new features, including table and equation editors, drag-and-drop editing, an integrated grammar checker, and more.

Most of WP 3.0's innumerable features are now accessible with a single click of the mouse. The button bar approach is unique and at first glance may give you pause. But while WP 3.0 offers a differ-

ent look, it's designed to make features easily available.

The main button bar (which runs along the left-hand side of the screen) provides access to many often-used features—such as indents, headers and footers, time and date stamps, print preview, a spelling checker, and more. In addition to the document editor, WP 3.0 includes a graphics editor and an equation editor. As you switch modes, the button bar changes to reflect the modes.

You can also add or edit button bars to reflect your work style. For example, you can have one group of buttons for writing documents, another for editing them, another for formatting them, and so on. You can save new or edited button bars in your library, making them available in any of your WP 3.0 documents, or save them for use in only the active document. A pop-up menu at the top of the bar lets you select the button bars you want to display.

Some people don't like lots of icons and buttons crowding their screen real estate. Others hate dealing with several levels of pull-down menus and dialog

boxes or memorizing keyboard commands. WP 3.0's rulers offer an approach that lets you have the best of both worlds. The seven rulers in WP 3.0—Ruler, Layout, Font, Styles, Table, List, Merge—offer access to a variety of commands. Some commands you probably use every day; others you may use, for example, only when you're creating an index or table of contents or merging a form letter with a data file of names and addresses. The beauty of this system is that you can have any or all of the rulers available at once. Clicking on the appropriate box at the top of screen toggles between an expanded and collapsed view of the ruler.

With so many options available in the form of small icons and buttons, you'll appreciate WP 3.0's status bar. If you choose Show Help from the status-bar options menu (the small arrow located at the bottom left of the screen), you'll see what each element on the interface means as you move the mouse pointer over it. The status bar is customizable. You can display time, date, location in the document, battery status (for PowerBook and Duo users), and other status indicators. A pop-up menu in the lower left of the screen lets you add and delete items from the status bar.

The table and equation editors are notable new features in WP 3.0. The table editor makes it a snap to create tables in your document. You can even perform basic calculations such as sum and average. You can add color and tints to your rows and columns to make them both more attractive and easier to read. The equation editor will be a big hit with users who need to add scientific and mathematical equations and notations to their documents.

The previous version of WordPerfect for the Mac bundled WordPerfect's Grammar 5. WP 3.0 integrates the grammar checker into the Tools menu.

Cross-platform compatibility between Macs and Windows PCs is an important issue for major applications. WP 3.0 has taken a step forward by allowing you to open WP 3.0 files directly in the DOS and Windows versions of WordPerfect 6.0. Unfortunately, it's not a two-way street. You must import Windows and DOS documents into WP 3.0.

WP 3.0 is an accomplishment in ease of use. Features that might otherwise be hard to find now stare you in the eye. When it comes to accessible features and overall ease of use, WP 3.0 stands out from other word processors.—DAN MUSE



The Rulers If you want fast access to dozens of features, WordPerfect for Macintosh 3.0 groups commands into seven rulers (top). If you want the screen to yourself, collapse the rulers until you need to access specific categories of commands (bottom).

Back To
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Introducing Opus'n Bill. The only screen saver that makes you laugh.



No other screen saver delivers Opus and Bill's wisecracking, politically *incorrect*, current event humor, all wrapped up in

a series of very funny animated stories. And, with state-of-the-art, realistic, multimedia sound, it's as much fun to hear as it is to see. If Pulitzer Prize-winner Berkeley Breathed's Opus'n Bill isn't saving your screen, you're missing a lot of laughs. And it makes a great gift, too. See your retailer or call to take advantage of our special introductory offer.

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DELIRINA

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Circle 137 on reader service card

StudioPro 1.0

3-D Design Application

PROS: Flexible 3D Sculpter feature; artistic RayPainting renderer. **CONS:** Uninspiring animation environment; manual organized awkwardly.

COMPANY: Strata (801/628-5218). **LIST PRICE:** \$1495.



AUTOMAKERS OFTEN PRODUCE sports cars that share components with mainstream models but offer significant performance enhancements. StudioPro, a modeling, rendering, and animation program that builds on StrataVision 3D, resembles those sports cars. Anyone familiar with StrataVision will feel comfortable with StudioPro. However, with more-capable 3-D modeling tools, new rendering features, tuned-up animation capabilities, and better overall performance, StudioPro is souped-up and aimed at professional users. Think of it as StrataVision GTI.

StudioPro retains StrataVision's extensions architecture, facilitating the addition of modeling tools, surface textures, and shapes. However, StudioPro's tool palette is more logically organized, and its visually clearer texture palette toggles to display the contents of the shapes folder. Both textures and shapes can be dragged and dropped from the palette into the scene. Also, StudioPro has a button bar for quick access to extension modeling tools. In all, StudioPro's working environment is more comfortable and accessible than StrataVision's.

StudioPro includes modelers that lathe, extrude, and sweep surfaces, and a 2D Sculpter that lets you edit Bézier objects. Skin and unskin modelers let you stretch a surface across rib elements, as with an aircraft wing, or remove a surface to reveal interior detail.

The 3D Sculpter extension lets you edit 3-D objects by manipulating vertices or by deforming surface patches, much the way you would shape modeling clay. The 3D Sculpter works with polygonal and Bézier objects, and lets you manipulate them as wire frames or gray flat-shaded surfaces. It's a great addition.

StudioPro comes with more than four dozen surface and procedural textures. Surface textures are image maps applied to the outside of an object, while procedural textures are mathematical descriptions of texture materials you can apply to the entire object. StudioPro offers pre-

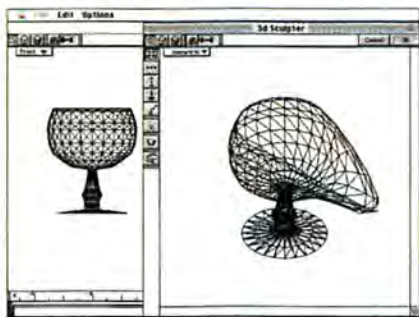
cise controls for customizing its textures, including diffusion, transparency, and bump mapping. Additional texture collections are available separately.

StudioPro places no limits, other than those of practicality, on the number or types of light sources, and can produce environmental effects such as reflections and fog. Rendering options include flat shading, Gouraud, Phong, ray tracing, Raydiosity, and a new technique called RayPainting.

RayPainting uses texture and lighting information to produce images that simulate traditional artistic techniques. Among the included effects are oils, chalk, watercolor, drybrush, pencil, and two that mimic van Gogh and Seurat.

Like all rendering, RayPainting is an automatic process. You don't have the option of editing individual brushstrokes, as you can, for example, when producing similar effects with Fractal Design's Painter. But RayPainting doesn't demand artistic talent, produces pleasing effects, and makes StudioPro more useful to illustrators and graphic designers.

StudioPro can render in the background, but most Macs will drag as they juggle tasks. StudioPro lets you suspend rendering until you're done using the Mac, or you can distribute rendering over a network with Strata's RenderPro.



The 3D Sculpter This tool lets you deform objects by pushing or pulling on surface patches or single or multiple vertices.

StudioPro builds animations by defining events over time and tweening the intervening frames. All objects, including lights and cameras, can move along linear or spline paths, and the program produces smooth acceleration effects.

New animation extensions automate a variety of tasks and let you easily incorporate special effects. Included with the program are path-filter extensions that align objects to paths, convert 2-D lines into animation paths, and keep objects, such as cameras and lights, pointed at



RayPainting StudioPro's new rendering option produces natural media effects from the texture and lighting information of 3-D scenes.

other moving objects. The special-effects extensions simplify the scripting of bouncing objects and produce shattering, exploding, and atomizing sequences.

On the whole, StudioPro provides a workable, if uninspiring, animation environment—it's neither as easy to use as Infini-D's nor as fully developed as Macromedia Three-D's. The special-effects extensions are eye-catching but of limited value. Animation pros are likely to prefer creating their own effects to using canned scripts. The path filters, on the other hand, are less sexy but ultimately more useful in day-to-day work. And the concept of animation extensions is excellent. If more of these become available, StudioPro could mature into an animation powerhouse.

StudioPro can import DXF, IGES, MiniCAD+, Swivel 3D, EPS, and PICT files, and exports DXF, TIFF, PICT, PICS, and QuickTime formats. Most StudioPro translators are extensions, so this list should grow.

StudioPro is a complicated program, so expect to spend some time learning it. The manual combines reference and background material with interspersed tutorial examples. This format works for novices but makes a veteran's search for specific references needlessly difficult. StudioPro requires a Mac with a math coprocessor (or FPU) and 5MB of RAM. Professionals will want the fastest Mac and as much memory as possible.

StudioPro improves greatly on StrataVision, but as with sports cars, the improvements lead to a higher sticker price. At \$1495, it directly competes with more competent modelers, such as Autodesk's formZ, and dedicated animators, such as Macromedia Three-D, Infini-D, a weaker modeler but a better animator, and Alias Sketch, a better modeler that lacks animation, both cost less. Sticker shock aside, if you need a well-balanced, all-in-one 3-D modeling, rendering, and animation solution, StudioPro is an excellent choice.—CARLOS DOMINGO MARTINEZ

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FrameMaker 4.0

Desktop Publishing Program

PROS: Superior long-document creation capability; superb equation editor and formatting and table-creation tools. **CONS:** Nonstandard font menu; strange keyboard shortcuts; minor quirks. **COMPANY:** Frame Technology Corporation (408/433-3311). **LIST PRICE:** \$895.



THE USUAL METHOD OF MAC desktop publishing involves working in three different programs. First you create and edit your text in a word processing program. Use a draw program to create graphics. Then import the whole kit and caboodle into a publishing program to fine-tune your layout. FrameMaker tries to do it all, and though it lacks the high-end drawing features of Adobe Illustrator, Aldus FreeHand, and Deneba's Canvas, it succeeds admirably in letting you build a lengthy publication without leaving the program.

You can format your document from a selection of standard templates, or build your own custom page design from scratch. Unlike most other document-creation programs, it even lets you mix portrait and landscape (vertical and horizontal) pages in a single document.

The centerpiece of FrameMaker is its extensive use of character and paragraph tags that allow you to automate text formatting. You can use or adapt the catalogs (character- and paragraph-format collections) that are supplied with the program's templates, or build your own from scratch. Designing a paragraph format involves calling up a six-part dialog box that you navigate via a pull-down menu. It allows you to set the basic paragraph properties (attributes), character formatting, widow and orphan control, numbering, hyphenation and justification settings, and basic table-cell formatting. A paragraph can also be assigned with a side head (which extends either left or right of the body copy) or with a run-in head. Character-format catalogs let you quickly switch to bold or italic for emphasis, or use special styles such as small caps or superscript. You can apply any property in a format, such as a paragraph indent or type style or size, to any selected paragraph, all paragraphs using that style, or all paragraphs in a document.

FrameMaker really shines in the area of table-creation tools. Convert text into tables, and tables back to text. Tables are

built with cells you can format separately or together. You can even base a cell's size on the width of selected type, and have the cell's text aligned top, center, or bottom in a column. The program will cut and paste columns and rows within a table or from table to table, format straddle heads (spanning two or more cells), and rotate the entire table or just individual cells. Tables can include equations, graphics, and footnotes, and you can apply rules and shading.

FrameMaker's spelling checker, thesaurus, and find/change features enhance its word processing capability. Using Claris XTND translators, you can open documents created in other word processing formats or import them into an existing FrameMaker document. A QuickAccess Bar provides an iconic view of basic program commands, similar to Microsoft Word's tool bar. You can do basic formatting and tab setting with a formatting bar, just as in a word processing program. Both text and graphic objects can be rotated freely, but text is best edited in its upright position to keep the text column from redrawing at every keystroke. Although it lacks sophisticated color-trapping tools, the newest version of FrameMaker can produce four-color separations and adjust registration and halftone screen settings.

FrameMaker 4.0 for the Mac is essentially the same as the Windows and Unix versions, but the Mac version adds support for Apple events, balloon help, publish and subscribe (this feature excludes plain text and most graphic formats, so it's not terribly useful), and QuickTime.

FrameMaker's equation editor greatly simplifies the often convoluted process of creating math text objects. A multi-layered palette lets you build complex mathematical expressions from scratch with relative ease. You can create custom math elements, or adapt existing ones to suit your needs. The program can also examine the equation syntax, so you can make sure you haven't left anything out.

FrameMaker adds simple-to-use index and table of contents features, applicable to a single document or a set of documents (using the book-generation feature). Cross-references can be set up using tags linked to specific headlines or paragraphs. The variable feature allows automatic page-numbering or, for example, automatic updating of a running head to reflect changes in chapter or section heads. FrameMaker's unique Conditional Document capability lets you gener-

ate more than one version of a document by tagging selected text or graphics as "conditional." This is useful for creating catalogs or brochures, where you might want to exclude items from one version.

Not everything is hunky-dory with FrameMaker. The font menus display only the family name of a font, not the individual styles (even if you've got a font will menu modifier utility installed). There are a liberal number of keyboard shortcuts, but some of them seem almost alien to a Macintosh user (though they'd be familiar to either Windows or Unix users). These include such commands as escape key-F-T-R to produce a document report such as a page count. The control key, seldom used on Macs, also gets plenty of action.

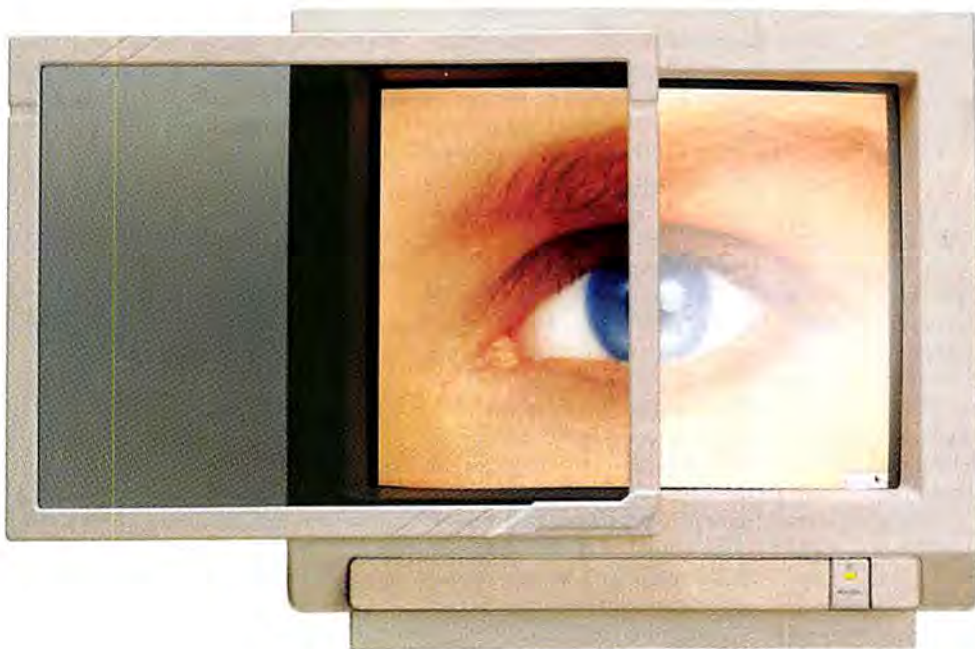
Despite its occasional interface oddities, FrameMaker is slickly designed and performs predictably and speedily in nearly all respects. For a program of its sheer power, it is not terribly difficult to learn, though I wouldn't recommend it for an absolute novice. Free technical support is limited to 30 days after you make your first telephone call (it's \$99 per year thereafter), but you'll find that help easy to reach, friendly, and supportive.

To simplify the learning process, FrameMaker comes with a *Getting Started* manual and a decent selection of templates that you can quickly adapt to many desktop publishing chores. Once you've mastered the basics, you can move on to the large *Using FrameMaker* book for detailed instructions. You'll want to keep the handy *Quick Reference* guide at hand for task-oriented advice and a long list of keyboard shortcuts—or use the program's context-sensitive help menu.

FrameMaker is not necessarily a direct competitor to Aldus PageMaker or QuarkXPress. It lacks many of those programs' features, such as pasteboards; fast, on-the-fly formatting changes through the Control and Measurement palettes; extensive sets of color models; even the ability to run text automatically around irregular-shaped graphic objects. If your desktop publishing work includes elaborate ads and brochures or free-form magazine layouts, FrameMaker is probably not your cup of tea.

But for projects ranging from simple letters to long, structured documents such as books, instruction manuals, and textbooks, FrameMaker is one of the best document-creation tools you can find on the Macintosh. It's reasonably fast and well mannered, and its ability to take you through all stages of composing your document without resorting to other programs makes it a real timesaver. I recommend it highly.—GENE STEINBERG

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Macro Makers

Keyboard Shortcut Utilities

QuickKeys 3.0

PROS: Easy to use; includes useful selection of ready-made macros; supports decisions and jumps; supports Apple events. **CONS:** A few obscure bugs; RAM-hungry. **COMPANY:** CE Software (515/221-1801). **LIST PRICE:** \$169.



Tempo II Plus 3.0.9

PROS: Large set of external functions; supports Apple events; RAM-efficient; macros playable by other versions of Tempo. **CONS:** Daunting for new users; can't edit mouse-clicks. **COMPANY:** Affinity Microsystems (303/442-4840). **LIST PRICE:** \$179.95.



NO MATTER HOW SIMPLE OR HOW complex your day-to-day computing is, eventually repetition works its way into your routine. For those situations, and for applications without built-in macros, you need the capabilities of a macro-building utility such as QuickKeys or Tempo II Plus.

QuickKeys

QuickKeys comes with ready-made shortcuts, so you can begin saving keystrokes right away. The package offers 12 sets tailored to popular applications, including 2 for QuickMail, plus a Finder set, a Universal set that operates anywhere, and 2 sets for the PowerBook. The Universal set includes key commands for Finder actions such as zooming windows, bringing up the Chooser, and shutting down. The Finder shortcut set has macros for toggling file sharing or 32-bit addressing on and off, and viewing a window by file name or icon, among others.

You can make your own shortcuts. Instant QuickKeys steps you through the process of creating a personalized set of shortcuts by choosing ready-made macros or creating macros from scratch. (An online tutorial describes the shortcuts in detail.) Instant QuickKeys provides an excellent visual keyboard interface for organizing your macros in sets and assigning modifier keys.

The QuickKeys application enables you to create and refine your own shortcuts. Record One Shortcut is best suited

to simple tasks, say, assigning a hot key to the Empty Trash menu item. Selecting Record Sequence records the entire sequence of events you perform—from when you start recording, until you click on the stop button. It records only the actual commands issued, such as button clicks. Record Real Time records not only your actions but also all the hesitations and idle time in between.

QuickKeys 3.0 also comes with 21 extensions that perform tasks, such as Decision and Jump extensions that allow conditional branching from within a sequence. Other extensions change the color depth of a monitor; dial a telephone; display and edit text; execute an Apple event to launch an application or, for example, to copy the contents of a cell in Microsoft Excel and insert it in a database record; or choose a network printer (although this extension evidently conflicts with LaserWriter 8.0—CE Software is aware of the problem).

One of the most noticeable improvements is the QuickKeys Editor, which features a full set of menus for more flexibility when creating or editing sequences and individual shortcuts. Recording sequences are also more intelligent.

QuickKeys shortcuts with pop-ups work in both QuarkXPress and Adobe Photoshop, but I wish you could override the Pop-Up extension. Pop-up menus such as Photoshop's Calculate command change name depending on the number of open windows. If you could record a click-and-drag, your macro would choose the menu item correctly; instead, the Pop-Up extension takes control and chooses by name instead of position.

QuickKeys 3.0 also has some conflicts with Now Utilities 4.0 that were not present in previous versions. CE Software is aware of these conflicts, however, and is working on an update.

Tempo II Plus

Anything you can do in QuickKeys 3.0 you can also do in Tempo II Plus, but Tempo's learning curve is steeper. Tempo is mainly text based, using a text string to describe the actions contained in a macro. This affords more control, especially when you are building very complex macros incorporating hundreds of commands. Tempo also exceeds QuickKeys' capabilities by offering control over complex tasks such as scripting. Affinity recently released TempoEZ, with a similar interface but aimed at an audience similar to that of QuickKeys.

Like QuickKeys, Tempo II Plus gives you the option of choosing Start Recording from its menu to have Tempo watch your actions. The interface is not as elegant as QuickKeys', but the function is as fast and easy. During the recording process Tempo II Plus also allows the option of branching—either unconditionally or conditionally. Tempo's branching options are similar to those in QuickKeys, but somewhat more complex.

Tempo II Plus also offers 50 externals that can assign variables and return Boolean values. For example, you could search for and open files that match a particular creator code and a specified date range. This is a powerful feature, but implementing the externals can be confusing; thankfully, the manual does an excellent job of explaining the externals.

When it comes to playing back a macro, Tempo II Plus is as flexible as QuickKeys. You can assign a macro a key command; add the macro to the macro menu (annoyingly, in the same location as Now Utilities' NowMenus pull-down menus); play the macro from the Tempo Command dialog box; run the macro at start-up; or have the macro execute at a specified time, such as at shutdown.

Tempo's new editor enables you to view and modify a macro and create a Do script command for Apple events. Also new is the Tempo Dialer DA, which allows you to dial the phone from any application.

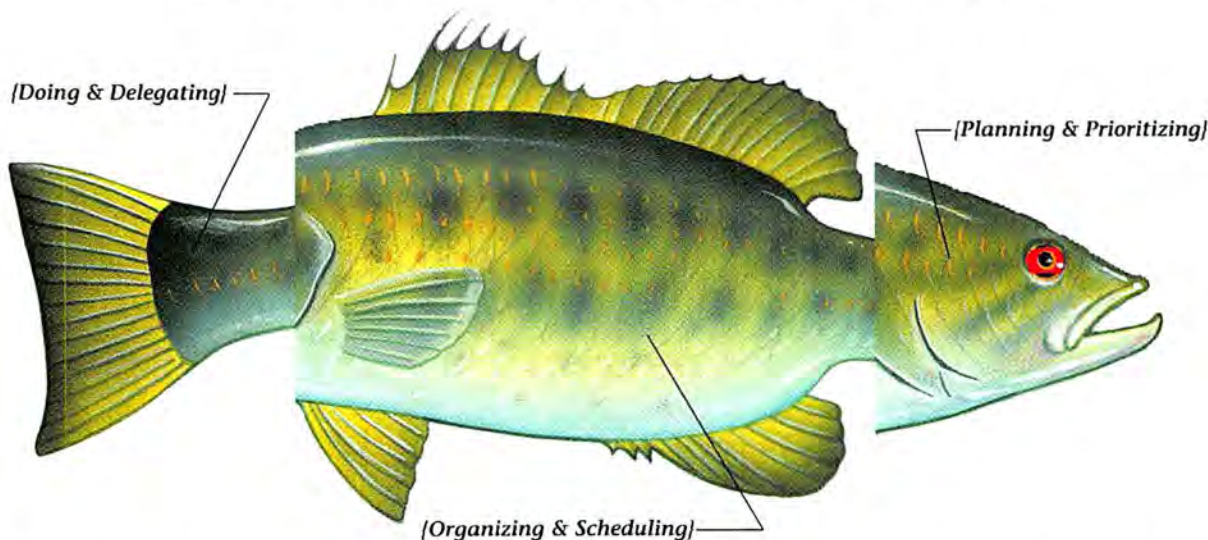
Tempo also comes with a disk of sample macros, for uses such as batch processing and Find/Replace for text applications, and utilities for programmers and power users. The sample batch-process macro can repeat a macro for every file in a folder. Similarly, you can set Tempo to print specific pages of a document instead of just a range of pages.

Picking a Macro Program

For a great many Macintosh users, the most significant difference between these two utilities is not what they are able to do, but how they do it. QuickKeys has a simple, unimposing interface, and you can quickly build a set of useful shortcuts. Novices can jump right into creating macros in Tempo, but most of this very capable utility's power is directed to the advanced user. Tempo II Plus offers power unavailable in QuickKeys 3.0—especially in the area of scripting—but its text-based interface can overwhelm the casual user. Professional consultants automating the interaction between a custom application and the end user will find QuickKeys lacking when compared with Tempo II Plus.

—SCOTT ARONIAN AND TODD POWER

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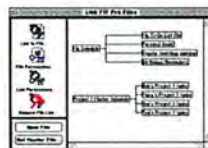


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Freedom of Press Classic

Printer Utility

PROS: Impressive output of PostScript graphics on non-PostScript printers; wide range of printers supported; uncomplicated interface. **CONS:** Slow; steep RAM requirements for background printing; background printing not supported with some QuickDraw printers; flawed PICT-conversion feature. **COMPANY:** ColorAge (508/667-8585). **LIST PRICE:** \$149.



COLORAGE'S UPDATED VERSION OF Freedom of Press allows you to print PostScript graphics on almost any non-PostScript printer—easily and with impressive results. Printing may be slower than with a genuine PostScript laser printer, but Freedom of Press is an economical and effective solution for owners of QuickDraw printers who need occasional PostScript output.

Originally released as Freedom of Press Light, the updated Classic version offers improved processing speed (especially of scanned images) and a total of 35 outline fonts, instead of the 17 that shipped with the original version. (The fonts are the standard 35 found on the Apple LaserWriter IINT.) The new package also directly supports a wider range of laser and ink-jet printers, including the Apple Color Printer, HP DeskWriter 550C, and Canon BJC-820.

The program ships with drivers for 40 popular Apple, Hewlett-Packard, and Canon printers, along with a generic QuickDraw driver that supports just about any printer you're likely to connect to your Mac. (The QuickDraw driver is essential for the StyleWriter, StyleWriter II, LaserWriter LS, LaserWriter IISC, and other printers not directly supported by the supplied drivers.)

Freedom of Press works its magic by reading and translating PostScript code—that task is normally handled by a PostScript printer's on-board processor. The program renders PostScript images at your printer's maximum resolution, so, for example, a StyleWriter II, which normally prints graphics at screen resolution—72 dots per inch—can instead print at an impressive 360 dpi, yielding beautifully defined line art and gray-scale images.

Printing with Freedom of Press is a two-step process. First, you create a PostScript file, using either the standard LaserWriter printer driver (you just select PostScript File as the Destination in the

Print dialog box) or the program's own driver, FP Spooler. FP Spooler, a separate little application, writes the PostScript file to disk and then passes it along to Freedom of Press for processing.

In the second step, the Freedom of Press program interprets the PostScript code and translates it into a bitmapped image that any printer can understand. Setting up the printing options is a straightforward process because of the program's clear, uncluttered interface, as well as the documentation, which addresses the specific needs of a wide variety of printers.

With enough available RAM, you can keep FP Spooler and Freedom of Press running in the background and have these two steps operate automatically. When you choose the print command, FP Spooler sends the files to Freedom of Press, which automatically prints the files in the background.

However, this demands plenty of memory. Freedom of Press requires at least 1.5MB of RAM—more is suggested (and usually required) if the PostScript files are fairly complex. FP Spooler eats up another 70K. Add to that the 2.5MB or so required by your system software and the RAM needed for any applications you'd be running to create the PostScript graphics, and you can see why ColorAge recommends 8MB of available RAM for background printing.

While the program is a great low-cost alternative for users who need occasional PostScript output, it really isn't an adequate substitute for a real PostScript printer if you make extensive use of PostScript graphics. Printing with Freedom of Press is considerably slower than using a PostScript printer because all the processing must be handled by your Mac's main processor; a slower Mac means slower printing. Also, the generic QuickDraw printer doesn't support background printing at all. And unless you have a lot of RAM to spare, every printing job has to be handled in two separate steps, which can be awkward.

Finally, the program has a significant bug, one that ColorAge openly acknowledges and promises to fix in future upgrades: a conversion feature that is supposed to convert PostScript files to PICT files of up to 600 dpi generates only 72-dpi PICT graphics.

ColorAge also is offering a Pro version of Freedom of Press starting at \$1495, with special features that support output to high-end imagesetters and film recorders.—JOSEPH SCHORR

Now Contact 1.0

Contact Manager

PROS: Fast; shares information with Now Up-to-Date; database can be searched without opening application. **CONS:** Poor dialing functions; no file reconciliation; no data entry shortcuts. **COMPANY:** Now Software (503/274-2800). **LIST PRICE:** \$99.



LIKE OTHER ADDRESS-BOOK programs, Now Contact is really a specialized database application that lets you record names, addresses, phone numbers, and other information about people. Now Contact's List view lets you display contact data in a spreadsheetlike format. It's easy to create custom layouts that show any subset of Now Contact's 28 data fields. You can specify font and type size for column headings and data, as well as background color and grid-line style.

Now Contact's List view has several features missing from TouchBase Pro, its closest competitor. For example, you can sort any field by clicking on its column heading. Another welcome addition is Now Contact's ability to edit data directly in the list, something you can't do with TouchBase. On the other hand, specifying which fields to display is a bit easier in TouchBase, and TouchBase's search capabilities are more comprehensive.

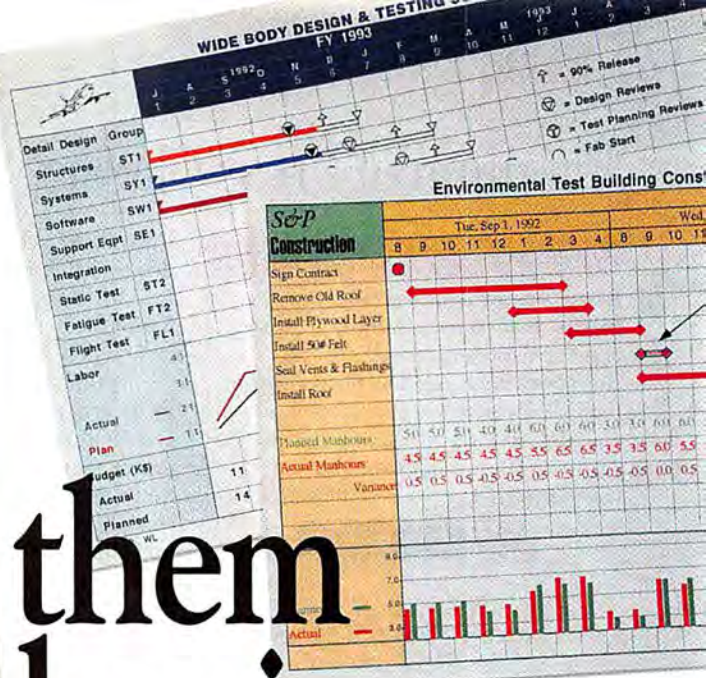
The QuickContact control panel lets you search for records that contain a text string by clicking on an icon in the menu bar, without launching Now Contact. QuickContact searches are very fast, and matching contacts pop up almost instantly. You can also display the phone numbers of your favorite contacts in the QuickContact menu, but you can't dial them without opening Now Contact.

Now Contact's Detail window lets you view and edit information for a single contact. The window displays up to six fixed-size blocks of data—one for the name, one each for work and home addresses, one for phone numbers, and two for Now Contact's eight custom fields. In addition to the four standard layouts, you can design your own, but you can only change the labels of the custom fields.

A text box in the Detail view lets you display contact notes, keywords, or calendar events by clicking on miniature icons. You can also attach Mac applications and documents to contact records—when you double-click on a linked document Now Contact opens the file if you

continues

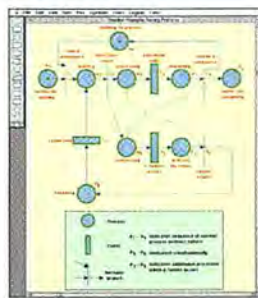
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Simply drag pre-drawn symbols onto a page and connect with curved or straight lines. Place text in symbols and on lines, as well as in freestanding notes. Change the chart as desired; lines stretch and stay attached to symbols. Even create stand-alone flowcharts that can be freely distributed to any Macintosh user (and any Windows user with an optional viewer). MacFlow is also System 7-savvy, letting you publish your charts and subscribe to text. Translate to and from text in ASCII and RTF formats as well as outlines created in Acta 7 and MORE.

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MacUser Magazine July '91

MacSchedule 3.0 Project Planning and Tracking

Lay it all out for them—the plan, the people, the cost. Give them a path to follow and a way to track progress. Successful projects need a roadmap, and nothing can beat a simple yet comprehensive project schedule.



The best way to create quick, presentation-quality project schedules is MacSchedule. The Gantt-chart interface lets you create schedules, with integrated financial data, minutes after you open the application—unlike complex project management software. And MacSchedule is as easy to learn as it is to use.

MacSchedule automatically creates and manages a project calendar. Just enter task names, then indicate timing with a click and drag of the mouse. Status tracking is also easy—just click on a task bar to show progress.

MacSchedule helps track a project from initial estimates to current status by automatically developing calendarized cost estimates and reporting cost and schedule variances in an Earned Value summary. MacSchedule is also System 7-savvy, letting you publish your schedules and data as well as subscribe to data from other programs. Place schedules in documents for proposals and reports or print schedules as slides, overheads, or wallcharts.

With MacSchedule's graphic feedback, you can tell at a glance where your project is and where it's headed. It's the perfect tool for any manager.

Show them your plans for success—get MacSchedule today.



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Circle 140 on reader service card

have the application that created it.

Another innovative feature lets you specify a primary address and phone number for each contact; the primary phone number appears in QuickContact searches and linked events. Now Contact lets you assign every contact to a category, and you can group related categories into sets. To locate contacts in the List view, you can specify a unique type style and color for each category in a set. If categories aren't sufficient, you can also assign contacts as many keywords as you like.

Associating contacts with events in a Now Up-to-Date calendar is straightforward, and you can create event links from within either program. Unfortunately, neither application offers the full range of data entry options that the other one does. For example, when you create a new calendar event in Now Contact, you can't specify its priority or reminder settings without launching Up-to-Date. Similarly, when you add a new contact in Now Up-to-Date, you can only enter the name, company, and phone number.

Now Contact provides a flexible template-based system for printing data. In addition to the standard address-book, label, and envelope layouts, you can create letters and fax cover sheets using a simple integrated word processor. Now Contact also includes a mail merge feature for sending to several people at once.

So what's missing? For starters, Now Contact lacks some of the data entry shortcuts found in other address-book software. For example, Now Contact can't automatically expand *po to poughkeepsie* the way Dynodex and TouchBase can. Now Contact's dialing functions are also incomplete—you can enter prefixes and suffixes, but there's no way to automatically strip the area code for making local calls. Now Contact does not support dialing via the Desktop Dialer from Sophisticated Circuits either.

Surprisingly, Now Contact has no command to locate duplicate contacts, a glaring omission for people who often need to merge contact files. And unlike TouchBase and Dynodex, Now Contact offers no easy way to reconcile the contact file on your desktop Mac with the one on your PowerBook. Finally, Now Up-to-Date's excellent networking features are absent from Now Contact.

If all this sounds overly gloomy, I should add that I actually liked Now Contact enough to begin using it as my everyday contact manager. If you can live with the deficiencies in the first release, Now Contact is an excellent choice. With a few changes and additions, it could easily become the top address-book program for the Macintosh.—FRANKLIN N. TESSLER

PowerBook Power Packs

PowerBook External Batteries

PowerPlate

PROS: High capacity. **CONS:** Large-size packaging; no included software. **COMPANY:** Technöggin (513/321-1777). **LIST PRICE:** Mini 3 \$169.95; 3x \$239.95; 5x \$299.95.



ThinPack

PROS: Compact, lightweight design; power-management utilities included. **CONS:** None. **COMPANY:** VST Power Systems (508/287-4600). **LIST PRICE:** \$199.95; utilities alone \$39.95.



THE NEW YORK-TO-LOS ANGELES red-eye flight is just leveling at 35,000 feet as I settle in to write this review. Minutes later, the PowerBook displays a low-battery alert. Impossible! I just charged it yesterday! Feverishly I save my work and switch to a backup battery, but not one of my spares has more than a few minutes of life remaining.

If you're a busy procrastinator like me, such PowerBook nightmares are all too familiar. Battery life is simply too brief for active users, and keeping recharged spares on hand is a chore. What we need is longer-lived batteries. Technöggin and VST Power Systems have risen to the challenge, offering several external battery packs to augment the PowerBook's built-in power.

Technöggin's PowerPlate line includes the Mini 3 and 3x, both rated at 5 amp-hours (Ah)—enough to power a 5-amp device for one hour; and the 5x, rated at 10Ah. VST has a single 5Ah product, the ThinPack. The PowerBook draws from about .75A to 2A, depending on the

model and the application in use. The battery packs attach to your PowerBook using Velcro-like fasteners and hook in through the AC adapter socket.

The vendors claim operating times from eight hours on a PowerBook 100 to four hours on a PowerBook 180c for the 5Ah units and double that for Technöggin's 10Ah unit. All use Apple's standard PowerBook AC adapter to recharge in six to eight hours. These lead-acid cell batteries can be recharged from any state; unlike NiCad cells, they don't need to be fully depleted before being recharged. LEDs show charging status.

The PowerPlates attach to the bottom of the PowerBook, connecting to its AC socket with a short jumper cable. The 2-pound Mini 3 adds ½ inch to the PowerBook's height, while the 2½-pound 3x adds ¾ inch, and the 4-pound 5x, a full inch. The svelte ⅜-inch 2-pound ThinPack attaches to the top or bottom, or you can leave it free-standing using the supplied 48-inch power cable. You can even use two ThinPacks, giving you 10Ah capacity in a 4-pound package.

The System 7 power manager sees the external pack's power cable as an AC adapter; as the battery discharges and its voltage drops, the power manager periodically issues the alert "Your charger is not charging." You can simply dismiss this alert, but the interruptions are annoying. And when the voltage drops to a certain point, low-battery warnings appear and the screen progressively dims, even though the external pack has hours of operating time left. Worse, you can't override the dimming, making use of your PowerBook more and more frustrating.

Fortunately, VST includes ThinPack Utilities, which corrects these problems. The utilities also give you a high-resolution battery-charge bar indicator that you can configure to run along any screen edge, as well as a graph of battery voltage over time. The bar indicator lets you set the voltage at which low-battery alerts occur, and comes preconfigured for a single VST external pack. VST sells the software separately for \$39.95, and it works well with the Technöggin products.

My tests showed a threefold to fivefold increase in battery life over the PowerBook battery used alone. To achieve this performance, though, you have to fully charge the PowerBook's internal battery before connecting and charging the external pack.

Both vendors have good products, but VST's compact design and bundled software make it superior.—MEL BECKMAN



Clockwise from upper right: The PowerPlate 3x (in use), ThinPack, and PowerPlate Mini 3.

DeskWriter 310

Portable Printer for PowerBook

PROS: Versatile design; prints in color, black-and-white, and gray scale; optional sheet feeder available; good 300-dpi print quality; good gray-scale quality. **CONS:** None.
COMPANY: Hewlett-Packard (800/752-0900).
LIST PRICE: \$379; with sheet feeder \$455



HP'S DESKWRITER 310 IS A VERSATILE, low-cost ink-jet printer with multiple personalities. With its 60-page sheet feeder, it's a great desktop printer. Stripped of its 3.2-pound sheet feeder, the printer is a 4.3-pound, battery-powered portable that fits in your overnight bag. And with a \$49 color print cartridge it offers low-cost three-color printing.

Apple's Portable StyleWriter presents a sleeker profile with the same rounded gray look as the PowerBook line. Both the DeskWriter 310 and the Portable StyleWriter make manual paper-feed easy. Where the StyleWriter's cover flips up to provide a paper tray, the DeskWriter grabs the edge of the page and aligns it automatically. While the StyleWriter is a few ounces heavier than the DeskWriter, it has a better shape for traveling: rectangular and flat, and about the size of two computer magazines stacked up (1.9 by 12.2 by 8.7 inches). The DeskWriter 310, at 2.5 by 12 by 5.75 inches, is slightly more awkward to fit into an almost-full briefcase. On the other hand, the DeskWriter's optional carrying case (\$99) nicely holds the printer, a PowerBook, and their accessories.

In performance, the DeskWriter 310 wins hands down over the Portable StyleWriter. In Macworld Lab tests, the DeskWriter printed text-only documents more than twice as fast as the Portable StyleWriter, and printed documents with graphics more quickly and with much

better results. Manufacturers' battery-life estimates (variable depending upon what you're printing) give the DeskWriter a two-to-one advantage. HP estimates 100 pages per battery charge, Apple only 50. The 310 is \$60 less than the list price of Apple's portable offering.

On the Desk

Used with its sheet feeder, the DeskWriter 310 becomes a worthy competitor to Apple's StyleWriter II. The original DeskWriter is a distant third here, with slower performance than the DeskWriter 310.

If you're a stickler for type and can't afford a laser printer, stay with the StyleWriter II, which produces crisp, clear type at 360-dpi. The DeskWriter produces good-looking type also, but at only 300-dpi resolution. This difference is most visible when you're using poor-quality paper. The DeskWriter 310's special



Hewlett-Packard's DeskWriter 310

dithering pattern yields noticeably better gray-scale images than either the Portable StyleWriter or the StyleWriter II.

Both printers can be shared over a LocalTalk network, and both provide back-to-front printing and support for a wide variety of output media; but the DeskWriter's color printing option gives you control over dithering and intensity.

Whichever printer you choose, you'll be getting great value and performance for hundreds of dollars less than even the least expensive laser printer.

—LIZA WEIMAN-HANKS

MacTools 3.0

Disk Utility

PROS: Automatically scans in background for disk problems; improved recovery of deleted files; creates emergency disks easily. **CONS:** Cumbersome backup. **COMPANY:** Central Point Software (503/690-8090). **LIST PRICE:** \$149.



CENTRAL POINT SOFTWARE'S NEW MacTools 3.0 makes recovering trashed files a snap, and fixes more disk problems than either of the two main competitors, Symantec's Norton Utilities for Macintosh (NUM) 2.0 and Symantec/Fifth Generation Systems' Public Utilities 2.0.

The first of the new features shows up during the installation process. In System 7.1, with its System Enablers for each Mac model, it's impossible to create a single disk that will work on any Mac and still fit on a single high-density floppy. During installation, MacTools checks your System Folder for the Enabler that you're using, then prompts you to create an emergency floppy that will work on your machine, with CP DiskFix set as the start-up application. The installer also prompts you to create another bootable floppy with the CP Optimizer application, which fixes disk fragmentation.

TrashBack is the easiest way I have found to retrieve accidentally trashed files. The program adds a TrashBack item to the bottom of the Finder's Special menu. This item gives you a hierarchical menu of the disk volumes available, with submenus showing the files or folders that were deleted when the Trash was emptied. Simply choosing a file or folder restores it to the place from which it was originally deleted. TrashBack tracks a user-specified number (from 200 to 999) of deleted files on a first-in-first-out basis.

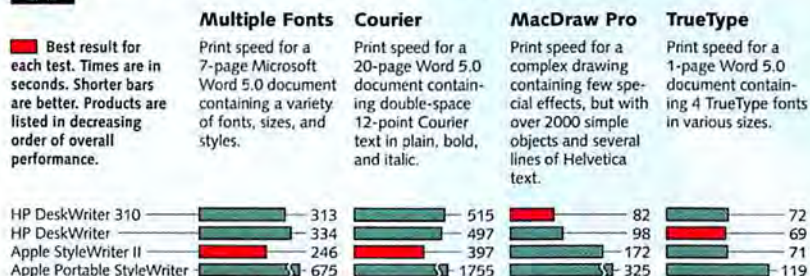
CP DiskFix, the heart of MacTools, has decreased the time it takes to scan a hard drive for problems. It now takes about half as long to complete a scan as it did with version 2. For example, a scan of my 120MB hard drive took three minutes, versus six minutes with the previous version. The new version looks for a corrupted desktop database (the invisible file the Finder uses to store the icons for files); scrutinizes the System file for proper installation; and looks for corrupted system files and applications.

MacTools 3.0 takes an idea that first appeared in Public Utilities—background

continues



HP DeskWriter 310 Speed Comparison



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scanning of disks for problems—and implements its own version with AutoCheck. AutoCheck scans the disk at user-specified intervals if the Mac is idle. AutoCheck uses the same analysis engine as CP DiskFix, and if it finds a problem, it displays an alert dialog box listing the problem and allows you to launch CP DiskFix to immediately repair the damage.

MacTools' other features have only minor changes. CP FileFix, which repairs damaged Microsoft Word and Excel files, adds support for Word 5.1 and Excel 4.0 format files. CP AntiVirus still checks your disks, either automatically or on command, but now has easier-to-enter virus signatures and can scan files compressed with Aladdin Systems' StuffIt software. Central Point now sends postcards with new virus signatures to all registered users whenever new viruses are discovered; it also posts the signatures to the Central Point forums on CompuServe, America Online, AppleLink, and Internet. MacTools includes an integrated virus checker—both NUM and Public Utilities lack this feature; however, Symantec has a separate antiviral utility called Symantec AntiVirus for Macintosh (SAM). The CP DriveLight control panel displays a flashing icon in your menu bar when the hard drive and floppy drives are accessed and when the serial ports or AppleTalk are in use. CP FastCopy is a utility that copies floppy disks and creates disk-image files. It can now read and write image files in Apple's Disk Copy format or Central Point's own proprietary format, and CP FastCopy can read image files from NUM's similar Floppier utility. You can also use CP FastCopy to copy floppies formatted in the 1.44MB or 720K PC-compatible formats.

The CP Backup application lets you back up to a folder on another hard drive and lets you back up files in Finder format. The new CP Backup also reuses space on floppy disk backup sets when files on the source disk change or are deleted between backups. CP Backup is now competitive with such stand-alone backup programs as Dantz Development's DiskFit Pro, even allowing you to encrypt your backups. CP Backup is not as easy to use as other backup programs, however; you must select the appropriate settings in several dialog boxes before you back up, and a few of the choices are unclear.

MacTools 3.0 is a welcome revision to an already fine package. With its disk-and-file maintenance and disk repair, virus protection, and backup, MacTools provides more value than either of the other utility packages.—TOM NEGRINO

SAM 3.5.8

Virus-Protection Software

PROS: Efficient, thorough virus and Trojan horse protection; seeks out suspicious activities.

CONS: Slows down system start-up and application launches; sometimes gives too many suspicious-activity alerts. **COMPANY:** Symantec Corporation (408/253-9600). **LIST PRICE:** \$99.



ALTHOUGH NOT NEARLY AS ubiquitous as in the PC world, viruses can be every bit as destructive on Macs. Most virus strains—small pieces of code that attach themselves to a file—do little more than put a silly message on your screen or cause slightly odd behavior. But some, especially the Trojan horse viruses, which infect innocuous-looking programs, can wipe out your hard drive.

The newest version of SAM, short for Symantec AntiVirus for Macintosh, includes SAM Intercept, an extension that monitors for the presence of viruses and other suspicious activities, and SAM Virus Clinic, an application that performs both on-demand and scheduled search-and-destroy missions on your disks.

The centerpiece of the program is SAM Intercept, which has four sets of protection options, ranging from Basic, which looks for known viruses and Trojan horse strains, to Custom, where you can choose from a list of system-related activities that might indicate the presence

time they're mounted. You can scan the System Folder or your entire start-up volume at start-up or shutdown. You can also scan files compressed with AutoDoubler (while it's active), Compact Pro, and StuffIt. To prevent the SAM control panel from being changed (or even deleted) without your permission, protect it with a password. This protection, though, is good only so long as the extension is loaded. If you start your Mac with extensions off, you can trash SAM Intercept as easily as any other program.

For basic 1MB Macintoshes, Symantec includes SAM Intercept Jr., which offers basic virus protection but none of the extensive configuration options offered by its bigger sibling.

SAM Virus Clinic extends virus protection by offering scheduled scans. It can also inoculate your software, which provides SAM Intercept with information it needs to determine whether an application has changed since it was last launched. During my tests, I found that applications as diverse as America Online and QuarkXPress did not suffer from this sort of protection. Some programs, though, are self-modifying (meaning the code may change slightly each time you launch it depending on how you change settings), so it's best to check with the software publisher before applying this sort of protection.

The key question to ask is: With all these marvelous features, can SAM really detect a virus? Don't try this at home, but I've accumulated an infected disk or two over the years, and indeed, SAM flagged the viruses as soon as the disks were mounted or the software was launched (see "Caught in the Act"). The downside of this protection is performance. It will take longer to start up your Mac, and as you launch an application, precious seconds will click by while SAM searches the code resources for a virus.

SAM's manual is well written and easy to follow. Technical-support lines are often busy, but the support people are friendly and helpful once you get them on the line. You can order both automatic disk updates for new viruses and maintenance releases for \$45 per year. New virus-detection and repair strings are also posted on the major online services.

If you don't exchange files with other users or connect to a modem or a Mac network, you may find adequate virus protection in free utilities such as Disinfectant (which cannot detect Trojan horse viruses). But if you're networked and you receive lots of data from different sources, you need all the virus protection you can find. SAM is one of the best solutions out there.—GENE STEINBERG



Caught in the Act SAM locates a virus strain inside a System file.

of an unknown virus. Such activities include processes that would normally occur if you're expanding a compressed file or copying a file to the System Folder. But the more advanced options have a downside: they produce almost constant warnings about system activities, even when no virus is present.

You have a number of options about what to scan and when. Normally, you scan a floppy disk when you insert it. You can also opt to treat removable cartridges as floppies so they'll be checked every

Flexibility (ˌflek·sə·ˈbil·ət·ē) *n.* 1, A feature previously not found in this category. *example:* For under \$800, **TI microWriter™** printers with **Adobe® PostScript®** give you more networking and paper handling *flexibility* than Apple and HP, at a lot lower price.



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If you're looking for a PostScript printer with a street price well under \$800, you'll have a hard time finding one with as many features as a TI microWriter.

Just look at the chart and compare it to our leading competitors, Apple and HP. Then, when you're ready for a full-featured printer that's truly flexible, at a price that's truly affordable, take a look at a TI microWriter. For more information or a dealer near you, call 1-800-527-3500.

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	TI microWriter PS23	Apple LaserWriter Select 310	HP 4ML
Print Speed	5 ppm	5 ppm	4 ppm
AppleTalk® Connection	Standard	Not Avail.	Standard
Paper Trays	(std.) 250 sheet	250 sheet	100 sheet
	(opt.) 250 sheet	250 sheet	Not Avail.
Auto Emulation Switching	Standard	Not Avail.	Standard
List Price	\$ 799	\$ 1079	\$ 1279



Specifications in chart are based on information as of 12/93. microWriter and "Extending Your Reach With Innovation" are trademarks of Texas Instruments. Adobe, PostScript and the PostScript logo are registered trademarks of Adobe Systems, Inc. AppleTalk is a registered trademark of Apple Computer, Inc. © 1993 TI.

Circle 265 on reader service card

Compatibility (kəm·pat·ə·'bil·ət·ē) *n.* 1, A feature typically lacking in this category. *example:* The new **600 dpi TI microLaser™ Pro 600** printer gives you Mac®, DOS, Windows, PostScript® and PCL5 compatibility standard; Apple and HP charge hundreds more.



Adobe PostScript

Specifications in chart are based on information as of 12/93. *Estimated dealer price including manufacturer's rebate is under \$1400. Dealer prices may vary. †At 4% coverage. ‡Rebate applies to PS23 model. microLaser and "Extending Your Reach With Innovation" are trademarks of Texas Instruments. Adobe, PostScript and the PostScript logo are registered trademarks of Adobe Systems, Inc. LaserJet is a registered trademark of Hewlett-Packard, Inc. Mac is a registered trademark of Apple Computer, Inc. © 1993 TI.

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Take print quality. We began with true 600 dpi resolution. And then enhanced it with 6MB of memory for improved graphics. Compatibility? We're Mac®, DOS and Windows compatible right out of the box. With all the right languages and interfaces. And with the intelligence to switch these automatically, depending on the environment. Connectivity? All popular protocols are supported with a single network option board.

Low maintenance? Our new toner cartridge typically gives you 15,000 pages between changes. Paper handling? Two 250-sheet trays come standard. And finally, value. Take a look at the chart below, compare features and price, and your choice should be simple.

We invite you to try the new TI microLaser Pro 600. For additional information or a dealer near you, call 1-800-527-3500.

	TI microLaser Pro 600	Apple LW Pro 600	HP LaserJet 4M
True 600 dpi	Yes	Yes	Yes
Speed/Processor	8ppm/RISC	8ppm/68030	8ppm/RISC
Emulations	PCL5/ Adobe® PostScript 2	PCL4/ Adobe PostScript 2	PCL5E/ Adobe PostScript 2
Compatibility	Mac/DOS	Mac/DOS	Mac/DOS
Toner Cart. Life	15K pages ¹	6K pages	6K pages
Paper Trays	250 sheet/ 250 sheet	250 sheet/ 100 sheet	250 sheet/ 100 sheet
Auto Language Switching	Yes	No	Yes
Auto Interface Switching	Yes	Yes	Yes
40MHz Processor Upgrade	Optional	Not Avail.	Not Avail.
List Price	\$1599*	\$2099	\$2479

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TimesTwo 2.0

Automatic Disk-Compression Utility

PROS: Compresses all files; fully transparent operation; no decompression utility needed.

CONS: Copy-protected installation master.

COMPANY: Golden Triangle Computers (619/587-0110). **LIST PRICE:** \$149.



VERSION 2.0 OF GOLDEN TRIANGLE's automatic disk-compression utility TimesTwo is a significant improvement over the original product. TimesTwo promises to double the apparent disk space available on a disk or partition by transparently compressing the data at the disk-driver level rather than as an addition to the Mac Operating System.

The product ships with a copy-protected master disk and well-written installation instructions. To install the program, you simply boot from the TimesTwo installation master disk and select a hard disk or partition to convert to a TimesTwo disk. The installer first runs diagnostics to ensure that your disk and SCSI connections are reliable and then compresses all data on the drive. When you next reboot, the Finder

shows the new size of your hard disk as being about twice its original capacity. You then use the disk as you normally would—TimesTwo transparently operates the compressed volume and, according to the vendor, is fully compatible with all software, including disk-utility programs such as Norton Disk Doctor. In my tests, over the course of two months running TimesTwo on a Centris 650, I experienced no problems, even while using myriad utilities and system software tools. All files appear at normal size, even though they actually consume considerably less disk space. Because the TimesTwo driver is contained on the hard disk (and is not part of the System Folder), you can use a TimesTwo disk (or removable cartridge) on another Mac without first installing any special extensions or utilities.

The original incarnation of TimesTwo suffered from several shortcomings: a copy-protected master disk, no support for disk partitions, the need for special crash-recovery steps, inaccurate disk space readings, and ungraceful full-disk handling. The new version addresses each of these problems, and provides a few new features in the bargain. You can now make backup copies of the master disk, although the product is still copy-protected. TimesTwo now also works with disk partitions, no longer requires special crash-recovery procedures, gives more

accurate disk-space reports, and issues "disk full" messages when a disk fills up. New features include MagicBoot, which sets up an emergency boot area on any volume for accessing a corrupted hard disk, and Optimize, which reorganizes files for improved performance.

The overall performance of the new version is similar to that of the original: it moderately increases the time needed for such tasks as copying files, launching applications, and saving data. Slower Macs (those with a 68000 or 68020) still take about twice as long for most operations under TimesTwo; faster Macs (68030 and up) slow by 15 to 25 percent. The faster the CPU, the more quickly TimesTwo's compression algorithm runs. All currently shipping Macs have 68030 or better processors, and thus suffer little loss of performance under TimesTwo.

Data-compression efficiency varies with the type of data, no matter what product you use. TimesTwo achieved about a 1.8:1 space increase with an average mix of applications and data files.

Golden Triangle has made good on its promise to fix TimesTwo's problems and has added features that most users will find useful. The new version is as transparent and robust as any driver-level compressor. It's definitely ready for prime time.

—MEL BECKMAN

SECOND LOOK

SoftPC 3.1

Windows PC Emulation

PROS: Faster than previous version. **CONS:** Still slow for most tasks. **COMPANY:** Insignia Solutions (415/694-7600). **LIST PRICE:** \$499.



THE EARLIER VERSION OF THIS DOS emulator that can run Windows 3.1 programs was known for being as slow as molasses, despite its faithful emulation of a complex operating system (see *Reviews*, *Macworld*, June 1993). Insignia Solutions has now tackled the speed problem with version 3.1.

The company has in fact succeeded in boosting performance. While version 3.0 ran barely faster than a Classic on a Quadra 950 with 16MB of RAM, the new version runs almost as fast as an original LC, according to Macworld Lab tests. From the perspective of a Windows PC user, that means SoftPC 3.1 with Windows is about as fast as an 8MHz IBM PC AT—a class of machine that Microsoft has long said is too underpowered for Windows.

The good news is that the performance on slower 040s, like those used in a Centris 610 or Quadra 610, is not much slower, so the product is accessible to more users. The earlier version was essentially unusable on anything less than a Quadra 950. Of course, no matter what system you run it on, you'll need 16MB of RAM, and you'll get overall performance somewhere between that of a Classic and an LC.

SoftPC with Windows gains most of its speed in tasks that are not CPU-intensive. But disk access, video display, and math calculations are noticeably faster. Still, don't read too much into this better performance: for video, the screen still crawls, and Windows does a lot of video processing.

Insignia has made the installation process—once very labor-intensive—easy, and has fine-tuned SoftPC's memory optimizations. Plus there's a built-in IPX networking protocol for connection to Novell NetWare servers. Insignia Solutions has the right idea, but the emulation approach used may be simply too CPU-intensive to work speedily on any 040-based Mac. Fortunately, according to

informal tests with a beta version, the version for PowerPC Macs doesn't suffer from the 040 version's performance problems.

In the meantime, if you need regular access to Windows, get an inexpensive 486SX-based Windows PC or an add-in PC card for your Mac (see "OrangePC," *Reviews*, *Macworld*, October 1993, and "Apple Ships Its First Mac with DOS," *News*, *Macworld*, February 1994).—GALEN GRUMAN



How Fast Is PC Emulation?

CORE PERFORMANCE INDEX

Times as fast as a Classic (Classic = 1.0).

Use these standard ratings of overall performance, based on a core test suite, to compare systems across classes. We timed typical business tasks in Microsoft Excel and Word that use the Mac's processor, drives, and video display.

Best result in tests.
Products are in order of overall performance.

Windows PC (33MHz 486DX)	13.2
Farallon's Timbuktu 5.01*	7.4
Orange Micro's OrangePC (25MHz 486SX)	5.8
Windows PC (10MHz 286)	1.9
SoftPC 3.1 running Windows**	1.6
SoftPC 3.0 running Windows**	1.1

*Running on a Centris 610 with 12MB of RAM and a 33MHz 486 PC over a LocalTalk network. **Running on a Quadra 950 with 16MB of RAM.

All configurations were tested with MS-DOS 5.0 and Windows 3.1. Systems were set at 8-bit color VGA video display except for the 286-based PC, which was set at monochrome.

Satisfaction (ˌsat.əs.ˈfak.shən) *n.* 1, A feature previously left to chance in the purchase of a printer. *example:* When you buy a new TI printer*, your **satisfaction** is **guaranteed** or call TI within 30 days and we'll take it back.



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When you buy one of these new TI printers, if you need any help at all, simply call us toll-free at 1-800-TI-TEXAS, and we'll work with you. Then, within 30 days from date of purchase, if you're still not completely happy, call TI and we'll take it back. It's as easy as that. That's how confident we are in each

and every printer we make. And even after the 30 days, you can continue to call the 800 number for any help you may need.

For more information about the TI microMarc™, the TI microWriter™ or the new TI microLaser™ Pro 600 printers, and for the name of a dealer near you, call 1-800-527-3500. And see for yourself how TI is redefining what you should expect from an office printer.

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OptiMem 1.4.1

Memory Manager

PROS: More effective use of your Mac's memory bank. **CONS:** Crashes sometimes when applications misbehave; does not recognize some popular programs. **COMPANY:** Jump Development Group (412/681-2692).

LIST PRICE: \$129.



OPTIMEM, THE FIRST PROGRAM from Jump Development Group, is a systemwide memory manager or optimizer. This control panel (which works only with System 7 or later) monitors RAM use and allocates it where it's needed. By making memory management more efficient, OptiMem allows you to open more programs at the same time. Since many Mac crashes are the result of memory-addressing problems, OptiMem promises to reduce crashes as well, though I cannot say for certain that I had fewer crashes while using it.

A Mac application has three memory settings. The first is the suggested size, which is what the publisher decides is the memory needed for normal use. The second is the minimum size, which is the small-

est amount of memory the program will launch and operate in (though probably less efficiently than in the suggested size). The final figure is the preferred size, which you can adjust as needed, using the Finder's Get Info feature.

When you open more than one application on your Macintosh, the program you're not immediately using just sits there, doing nothing, but hogging memory. With OptiMem, applications (although only those that the OptiMem control panel is configured for) open with their minimum memory allotment. If a program needs more RAM, OptiMem allows the program to tap the unused RAM on your Mac. When the program no longer needs this memory, the memory is freed and returns to the pool of unused RAM.

You can set the OptiMem control panel to warn you when you're running out of RAM. When memory is running low, OptiMem puts up a flashing traffic-light icon on the Apple menu, providing you with the option of closing the programs that you least need to have available.

Out of the box, OptiMem functions only with software that it is already configured for. It did not recognize a number of memory-eating programs in my tests, such as Adobe Photoshop 2.5.1 and FrameMaker 4.0 (although support for FrameMaker may be added in a later release,

and at press time, Jump Development announced version 1.5.1, which supports Photoshop). You have the option of adding new programs, however, and OptiMem will configure itself by watching the way a program uses available memory.

OptiMem works best when your software is well behaved. But not all software works gracefully at its minimum RAM setup, or uses or lets go of memory when it's supposed to. In such situations, OptiMem isn't much help. If a program doesn't take well to a minimum-memory situation, it may cause crashes—as happened to me a few times. OptiMem can be deactivated from incompatible programs to solve this. I also uncovered some compatibility issues (such as with DayStar's QuadControl cdev) that may be addressed by the time this review is printed.

The short instruction manual explains the program and gives you helpful hints on optimizing memory use. Jump Development isn't large enough yet to impose the terrors of a voice-mail system on its users, so technical support is easy to reach, friendly, and helpful.

OptiMem is a clever idea, and for the most part, Jump Development has pulled it off. If you don't have enough RAM, or if you just want to make the best use of what you have, OptiMem may be just your ticket.—GENE STEINBERG

PenDirect ADB

Light-Pen Input Device

PROS: Doesn't require a separate power supply; easy to set up. **CONS:** Expensive; more awkward than a mouse for most operations; requires additional hardware for pixel depths greater than 8 bits. **COMPANY:** FTG Data Systems (714/995-3900). **LIST PRICE:** \$498.



THE PENDIRECT IS AN ALTERNATIVE input device that lets you manipulate items on the Macintosh screen using a special stylus called a light pen. To determine the pen's position, the PenDirect uses a compact interface box that hooks up to the Mac's video card or video-out port and the monitor. (The manufacturer says the PenDirect is compatible with most Mac displays and video cards.) The interface draws power from the Mac's ADB port, eliminating the need for an AC cord or adapter. The jet-black pen connects to the interface with a long phone-style cord. A switch that activates with light pressure on the pen's tip takes the place of the button on a mouse.

The software includes a control panel and a small start-up application that runs

automatically each time you boot the Mac. You use the control panel to calibrate the light pen to your monitor. The control panel also lets you customize some aspects of the light pen's operation. For example, the pen sometimes doesn't register dark objects; to make detection of dark colors more reliable, you can set the PenDirect software to flood the screen with blue whenever you touch the pen to the monitor. (To use this feature at color depths beyond 8 bits, however, you have to purchase a second unit for \$149.) Another feature freezes the cursor momentarily when you select items in the Finder, making it easier to double-click on them. Finally, you can opt to smooth the motion of the cursor as the pen moves across the screen, albeit at the expense of slightly degraded response.

The light pen's biggest advantage over other pointing devices is the one-to-one relationship between pen and cursor movement. For example, in graphics applications you can actually draw on the screen. Small children may also find the light pen less cumbersome and more intuitive than a mouse, as my 26-month-old daughter did in a CD-ROM game.

Overall, though, I found the PenDirect ergonomically inferior to a mouse for routine tasks like word processing. For example, the light pen forces you to hold your arm up and away from your body, an un-



PenDirect ADB

comfortable position unless you also perch your elbow on the desktop. Also, reaching for the light pen for brief tasks like selecting text is more awkward than using a mouse. (Of course, the pen can always be used in tandem with other ADB devices.)

Still, the PenDirect light pen performed well in my tests. It's worth considering if you're unhappy with your mouse or trackball, although for graphics applications I suggest that you try a digitizing tablet first. And if your toddler is having trouble with the mouse, the PenDirect is an excellent, if expensive, alternative.—FRANKLIN N. TESSLER

RCD-202

CD-ROM Writer

PROS: Relatively inexpensive; easy to use; writes data to several formats. **CONS:** Incompatible with many hard drives; multisession discs can be read only by RCD-202 players. **COMPANY:** Pinnacle Micro (714/727-3300). **LIST PRICE:** \$3995.



WRITE HUNDREDS OF MEGA-bytes of data to a CD-ROM on your desktop for under \$4000? Several vendors now offer hardware-and-software packages that do just that. Pinnacle Micro's RCD-202 reads CD-ROMs at a standard 150K per second and creates CD-ROMs in several formats—Apple HFS; ISO 9660; CD-audio; and CD Image, which creates a mirror image of a volume. No new technology is without its trials, and the RCD-202 is no exception, but if you are careful in matching your needs and system configuration to the RCD-202's constraints, you might find that this easy-to-use package suits your needs.

Conveniently sized for the desktop, the RCD-202 is a half-height, caddy-style

mechanism with dual SCSI ports, a push-button SCSI ID selector, a front-panel jack for earphones, a volume controller, and rear-panel RCA audio jacks and outputs. It writes to both 63-minute (580MB) and 74-minute (680MB) blank discs.

Stable and full-bodied software is an imperative when writing a CD-ROM. The first versions of RCD-202 software were bug-ridden and lacked functions that most Macintosh users would find necessary. The most recent release, version 1.3, is much more robust.

You can now write file-by-file HFS format (so you can record files selectively) and multisession format (the most recent, Orange Book, standard), although you can play multisession discs created on the



Drag-and-Drop Recording The interface for the RCD-202 software employs a simple drag-and-drop metaphor. The source volume appears on the left with the destination CD-ROM on the right.

RCD-202 only on an RCD-202. According to Pinnacle Micro, third-party software will allow other players to read CD-ROMs recorded on the RCD-202.

Version 1.3 also provides a test, called Predictor, that determines whether your configuration will support the proper sustained data-transfer rate to the drive. The Predictor test is a boon because it is possible that the hard disk on which you store the data to be copied is not compatible with the RCD-202. The volume must support at least a 300-Kbps transfer rate for CD Image and audio files, and at least 1 MBps for HFS and ISO-9660 files; seek times should be less than 25 milliseconds.

Furthermore, hard drives perform thermal-recalibration routines that break the flow of data—sometimes these are long enough to abort the write procedure. Another problem is that the RCD-202's small (64K) buffer sometimes chokes when it is faced with the task of transferring many small files or files from a badly fragmented hard disk. Predictor is fairly reliable, but it takes as long to run the test as it does to actually write the CD-ROM.

The RCD-202 was the first CD-ROM writer to break the \$4000 barrier, but several companies have since matched or bettered the price. Still, if you wish to archive data simply and inexpensively, the RCD-202 fits the bill.—SUZANNE STEFANAC

Myst 1.0

Graphical Adventure Game

PROS: Exquisite graphics and sound; engaging nonlinear story; challenging puzzles. **CONS:** May have a negative impact on your productivity. **COMPANY:** Brøderbund Software (415/382-4400). **LIST PRICE:** \$59.95.



IN THE INTEREST OF FULL DISCLOSURE, we'll start with a confession: we have never met Robyn and Rand Miller, but we're big fans. We've loved their work since we first clicked our way through *The Manhole*, the charming interactive wonderland that defined a new genre of computer games.

When we learned that the Miller brothers were working on a game for older audiences, we expected a rich environment full of clever twists and surprises. We weren't prepared for the unbelievable believability of the fantastic world we entered after inserting the disc in our CD-ROM drive. Instead of booting a computer program, we felt like we were watching the opening scene of a movie—a movie that quickly drew us into the leading role.

The game starts on a deserted island—an island full of questions. As you learn of the island's strange, dark history, you uncover a disturbing mystery. Your explorations lead you to several surrealistic worlds containing puzzles that must be solved to unravel the mystery and unlock gateways to other worlds. The puzzles aren't easy. Many require careful inspection of the environment, and a few are downright obscure. (We needed a few hints to get us through—only because we had a deadline, of course.)

While puzzle solving and exploration have always been staples of adventure games, *Myst* is in a class by itself. For one thing, players don't die (although it is possible to lose, so it's still important to save

your game occasionally). There are no distracting controls or inventories in the simple point-and-click interface. And *Myst* has far less repetitive busywork than most adventure games. Enticing clues and intriguing bits of the unfolding story are revealed regularly no matter which paths you choose to explore.

But *Myst*'s real strength is the totality of the experience and mood it creates. Every scene looks like a color photograph—a photograph of a not-quite-real place. Quick-Time movies are seamlessly woven into the animated 3-D graphics. Ambient sounds of wind, water, wood, and machinery enhance every scene. And the moody musical sound track helps make *Myst* feel like part movie, part dream.

Myst was two years in the making, and it shows. It's been polished until it shines. *Myst* is the first CD-ROM game we've seen that doesn't constantly remind us how slow the medium is; the smooth pacing of actions and sounds matches the dreamlike quality of the game.

We did encounter a couple of glitches and frozen screens when we tried to run the program with all of our system extensions turned on. But once we trimmed our extensions library, the program ran smoothly but slowly. If only we could have solved all of the game's puzzles that easily.

—GEORGE AND BEN BECKMAN



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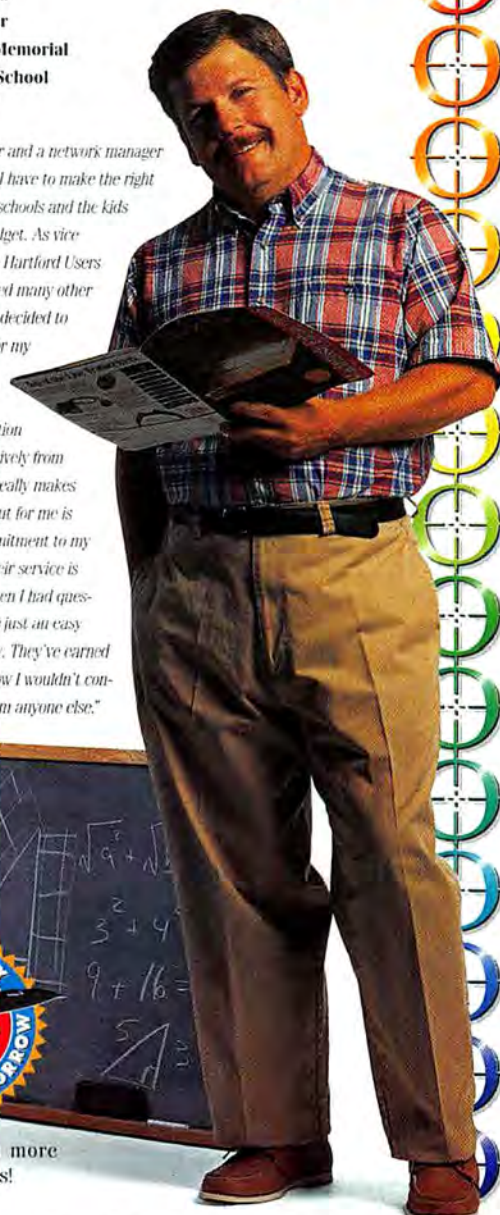
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The Disney Collection Screen Saver

Screen-Saver Utility

PROS: Excellent animation and sound.

CONS: High disk space and memory requirements; some modules don't work in more than 256 colors. **COMPANY:** Berkeley Systems (510/540-5535). **LIST PRICE:** \$49.95.



ACCORDING TO CONVENTIONAL wisdom, computers that present the same display for many hours at a stretch will eventually leave an image physically etched into the monitor. Screen savers like The Disney Collection from Berkeley Systems—producers of After Dark, More After Dark, and Star Trek: The Screen Saver—are supposed to prevent that from happening by automatically changing the display whenever the computer is idle. (A technical-support specialist for one monitor vendor confirmed that burn-in poses a real risk. I've never been curious enough to experiment with my system, though.)

If keeping your monitor healthy is all you're interested in, simple screen-blanking utilities are available at little or no cost from bulletin boards, online services, and

user groups. But Berkeley Systems' products aren't supposed to be utilitarian—they're designed to entertain, like movies and Broadway musicals. All 16 modules in The Disney Collection include sound effects, and 4 of them—Little Mermaid, Captain Hook, Beauty and the Beast, and Sorcerer's Apprentice—play music from the Disney movie of the same name.

Unfortunately, all the whiz-bang graphics and sound come at a price. You cannot even install all of the components unless you have 7MB of free disk space. Some of the modules need more than 3MB of memory to run with sound, and three of them won't work at all if your monitor is set to display more than 256 colors. It's also worth noting that some of the Disney modules might do a less than thorough job of saving your screen. For example, parts of the Goofy module don't seem to change very often.

Still, watching cute little dalmatian puppies cavort on your monitor is a welcome change from spreadsheets. I also like the module that shows Mickey Mouse poking around a haunted version of the desktop by matchlight. Beauty and the Beast and Little Mermaid are also delightful—the colorful graphics and music are sure to please

kids (see "Beauty and the Beast"). But I was disappointed not to see a module from *Aladdin*, my favorite Disney movie of recent vintage. (I can almost hear the genie complaining "I'm trapped in the monitor and I've got *such* a headache!" Maybe next year.) As always, The Disney Collection is compatible with all previous After Dark modules, although the Disney screen savers don't run under MultiModule, so you can't mix and match them.

Is The Disney Collection more effective than other screen savers? Probably not. But at a street price of around \$30, it'll provide an entertaining diversion for Disney fans who use Macs.—FRANKLIN N. TESSLER



Beauty and the Beast This module features colorful scenes from the movie accompanied by the award-winning theme song.

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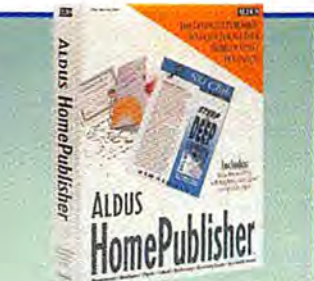
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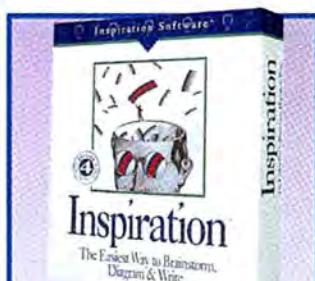
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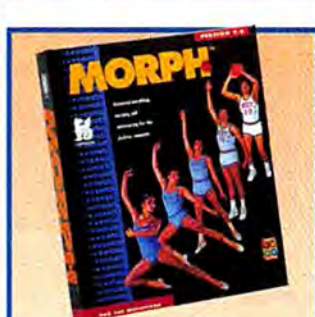
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13711 Home Publisher 2.0 44.95
11548 PageMaker 579.95 6678 Upgrd. 139.95
Allsys
1195 Fotographer 258.95
★ Apple Computer ... 30 day MBG
3008 Apple Font Pack 45.95
★ Ares Software ... 30 day MBG
8878 FontMong. 94.95 8588 ChameIn 184.95
Broderbund Software
13603 Print Shop Deluxe 49. 3572 Kid Pix 34.
★ Claris ... 30 day MBG
14158 Impact or 2518 MacDraw Pro ea. 269.
★ DeltaPoint ... 60 day MBG
12974 DeltaGraph Pro 3 139.95
★ Deneba Software ... 30 day MBG
11055 artWORKS 99. 3227 Canvas 3.5 259.
Fractal Design
10402 Painter 2.0 265. 1564 PainterX2. 94.95
Gold Disk
12279 Astound 249.
Gryphon
4202 Morph 2.0 154.95
★ Letraset - Full FonTek library avail. call
★ Manhattan Graphics ... 30 day MBG
12980 Ready, Set, Go! 6.0 149.95
Quark
7612 QuarkXPress 3.2 589.
★ Ray Dream ... 30 day MBG
12264 JAG II 89. 4761 Designer 3.0 249.
★ T/Maker ... 30 day MBG
ClickArt (bitmapped) 34.95 (EPS) 55.95
3144 Incred. Images or 3147 CD-ROM ea. 89.95

PROGRAMMING/UTILITIES

★ Abbott Systems ... 30 day MBG
5236 CanOpen 2.0 59. 9578 Kaleidoscope 25.
★ Aladdin Systems ... 30 day MBG
7410 StuffIt SpaceSav. 34.95 6740 Deluxe 69.
★ Apple Computer ... 30 day MBG
1206 At Ease 45.95 7072 QuickTime Kit 105.
Chinese or Japanese Lang. Kit. ea. 195.
1074 System 7.1 59.95 13047 S7 Pro. 99.95
10478 System 7.1/Font Pack Bundle 62.
★ Berkeley Systems ... 30 day MBG
1502 The Disney Collection Screen Saver. 29.
5737 After Dark 2.0x (30+ screens!) 29.
2198 More After Dark 25. 2196 Bundle 39.95
3392 Star Trek: The Screen Saver 29.
★ CE Software ... 60 day MBG
1727 CalendarMaker 39. 7927 QuickKeys 105.
★ Central Point ... 30 day MBG
5041 MacTools 3.0 85.95 10595 Safe/Sound 32.
★ Dantz Development ... 30 day MBG
9115 DiskFit Direct 1.0 29. 3393 Pro 72.
5255 Retrospect 145. 7945 Remote 2.0 259.



Gryphon Software
4202 Morph 2.0—Create startling special effects with this hot, new application. Produce dazzling transitions between two images to create bizarre caricatures or QuickTime movies \$154.95



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14587 SBC-2 SuperCharger—Charges and conditions your PowerBook Duo battery in less than 90 minutes! \$139.95
14841 BC4-200—Charges up to four batteries independently 179.95



1992 MacWEEK Diamond Award Winner
★Dantz Development ... 30 day MBG
7945 Retrospect Remote 2.0—Powerful Mac network backup software. For automatic, centralized backup and archiving. Supports compression, encryption, & verification \$259.
3393 DiskFit Pro 1.1—Efficient media backup 72.

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ChipSoft

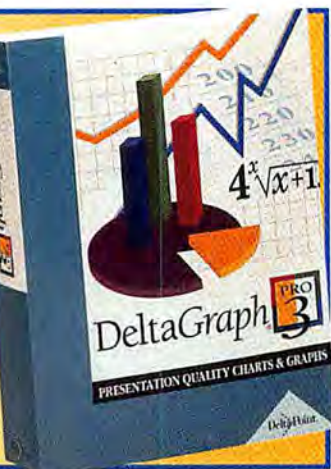
8059 **MacInTax 1040**—Easy, fast, accurate. The EasyStep feature walks you through the tax return process. Includes over 90 forms, schedules, & worksheets, IRS instructions, tax help, & itemizations..... **\$39.95**



★ CheckMark Software ... 60 day MBG

5863 **MultiLedger 3.0**—Easy-to-use, integrated accounting software selected as a *Macworld* Editors' Choice (11/92)..... **\$229**.
5862 **Payroll 5.1**—Complete payroll management which also works with M.Y.O.B. 169.

★ **DeltaPoint ... 60 day MBG**
12974 **DeltaGraph Pro 3**—DeltaGraph Pro 3 is unsurpassed for creating visually stunning, technically accurate charts and graphs, all with publication quality. It provides a gallery of more than 60 distinct chart types and formatting options that make it possible to create more than 200 chart styles. It includes the widest range of data-driven graphics technology available, making it perfect for the business arena, scientific, and highly technical markets. Features a 360° 3D chart rotation, 14 distinct new chart types, an expert advisor system, multiple document support, and extensive data linking capabilities. Plus control your chart's size, placement, and color.
More than 100 new features!..... **\$139.95**



- ★ **Datawatch ... 30 day MBG**
4803 **Virex/Mac S59**. 11486 SuperSet Util. \$89.
FWB, Inc.
- 2999 **Hard Disk Toolkit 125**. 7929 Pers. 49.
- ★ **Golden Triangle ... 30 day MBG**
11731 **TimesTwo (1.44)**..... 85.
- ★ **Harvard Systems Corp. ... 30 day MBG**
11193 **Kal's Power Tools for Photoshop**..... 89.
- ★ **Inline Software ... 30 day MBG**
7068 **INITPicker 49**. 1740 Redux Dlx 2.01 49.
- ★ **Kent Marsh Ltd. ... 30 day MBG**
9513 **FolderBolt 73**. 1839 NightWatch II. 89.
- ★ **MicroMat Computer Systems**
3732 **MacEKG II**..... 89. 2998 DriveTech..... 42.
- ★ **Now Software ... 30 day MBG**
12303 **Now Compress 46**. 12304 FUN!..... 29.95
6925 **Now Utilities 4.0**..... 84.
- ★ **Stac Electronics**
11568 **Stacker for Macintosh**..... 75.
- ★ **Symantec ... 60 day MBG**
3955 **Suitcase 2.1.3**..... 53.
14244 **SuperDoubler**..... 79.95
5176 **SAM**..... 65. 6748 **NUM**..... 95.
- ★ **Teknosys ... 30 day MBG**
5203 **Help!**..... 89.95

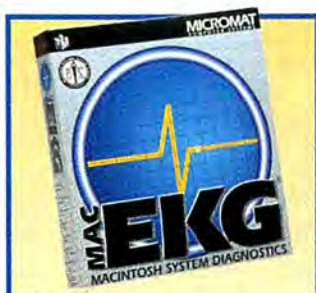
LEARN & PLAY

- ★ **Callisto ... 30 day MBG**
11756 **Super Maze Wars**..... 39.95
- ★ **Davidson & Associates ... 30 day MBG**
2574 **MathBlast**. Plus or 1076 Zoo Keep. ea. 34.
- ★ **Edmark Corporation ... 30 day MBG**
7155 **Kid Desk 24**. 7318 Millie's Math Hse. 29.
- 1078 **Bailey's Book House**..... 29.
- ★ **Electronic Arts**
1907 **PGA Golf 38.95** 2805 Tour. Course 18.95
GameTek
- 13813 **Jeopardy** or 7433 **Wheel of Fortune** 24.95
- ★ **Great Wave ... 30 day MBG**
6693 **KidsMath** or 2276 **Kid's Time Dlx**..... 25.95
- ★ **HyperGlot Software ... 30 day MBG**
(Language Tutorials: full line available)
- ★ **Inline Software ... 30 day MBG**
11188 **Pax Imperia**..... 36.95
9792 **Deliverance** or 9797 **Firefall Arcade** 29.95
- ★ **Interplay Productions**
1615 **Mario Teaches Typing**..... 29.95
Bridge Dlx or **Out Of This World** ea. 34.95
- ★ **Leister Productions ... 30 day MBG**
7126 **Reunion 3.0**..... 115.



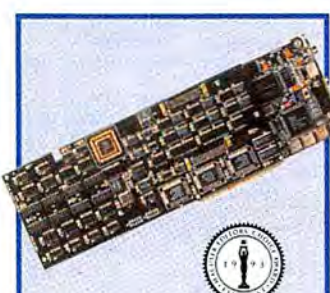
★ Great Wave Software ... 30 day MBG

1014 **ConcertWare Pro 1.0**—Makes music notation easy for experts and amateurs alike. Quick entry of up to 32 staves, powerful editing tools, and MIDI playback..... **\$175**.



MicroMat

3732 **MacEKG 2.06**—Automated diagnostic features locate minor problems before they become disasters. Historical arrays show changes in your Mac since the last test. Also notices software conflicts and hardware deterioration..... **\$89**.



RasterOps

14749 **MoviePak Presenter**—Create full-motion, full-screen QuickTime movies on your Mac. Capture and play back video images in 24-bit color at up to 60 fields/sec (640 x 480)..... **\$1559**.

- ★ **Maxis ... 30 day MBG**
14126 **El-Fish** \$36.95 11628 **A-Train Bun**. \$44.95
13818 **SimCity 2000** 41.95 5279 **Classic** 24.95
- ★ **MECC ... 30 day MBG**
3959 **Word Munch** 18. 3963 **Oregon Trail** 28.
- ★ **Microsoft ... 30 day MBG**
2868 **Flight Simulator 4.0 (CP)**..... 42.
14214 **Creative Writer**..... 42.95
- ★ **Nordic Software**
7723 **Lang. Explorer** or 7767 **ClockShop** ea. 29.
8260 **Word Quest** or 7470 **Jungle Quest** ea. 30.
- ★ **Psychosis**
11562 **Lemmings** 35. 8720 **Oh, No! More** 29.
- ★ **Software Toolworks**
4619 **Mavis Beacon Typing 2.0 (CP)**..... 29.95
5201 **The Miracle (piano teacher)**..... 299.95
- ★ **StarPlay Productions ... 30 day MBG**
3675 **Crystal Caliburn**..... 33.95
- ★ **Voudette**
4764 **FLOWERscape**..... 48.

VIDEO AND SOUND

- ★ **Coda Music Technology**
5604 **Finale 3.0** 549. 12307 **Fin. Allegro** 259.
- ★ **Great Wave ... 30 day MBG**
1014 **ConcertWare Pro 1.0**..... 175.
- ★ **Macromedia**
7651 **Action!**..... 209. 5087 **Director 3.1**..... 799.
- ★ **Nova Development**
11101 **Kaboom!** 29. 12278 **w/More Kab.** 40.
- ★ **Radius ... 30 day MBG**
1738 **PrecisionColor Pivot (req. interface)** 949.
1749 **VideoVision Studio Upgrade**..... 1699.
- ★ **RasterOps**
8944 **24STV** 799. 3043 **PaintBoard Turb.** 1199.
14749 **MoviePak Presenter**..... 1559.

- ★ **Sigma Designs**
1565 **MovieMav** \$299. 11541 **ErgoVw. 17** \$1199.
- ★ **Sony Multiscan Trinitron Monitors**
10529 **CPD-1730 17"**..... 1149.
- ★ **SuperMac/E-Machines ... 30 day MBG**
7677 **17" Multimode Display**..... 899.
12704 **20" Color 1849**. 10321 **Col.Pg. T1611** 1299.
10322 **Presenter** or 8028 **Futura IISX**..... ea. 469
8005 **Ultura LX 1199**. 7985 **EtherDock**. 649.
- ★ **VideoLabs**
13121 **FlexCam (camera)**..... 499.95

CD-ROM

- ★ **Apple Computer**
13722 **AppleCD 300**..... 399.
13725 **PowerCD (with 3 free CD titles)**..... 399.
- ★ **Clarix Clear Choice ... 30 day MBG**
13907 **From Alice To Ocean Bk. (w/CDs)**..... 46.95
- ★ **Broderbund**
13600 **The Tortoise and the Hare**..... 34.
13602 **The New Kid on the Block**..... 34.
13601 **The Treehouse**..... 36.
- ★ **FWB, Inc.**
10198 **CD Toolkit**..... 49.
11582 **HammerCD**..... 659.
- ★ **Microsoft ... 30 day MBG**
1741 **Musical Instruments on CD-ROM**..... 55.
- ★ **Presto Studios ... 30 day MBG**
11330 **The Journeyman Project**..... 44.95
- ★ **Software Toolworks**
3915 **Grolier Encyclopedia**..... 249.95
12968 **The Animals!**..... 55.
- ★ **Spectrum Holobyte ... 30 day MBG**
1485 **Iron Helix**..... 59.95
- ★ **Time Warner**
7454 **Hell Cab 1.0 (CD-ROM)**..... 64.

COMMUNICATIONS

- ★ **Apple Computer ... 30 day MBG**
7073 **Mac PC Exchange**..... \$59.
10453 **AppleShare 4.0** 1469. 14576 **Upgd.** 539.
7101 **AppleTalk Remote Access 1.0**..... 149.
14231 **Remote Access 2.0 Client for Mac** 54.95
- ★ **Asante Technologies, Inc.**
Asanté Lite Ethernet Cards..... ea. 125.
2775 **10/T Hub-8** 249. 2772 **10/T Hub-12** 499.
- ★ **BOCA Research**
11052 **M1441 V.32bis FaxModem**..... 189.
- ★ **Cardinal Technologies ... 30 day MBG**
11698 **MVP144MAC with FAX**..... 189.
- ★ **Coactive**
1184 **Mac Connector**..... 29.95
1189 **Coactive Connector Mac to PC**..... 164.95
14025 **Coactive Connector DOS/Win**..... 134.95
- ★ **CompuServe ... 60 day MBG**
1676 **Membership Kit 25**. 1673 **Navig. 3.2** 49.
- ★ **DataViz ... 60 day MBG**
1823 **MacLink Plus/PC Connect 7.5**..... 129.
12613 **MacLink Plus/Easy Open Translators**. 69.
12093 **MacLink Plus/Translators Pro 7.5**..... 95.
- ★ **Dayna ... 60 day MBG**
11878 **DOS Mounter Plus**..... 54.95
DaynaPORTE: (BNC or 10 BASE-T) ea. 149.
8719 **EtherPr.** or 9888 (10BASE-T) ea. 339.95
- ★ **Dove Computer ... 30 day MBG**
12453 **DoveFax 144E** 249. 10200 **Pro-V** 399.
- ★ **Farallon Computing ... 30 day MBG**
11696 **Etherthin Mac/PB**..... 309.
4869 **PhoneNET Connector 10-Pk (DIN8)** 195.
9805 **Timbuktu 129**. 4866 **Remote 3.0** 129.
9516 **PowerPath 105**. 9518 **LocalPath**. 139.
6922 **Replica/Mac 69.95** 7407 (10 user) 499.95
- ★ **Freesoft ... 30 day MBG**
6115 **White Knight 11**..... 85.
14804 **Second Sight**..... 119.95
- ★ **Global Village ... 30 day MBG**
7889 **TelePort/Bronze II 95**. 2179 **Gold** 299.
- ★ **Hayes**
10822 **ACCURA 2400** 74.95 11422 **96 Fax** 215.95
11419 **ACCURA 144+Fax144**..... 239.95
2300 **Smartcom II 84**. 5971 **OPTIMA 24** 119.
- ★ **Insignia Solutions**
7557 **AccessPC 3.0**..... 79.
4089 **SoftPC**..... 99. 10554 **SoftPC Pro**..... 195.
- ★ **Practical Peripherals ... 30 day MBG**
8063 **PM14400FX FxMod.** 429. 11045 **MT 235**.



★ FreeSoft ... 30 day MBG

14804 **Second Sight**—Construct and operate your own multi-line bulletin board service. High-speed modem support, local flow control, multi-node file sharing, and simplified set-up..... **\$119.95**

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Epson

8194 Action Scanning System—Includes Photoshop LE, Scantastic PIM & DA, and cable... **\$849.95**
8219 ES-800C Pro Mac—Everything for the pro. Incl. Photoshop 2.5, Scantastic PIM & DA, Kai's Power Tools, and cable... **1399.95**

★ **Shiva ... 30 day MBG**
6555 LanRover/L... \$599.
NetModem/E (thick, thin, 10-T) ea... 1439.
★ **Software Ventures ... 30 day MBG**
1964 MicroPhone II 139. 3455 Pro... 209.
★ **STF Technologies ... 30 day MBG**
7639 FaxSTF 3.0... 39.95
SupraFAXModems
11223 V.32bis 14400... 234.95
5337 14400LC... 164.95
★ **Synergy ... 30 day MBG**
6618 VersaTerm 5.0 109. 6619 PRO 5.0 169.
U.S. Robotics
11842 Sportster 14.4 Mac & Fax... 229.
★ **Zoom Telephonics ... 30 day MBG**
7757 FaxModem AFX... 69.95
3553 FaxModem VFX V.32bis... 179.95
14152 FaxModem VFX 14.4V for Mac... 199.95
7917 FaxModem PKT (pocket)... 79.95

INPUT/OUTPUT

Advanced Gravis
1482 Game Pad 39. 9963 MouseStick II 69.
★ **Appoint ... 30 day MBG**
Mac Crayon (red, blu, grn or yel) ea. 32.
Caere
4930 OmniPage Pro 489. 7705 Direct... 189.
7925 OmniScan... 399.
★ **Datadesk ... 30 day MBG**
9830 MAC101E 129. 2384 w/QuickKeys 159.
Epson
8194 Action Scanner (ES-600C SCSI) 849.95
8219 ES-800C Pro Mac... 1399.95
GCC
14247 WriteMove II... 419.95
★ **GDT Softworks ... 30 day MBG**
2499 PowerPrint 99. 12717 PP. NW. 329.
Hewlett-Packard LaserJets
8368 LJ 4M 2149.95 4312 4ML 1129.95
Interex Computer Products
12862 105 Key Deluxe Keyboard... 99.
★ **Kensington ... 30 day MBG**
2547 Turbo Mouse 4.0 ADB... 107.
Key Tronics
6974 Mac Pro+Keyboard 135. 1070 TrakPro 219.
Kraft Joysticks
7519 KM30... 42. 9508 Thunderstick... 52.
★ **Microtek Labs, Inc. ... 30 day MBG**
13815 ScanM. IIG 499.95 13814 IIS 779.95
★ **Mouse Systems ... 30 day MBG**
7520 Litt. Mouse ADB or 8001 Plus ea. 69.95



★ **MDS CD-ROM ... 30 day MBG**
8497 Chinon S35—250ms average access, 300 KB/s sustained transfer rate, fully-integrated audio, multi-session, Kodak Photo CD-compatibility with a 256 KB buffer... **\$429.95**
(Other CD-ROM types also available.)



★ **Texas Instruments ... 30 day MBG**
13658 TI microLaser Pro 600 PS23—Photo-quality, 600 dpi with 8ppm RISC power. 500-sheet capacity, 6 MB, Adobe PostScript level 2 w/25 fonts, PCL5, Mac/PC ready **\$1399.95**
13659 TI microLaser Pro 600 PS65... **1599.95**

★ **Soph. Circuits ... 30 day MBG**
8009 PowerKey \$75. 8008 Remote \$32.
Texas Instruments
13658 microLaser Pro 600 PS23... 1399.95
13659 microLaser Pro 600 PS65... 1599.95
14237 microMarc InkJet... 299.95
UMAX
13748 UC630 869.95 13751 UC1260 1849.95

UPGRADES & DRIVES

SIMMs ... Call for latest pricing.
★ **Applied Engineering ... 30 day MBG**
8361 1.44 MB HD Drv. 229. 5290 Pis. Drv. 299.
10282 TransWarp 4300 (40 MHz, no FPU) 399.
★ **DayStar Digital ... 30 day MBG**
11987 FC 040 (Quadra 700, 800, 900, 950) 359.
1312 Trb. 040i 20 MHz 649. 1302 33 MHz 849.
1670 PowerCache 50 MHz (no FPU) 629.
FWB, Inc.
9529 PocketHammer 170... 459.95
14322 PE 340 FMF... 579.95
14318 PocketHammer1000FMF... 1349.95
IOmega
6499 90 MB Transp. (reqs. interface)... 479.95
2467 90 MB Gold Std. Rem. Cart. (3)... 289.95
8781 Mac Transportable 90 PRO... 479.95
10499 Transportable MultiDisk 150... 589.95
★ **MDS Drives ... 30 day MBG**
8141 MDS 44 SyQuest w/SW & cart... 299.
5534 MDS 88 469. 10590 MDS 88c... 489.
11963 MDS 120 MB Fixed Drive (upright) 329.95
11962 210 (upr.) 429.95. 11961 540 799.95.
11881 MDS 120 MB (zero footprint)... 289.95
11880 210 MB 429.95 11863 540 MB 799.95
Peripheral Land, Inc. (PLI)
8327 Infinity 40 Turbo... 379.
11470 Infinity 88/RW 44... 625.
2864 Infinity Floptical Drive (21 MB)... 409.
8811 1 GB Mini Array... 2329.95

ACCESSORIES

Apple Computer
11663 StyleWrit. II Cart. 23. 11669 (3 pk.) 63.
LaserWriter Toners: Pers. 65. LW II 85.
Disks/Carts.: BASF, Fuji, KAO, Sony
★ **I/O Design Cases ... 30 day MBG**
8812 Ultimate Class. 62.95 1941 Ult. LC 89.95
13549 PowerBook Leather Satchel (black) 77.95
★ **Targus ... 60 day MBG**
7369 Nitepac 35.95 13941Bus. Com. 114.95

★ **MDS Drives ... 30 day MBG**
MDS Removable Drives (20ms average access time) includes cartridge, FWB's Hard Disk ToolKit PE, and DayMaker Organizer 3.0 Free!
8141 MDS 44... **\$299.**
10590 MDS 88c (also R/W 44)... **489.**
MDS External Fixed Drives—Available in zero footprint or upright models. Using major manufacturer's drive mechanisms.
11881 120 (zero footprint)... **289.95**
11963 120 (upright)... **329.95**
11880 210 (zero footprint)... **429.95**
11962 210 (upright)... **429.95**
11863 540 (zero footprint)... **799.95**
11961 540 (upright)... **799.95**
2219 1 GB(zero footprint)... **1089.95**
12324 1 GB (upright)... **1129.95**



★ **Attain Corporation ... 60 day MBG**
8465 IN CONTROL—1992 MacUser Editors' Choice Award for Best Organizational Tool. The new standard. The only product to manage activities as outlines, prioritized lists, and calendars!... **\$85.**



Software Toolworks
12963 The Animals—Breakthrough video-with-sound technology lets you see and hear over 200 exotic mammals, birds, and reptiles in over 60 minutes of video clips... **\$55.**



★ **SyQuest Cartridges ... 5 yr. warranty**
Reliable, high-capacity, long-life, interchangeable removable media. Also available in 3, 5, 10 packs at big savings.
5912 44 MB Cartridge... **\$65.**
3603 88 MB Cartridge... **100.**
11711 105 MB Cartridge... **59.95**

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Hard Disk ToolKit
MDS Internal Fixed Drives—We also have internal drives in many popular sizes. Installation kits sold separately. Call for pricing.



STF Technologies
7639 FAXstf—Create, address, and send faxes directly from your Mac applications. Features improved user interface, grayscale support, background operation, and enhanced fax management tools... **\$39.95**



★ **Palo Alto Software ... 60 day MBG**
6975 Business Plan Toolkit 4.0—Customize plans with preprogrammed spreadsheets & text guide... **\$75.**
4690 Marketing Plan Toolkit 5.2—An organized method for planning and managing the marketing process... **75.**

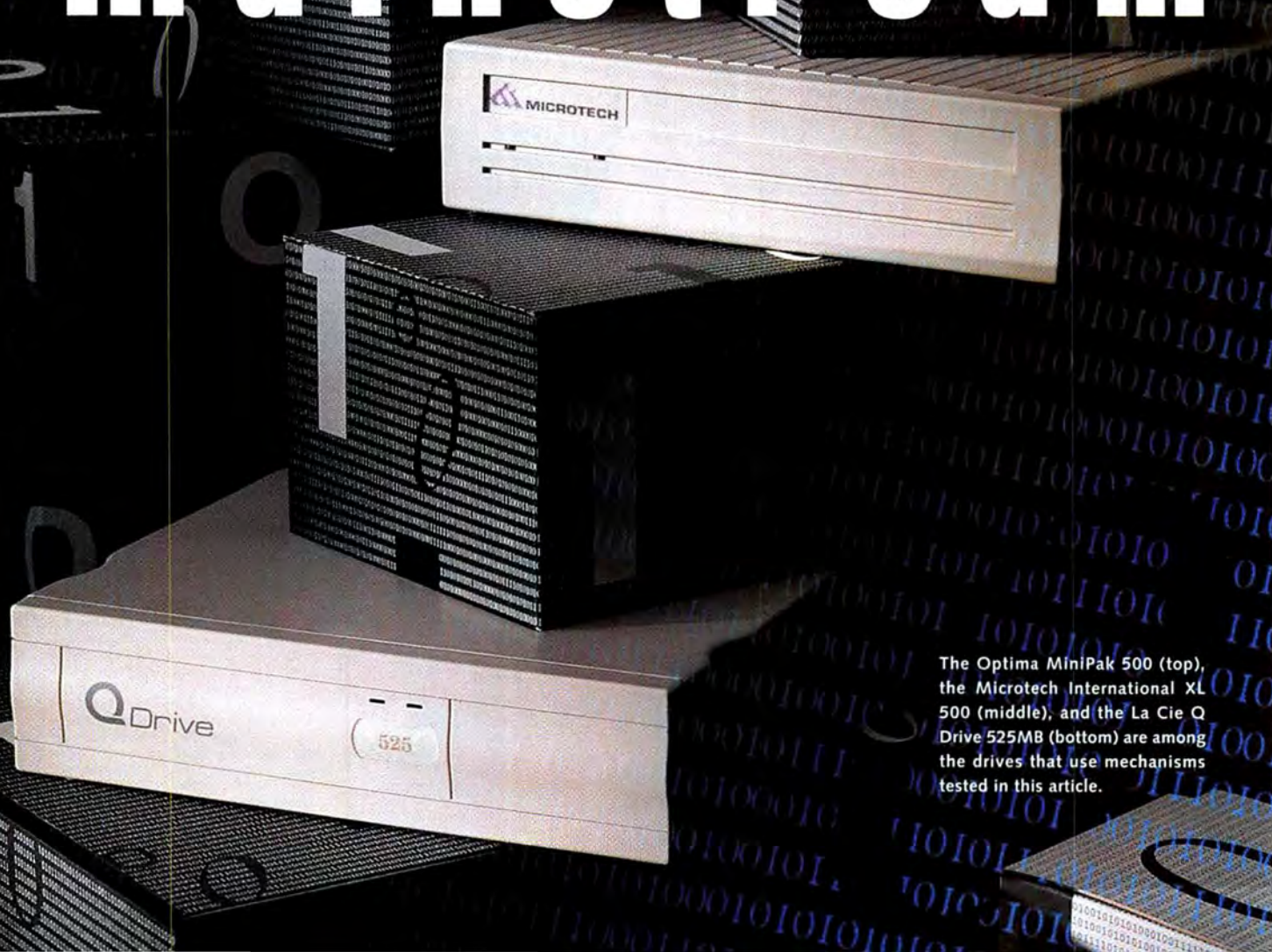
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Mainstream



The Optima MiniPak 500 (top), the Microtech International XL 500 (middle), and the La Cie Q Drive 525MB (bottom) are among the drives that use mechanisms tested in this article.

Macworld Lab tests hard drives based on 120MB-540MB mechanisms

Unless you routinely work with huge database or graphics files, don't waste your money buying a giant hard drive. A drive no larger than 500MB offers plenty of space for your business and personal needs. The great challenge of buying a mainstream hard drive lies in stripping away drive vendors' claims about the added performance value of their software.

The key factors for speedy data delivery are the size of read and write *caches* (small amounts

Mechanism"). This makes your buying decision relatively straightforward: pick the biggest, fastest drive you can afford, from a vendor that offers reasonable technical support and service.

Filtering a Sea of Products

Still, choosing from among nearly 200 products offered by 29 vendors is a formidable task. Macworld Lab met the challenge by testing a representative drive from each major

Excel file might differ by one or two seconds.

By the same token, some software vendors claim their formatters enhance drive performance, though they acknowledge that speed benefits are small. We tested a drive based on a Quantum 240MB mechanism using 17 different formatters. Most of these tests yielded identical results; the exceptions (FWB's Toolkit Personal Edition, Microtech International's Hard Drive Formatter, CMS Enhancements' SCSI Utility, and Transoft's SCSI Director 2.2.1) all fell about 10 percent behind the pack.

Macworld Lab compared the relative performance of the mechanisms by formatting each one with the same software and using our standard hard drive test suite (see "Behind Our Tests"). We also tested duplicates of some units to determine what performance differences can crop up among identical mechanisms. Those tests indicate a maximum difference of 7 percent and an average difference of 3 percent; these narrow margins held even when mechanisms had different *firmware*—ROM-based software in the drive mechanism that interprets commands from the Mac and directs the mechanism.

Mechanism Costs and Benefits

For the second year in a row, the Maxtor MXT-540 mechanism was the speed leader, winning in all but one test. It can be bought from FWB, PLI, MicroNet Technology, Microtech International, APS Technologies, and ETC Peripherals, with prices beginning at \$819 (\$1.52 per megabyte) from mail-order vendor APS.

Two other mechanisms—the Quantum LPS525S and the Seagate ST3610N—are

of RAM that increase the efficiency of data transfers); *spindle speed* (the speed with which the disks revolve); and, to a lesser extent, *access time* (the rate at which data is found on the disk). All of these are determined by the design of the mechanism that each hard drive is based on, not by the vendor that sells you the product.

Macworld Lab tested 13 drive mechanisms with storage capacities from 120MB to 540MB, and found that regardless of the software supplied by the vendors, higher capacities mean faster drives. Where different vendors' drives use identical mechanisms, performance is nearly identical.

Although the drives in the product table sell for \$239 to \$1675, you can pay \$2 or less per megabyte of storage at any capacity in this review (see "Available Drives for Each

mechanism capacity within this range.

Over several years of testing hard drives, we've learned that the performance gains attributable to a vendor's driver software—the software the Mac uses to control the hard drive—don't amount to much, despite some vendors' claims. The fastest and slowest drives based on the same mechanism will always be within 10 percent of each other's performance—and usually show less than 5 percent difference. Moreover, only about 30 percent of the time spent on typical functions, such as opening or saving a file, involves the hard drive; system and program overhead accounts for the other 70 percent. Therefore, the real performance variation between like mechanisms from different vendors is less than 3 percent. For example, saving a 400K Microsoft

Storage

by Tim Warner



The Club Mac 345 (top, based on a Maxtor 7345S mechanism), Mirror's Enviro SmartStack 170 (middle, based on a Quantum ELS170S), and the APS Technologies Q240 (based on the Quantum LPS240S) are three of more than 200 drives in the 120MB to 540MB range now offered by more than two dozen vendors.

only slightly smaller and slower than the MXT-540. With formatted capacities of 500MB and 509MB respectively, these drives cost on average \$100 to \$200 less than the Maxtor mechanism, yet perform only 10 percent slower overall. If you save a 3.9MB Adobe Photoshop file, for example, this translates into a difference of only 4 seconds. The LPS525S is currently being replaced by the Quantum LPS540S in desktop computers and the Quantum Empire 540S in workstations and RAID systems. This could mean good deals on the 525MB drives as vendors clear out their inventories.

For those of us with more modest budgets, the Quantum LPS240S represents an attractive option. This mechanism is only 20 percent slower than the MXT-540 in overall performance. Sixteen vendors carry it, with prices ranging from \$319 (Spin Peripherals and Relax Technology) to \$899 (GCC Technologies). The LPS240S is gradually being phased out in favor of the Quantum ProDrive LPS270S—which should offer better performance and reliability, and a little more storage capacity at a similar price. But during the transition, you should be able to find discounts on the LPS240S.

If your wallet is thinner still, consider the 161MB Quantum ELS170S. This drive is slow: when duplicating a 3.2MB

file in the Finder, it placed second to last in speed at 13 seconds, compared with the MXT-540's 6.7 seconds and the Quantum LPS240's 9.8 seconds. Still, you can buy an ELS170S for only \$249 (from Spin Peripherals). And you'll get 50MB more storage than with the cheapest and slowest mechanism we reviewed, the Quantum ELS127S, which on average costs only about \$20 less than the ELS170S.

Several drives of about 120MB are available: GCC sells the Conner CP30100, MacDirect offers the Maxtor 7120S, Focus Enhancement has the Maxtor 7131S; and MindFlight Technologies, Liberty Systems, and CMS sell the Quantum Go 120S. The Quantum ELS127S is sold by several companies, but for the most part, all of these mechanisms are poor deals. Prices are relatively steep, starting at \$239 (\$1.99 per megabyte) and going up to \$710 (\$5.91 per megabyte).

Other mechanisms to avoid include the Toshiba MK2326 and the Maxtor 7345S. While both offer reasonably high capacity, they ranked, respectively, fourth and third to last in performance, and typically cost more than \$2 per megabyte.

Price-Shopping Insight

In response to increasingly demanding applications, Apple has been including larger hard drives in its systems. While you can still get an 80MB drive in an LC or Performa Macintosh or in the Quadra 605, 160MB to 500MB internal drives are now standard in most Apple models. Therefore drive prices in this capacity range have dropped precipitously.

When looking at prices, however, consider whether a company sells directly to consumers via mail order, or sells through a dealer. Dealer prices are generally higher than mail-order prices. Historically dealers have offered better, more personal service and support for the premium you pay.

But these distinctions are beginning to disappear. With stiffer competition and with faster, more reliable drive mechanisms constantly coming to the market, better service and support is less important. Moreover, some direct resellers, such as La Cie, have generally done very well on our technical-support surveys, providing the same high quality as premium vendors.

Many mail-order companies, including APS, Club Mac, Focus Enhancements, MacDirect, and MacProducts, include very good manuals and repair policies. Some are offering new technologies—such as smaller cases, stacked designs, and better termination schemes—to improve reliability and flexibility.

For the strongest and best companies, the chief distinction between dealers and direct resellers is a price disparity—though it's not as huge as it might appear from the suggested retail prices in our table, which are nearly always higher than actual dealer prices. Dealer prices vary considerably, but expect dealer prices to be significantly higher than mail-order prices.

Among direct resellers, APS, La Cie, and Spin Peripherals are good choices. La Cie is a particularly strong choice; it did well on our tech-support tests, offers time-tested reliability with its SilverLining formatting software, and boasts respectable prices to boot. APS Technologies also has exceptional software and prices; it fell down on tech support for this article, but historically has provided very good support. Spin Peripherals, a relative newcomer, offers the lowest prices in this review for four of its five offerings, and provided very good tech support.

Among the companies that sell through dealers, FWB has excellent software and manuals. It uncharacteristically fell short on tech support in this review, however. Although MicroNet's software is somewhat confusing, it has very good manuals and recently began offering on-site service within four hours through IBM, which may justify its generally high prices—at least for corporate users engaged in particularly time-critical tasks.

Other notable companies are Mega Drive and Mirror, not so much for price (although Mirror has fairly competitive prices and did well on tech support) as for novel case designs. Mega Drive's products in this review are all removable; they slip into the bays of an enclosure that includes keys for maximum data security. Mirror's SmartStack allows you to stack several drive modules (they can be hard drives or other media) on top of a single power source. Cabling is handled with the casing so there are no messy tangles to deal with. Naturally you pay a premium for the convenience of such options—\$119 for the SmartStack, and \$419 to \$524.99 for the Mega Drive bays.

A few vendors, faced with lower and lower margins, have been forced to cut corners to stay in business, lowering the overall quality of their products and services. Be sure to check return and repair policies. Most companies offer two-day turnaround, but a few offer faster service

for an additional fee. DriveSavers, a data-recovery service, says failures usually occur in the first 90 days after purchase, so you'll know soon whether a drive will work reliably in the long term.

Choosing a Formatter

Formatting software comes with every drive, but its quality varies greatly. And not all software is transferable: some formatters look for a particular brand of drive. Other software works with a wide array of drives, and you can buy it as a stand-alone product.

Contrary to some vendors' claims that their software squeezes more room into a drive, formatted capacity proved to be a nonissue. Among 17 formatters we tested, formatted capacity was identical. (Expect the formatted capacity of a drive to be about 5 percent less than the advertised capacity of the mechanism. For instance, a Quantum LPS240S mechanism formats to 232MB.)

(And speaking of capacity, don't be tempted to buy a smaller drive than you need and rely on compression software to double your drive's capacity. Such software slows down your machine and vastly complicates data recovery in the event of a drive failure.)

More important than formatted capacity are the features of the formatting software: the quality of the interface and partitioning process, the ability to password-protect partitions, the ability to sidestep damaged areas of a disk, and overall reliability. Generally, stand-alone formatters handle these jobs most effectively (see the feature "Hard-Drive Optimizers," in this issue).

Among formatting products, FWB's Hard Disk Toolkit wins hands down. The FWB product has an uncluttered interface and provides a full array of features, including a security erase—for cases when you *really* want to get rid of your data. (Normally, deleting a file just overwrites the reference to the file on your desktop.) Hard Disk Toolkit also offers an impressive array of support programs that let you do everything from mounting offline disks to configuring a drive's controller settings. (Avoid FWB's Hard Disk Toolkit Personal Edition,

however. It lacks partitioning, security, and the support programs that the full version offers.)

Consider software after you have chosen the drive you want. You may be satisfied with the software that comes bundled; if not, you can purchase a stand-alone formatter later.

Smaller Drives Ahead

Low-capacity 3.5-inch mechanisms are slowly being replaced by larger capacities in smaller boxes. The demand for low-capacity drives will soon be met by the

WHEN A DRIVE IS TOO FAST FOR YOUR CPU

Before deciding that the drive mechanism is all-important, remember that your system is only as fast as its weakest link. Whenever you read or write data to a drive, the controller on the drive and the controller on your Mac's motherboard (or SCSI adapter) have to communicate at the same rate. The controller hardware on older computers can't keep up with faster, higher-capacity drives. The drive effectively slows down to the computer's speed. For example, the SCSI chips on a Mac LC have a maximum bandwidth of 1100 kilobytes per second; most drives in this review can transfer data at 1.4 megabytes per second. Thus the computer is the bottleneck in any data transfer.

The minimum computer you need to take full advantage of the full speed of any of the drives in this review is an LC III or Centris 610. Conversely, a fast computer, such as the Quadra 840AV, will spend a good deal of its time waiting for a slow drive, bogging you down considerably. All of the 68040-based Macs have fast SCSI hardware yielding transfer rates of about 3.4 MBps—more than fast enough for drives up to 540MB. Additionally, the Quadra 660AV and 840AV incorporate the new SCSI Manager that supports faster data transfers and background operation (see the feature "Hard-Drive Optimizers," in this issue).

As computer speeds continue to improve and the practical limitations of SCSI disappear, drive manufacturers will have to dramatically improve on existing technologies—or invent new ones—just to keep up.

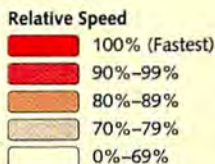


Drive Mechanism Performance

All times are in seconds.

The mechanisms are listed from fastest (top) to slowest (bottom). To determine rankings, Macworld Lab indexed combined test results against the fastest mechanism in each test. Thus, the Maxtor MXT-540SL gets a 1.00, and the Quantum ELS127S gets a 0.62. Index numbers are listed to the left of the mechanism names.

We measured each mechanism's ability to duplicate a 3.2MB file and a 3.2MB folder, to search a 4370-record 4th Dimension database for a specific record, and to compile code in Think C. We also measured each drive's speeds for opening and saving files from Aldus PageMaker and Adobe Photoshop.



	Mechanism tested ¹	Duplicate	Open	Save	Search	Compile
Overall Fastest	1.00 Maxtor MXT-540	16.96	29.60	24.74	17.51	12.53
	0.90 Quantum LPS525S	17.94	33.65	28.84	16.96	14.98
	0.86 Seagate ST3610N ²	19.67	35.92	25.55	19.67	15.78
	0.80 Fujitsu M2624	21.86	36.37	36.04	18.91	17.21
	0.78 Seagate ST3550N	19.77	36.59	34.66	22.26	16.59
	0.77 Quantum LPS240S	21.78	38.74	37.98	17.36	17.40
	0.76 Quantum LPS120S	20.16	41.55	43.24	17.54	17.37
	0.76 Seagate ST3390N ³	20.07	38.47	36.15	22.54	17.06
	0.74 Seagate ST3600N	24.90	38.94	31.95	20.11	18.78
	0.67 Toshiba MK2326	27.41	42.76	44.14	20.46	19.53
	0.66 Maxtor 7345S	27.26	40.87	43.40	21.82	19.62
	0.64 Quantum ELS170S	29.29	49.21	43.41	20.46	19.21
Overall Slowest	0.62 Quantum ELS127S	30.88	51.31	47.06	20.68	19.18

¹ For specific hard drives that use these mechanisms, see the table,

"Available Drives for Each Mechanism."

² Identical to Optima ST3610N. ³ Identical to Optima ST3390N.

Available Drives for Each Mechanism

Company	Phone	Toll-Free Phone	MECHANISM/PRICE	
			120MB to 199MB Unformatted	200MB to 299MB Unformatted
APS Technologies	816/483-6100	800/233-7550	Quantum GRS-160 ⁺ /\$429	Maxtor 72455 ⁺ /\$329
			Quantum ELS1705/\$269	Toshiba MK2224 ⁺ /\$599
Club Mac	714/768-8130	800/258-2622		
CMS Enhancements	714/222-6000	none	Quantum Go 1205 ⁺ /\$710	Toshiba MK2224 ⁺ /\$1191
			Quantum ELS1705/\$413	Quantum LPS2405/\$502
DynaTek Automation Systems	416/636-3000	none	Quantum ELS1275/\$489	Quantum LPS2405/\$569
Focus Enhancements	617/938-8088	800/538-8866	Maxtor 71315 ⁺ /\$279.99	Maxtor 72135 ⁺ /\$399.99
			Quantum ELS1705/\$269.99	Quantum LPS2405/\$339.99
FWB	415/474-8055, ext. 634	none	Quantum ELS1705/\$529-\$619 ^c	Quantum LPS2405/\$619-\$729
GCC Technologies	617/275-5800	800/422-7777	Conner CP30100 ⁺ /\$569	Quantum LPS2405/\$899
			Conner CP30175E ⁺ /\$629	Seagate ST3243N ⁺ /\$1599
La Cie	503/520-0845	800/999-0143	Quantum ELS1705/\$279-\$469 ^c	Quantum LPS2405/\$389-\$649
Liberty Systems	408/983-1127	none	Quantum Go 1205 ⁺ /\$599	Toshiba MK2224 ⁺ /\$899
			Quantum ELS1275/\$499	Quantum LPS2405/\$699
			Quantum Go 1605 ⁺ /\$799	
			Quantum ELS1705/\$599	
MacDirect	312/664-8225	800/621-8462	Conner CP30170E ⁺ /\$288	Conner CP30200 ⁺ /\$368
MacLand	602/520-5802	800/333-3353	Quantum ELS1705/\$299	Quantum LPS2405/\$359
MacProducts USA	512/476-5295	800/622-3475	Quantum LPS1205 ⁺ /\$279	Toshiba MK2224 ⁺ /\$699
			Quantum LPS1275 ⁺ /\$306	Quantum LPS2705 ⁺ /\$369
			Quantum LPS1705 ⁺ /\$315	
MacWarehouse	908/905-9279	800/255-6227	Quantum ELS1275/\$349.95	Quantum LPS2405/\$429.95
			Quantum ELS1705/\$369.95	
Mass Microsystems	408/522-1200	800/522-7979		Maxtor 72455 ⁺ /\$739
Mega Drive [†]	310/247-0006	800/664-6342	Quantum ELS1275/\$447.95	Quantum LPS2405/\$614.95
			Quantum ELS1705/\$479.95	
MicroNet Technology	714/453-6100	none	Maxtor 71205 ⁺ /\$575-\$625	Maxtor 72455 ⁺ /\$725-\$775
Microtech International	203/428-6223	800/626-4276	Quantum ELS1275/\$309-\$399 ^c	Quantum LPS2405/\$331-\$369
			Quantum ELS1705/\$280-\$319 ^c	Maxtor 72455 ⁺ /\$359-\$509
MindFlight Technologies	604/434-6463	800/263-3888	Quantum ELS1275 ⁺ /\$439	Quantum LPS2405/\$549
			Quantum Go 1205 ⁺ /\$519-\$589 ^c	
			Quantum Go 1605 ⁺ /\$549-\$609 ^c	
			Quantum ELS1705/\$449	
Mirror [†]	800/654-5294	800/654-5294	Quantum ELS1275/\$269	Quantum LPS2405/\$369
			Quantum ELS1705/\$289	
Optima Technology	714/476-0515	none		Optima ST3285N ⁺ /\$549
PLI	none	800/288-8254	Quantum ELS1705/\$605	Conner CP30200 ⁺ /\$756
Procom Technology	714/852-1000	800/800-8600		Seagate ST3285N ⁺ /\$695
Relax Technology	510/471-6112	none	Quantum ELS1275/\$259	Quantum LPS2405/\$319
Spin Peripherals	617/965-9882	800/466-1200	Quantum ELS1275/\$239	Quantum LPS2405/\$319
			Quantum ELS1705/\$249	
Third Wave	512/477-9845	800/880-7555	Quantum LPS1275 ⁺ /\$289	Toshiba MK2224 ⁺ /\$649
			Quantum LPS1705 ⁺ /\$309	Quantum LPS2705 ⁺ /\$385
TMS Peripherals	407/998-9928, ext. 1	800/275-4867, ext. 1	Quantum LPS1705 ⁺ /\$279	Quantum LPS2405/\$330
Tulin Technology	408/432-9057	none	Quantum ELS1275/\$249	Conner CP30250 ⁺ /\$329
			Quantum ELS1705/\$259	

Except where noted, mechanisms were tested by Macworld Lab.

Technical-support ratings are based on a series of calls made to each company by Macworld staffers (posing as customers) to gauge the accessibility, helpfulness, and accuracy of the company's support technicians. Macworld uses a point system, including bonuses and demerits, to derive the final rating. Ratings are for companies, not individual products.



Macworld Lab used application-based tests to judge the relative performance of mechanisms and software in this review. To measure differences in access times, we conducted a search of a 4370-record 4th Dimension database. Most of the files that people use daily are very small, so we determined read and write performance for small files with a series of opens, saves, and file duplications using Aldus PageMaker 4.2 and the Finder; we also compiled an application in Think C.

Larger files, such as those used in graphics and video applications, require fast *throughput*—the ability of the drive to coordinate read and writes with its data caches for the highest sustained data-transfer rate. To measure throughput, we opened and saved an uncompressed 5MB Photoshop file. All tests were conducted on a Centris 650 with 8MB of RAM using System 7.1.—**Macworld Lab testing supervised by Tim Warner**

growing ranks of 120MB to 160MB 2.5-inch notebook drives. While they are relatively expensive now and their performance falls below even lower-capacity 3.5-inch drives such as the Quantum ELS127S, several 2.5-inch drives, such as the Quantum Go Series, promise higher reliability than their larger counterparts. Given the nature of the lucrative notebook market, you can expect better performance from future models. Other manufacturers are also focusing their engineering attention on 2.5-inch drives for the mainstream. By the time you read this, 2.5-inch drives with over 500MB of storage will already be available. It's only a matter of time before smaller drives become the norm.

That's good news for the vast majority of business and home users—who don't need more than 500MB for their daily work and would enjoy a little extra desk space. But there's no compelling reason to wait for 2.5-inch drives to take over the market—the current offerings represent great values. **m**

Assistant editor TIM WARNER has been testing storage and display peripherals for Macworld Lab since 1990.

300MB to 499MB Unformatted	500MB to 540MB Unformatted	Direct/ Dealer	Technical- Support Rating
Maxtor 7345S/\$449	Maxtor MXT-540/\$819	●/○	poor
Toshiba MK2326/\$789	Quantum LPS525S/\$719	●/○	
Maxtor 7345S/\$409		●/○	unacceptable
Toshiba MK2326/\$1422	Quantum LPS525S/\$1049	○/●	^a
Seagate ST3550N/\$872		○/●	
	Quantum LPS525S/\$1019	○/●	excellent
Maxtor 7345S/\$629.99	Quantum LPS525S/\$709.99	●/●	excellent
		●/●	
Seagate ST3390N/\$749	Seagate ST3656N ^h /\$1139	●/●	unacceptable
	Maxtor MXT-540/\$1529	○/●	
		●/●	very good
		●/●	
		●/○	excellent
Toshiba MK2326/\$1099	Quantum LPS525S/\$1099	●/○	very good
		●/○	
		●/○	
	Conner CP30540 ^h /\$758	●/○	very good
	Fujitsu M2624/\$758	●/○	very good
	Quantum LPS525S/\$799	●/○	unacceptable
Quantum LPS340S ^h /\$459	Fujitsu M2624/\$958	●/○	poor
Toshiba MK2326/\$769	Toshiba MK2428 ^h /\$949	●/○	
	Quantum LPS540S ^h /\$767	●/○	
	Quantum Empire 540S ^h /\$870	●/○	
	Quantum LPS525S/\$899.95	●/○	^d
		●/○	
Maxtor 7345S/\$959		○/●	unacceptable
Seagate ST3390N/\$799.95	Seagate ST3600N/\$1199	○/●	unacceptable
Seagate ST3550N/\$1039		○/●	
Maxtor 7345S/\$995	Seagate ST3610N/\$1675	○/●	acceptable
	Maxtor MXT-540/\$1675	○/●	
Maxtor 7345S/\$489-\$669	Quantum LPS525S/\$619-\$739	○/●	very good
	Maxtor MXT-540/\$869-\$1059	○/●	
	Quantum LPS525S/\$1119	○/●	poor
		○/●	
		○/●	
	Quantum LPS525S/\$759	●/○	very good
		●/○	
Optima ST3390N/\$699	Optima ST3610N/\$899	○/●	good
	Maxtor MXT-540/\$1513	○/●	unacceptable
Seagate ST3390N/\$895	DEC DSP3053 ^h /\$1395	○/●	excellent
Seagate ST3550N/\$1195		○/●	
	Fujitsu M2624/\$729	●/●	acceptable
Seagate ST3390N/\$399	Quantum LPS525S/\$649	●/○	very good
		●/○	
Quantum LPS340S ^h /\$489	Fujitsu M2624/\$809	●/○	unacceptable
Toshiba MK2326/\$769	Toshiba MK2428 ^h /\$949	●/○	
	Quantum LPS540S ^h /\$899	●/○	
	Quantum Empire 540S ^h /\$999	●/○	
	Quantum LPS525S/\$675	●/○	good
Maxtor 7345S/\$429	Quantum LPS525S/\$649	●/○	very good
		●/○	

^a No representative of this mechanism was tested by Macworld Lab.

^b Not tested—company charges by using a 900 number for technical support.

^c Vendor sells the mechanism in more than one product line, with different pricing.

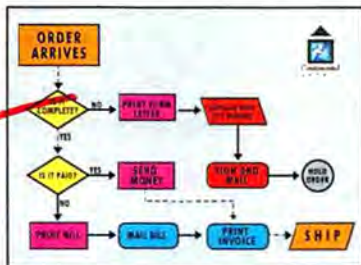
^d Not tested—company requires order number for technical support.

^e Drives require separate bay to operate. Bay prices range from \$419.99 to \$524.99.

^f SmartStack line of products requires purchase of power base for additional \$119.

Introducing ^{new} Claris business graphics, h

Take a brief moment to reflect on the difficulties you face creating graphics on the job. There's the cutting and pasting. Then making changes. Transferring files. More changes (OK, enough already). We're not asking you to dwell on these painful memories due to a masochistic streak, but



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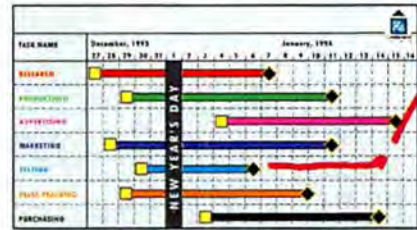
ClarisImpact allows you to create business graphics, then add text, data and freeform drawing, all without ever leaving the program. Something unheard of in the business graphics arena. And when those inevitable revisions work their way back to your desk, you'll be able to react without angst. Because when you make a change, ClarisImpact acts as your assistant, automatically making the necessary adjustments to the rest of your

chart and document.

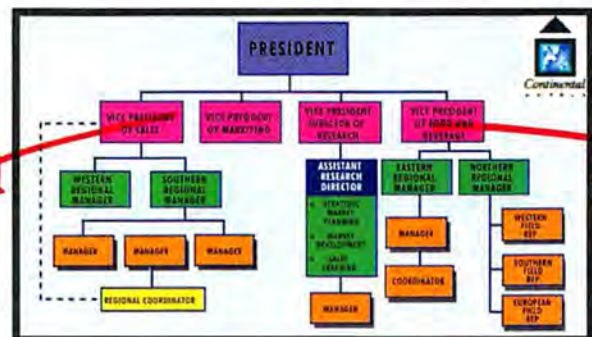
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graphic from

scratch, ClarisImpact takes care of the groundwork for you. You merely select the type of chart you want: organizational, bar or pie chart, timeline or calendar, to name just a few. Then enter your data. The application instantly creates the graphic for you — perfectly aligned, connected and proportioned. Choose from seven pre-designed style options or customize the styles to give them the look you want. You



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*Offer available in the U.S. only and expires 6/30/94. Coupon applicable toward purchase at suggested retail price of \$399, only available through Claris. Not valid with any other offer. Allow 2-4 weeks

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things been changed

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TOP 10 CD-ROMs

Macworld
salutes the year's
best discs

The information superhighway, which promises to deliver hundreds of interactive multimedia programs to our TV sets, is still years away. But in the meantime we have something that hints at things to come: CD-ROM.

Thanks to their ability to store an enormous amount of data—just over 600MB—compact discs are currently the only medium that can deliver the kind of interactive, multimedia, virtual experiences we've been promised. Using today's most accomplished CD titles, for instance, you can follow the Oregon Trail as a pioneer, go scuba diving in Hawaii, or get on-the-job training as a member of Congress—without ever

leaving your computer.

The possibilities are endless and exciting, and for *Macworld's* salute to Macintosh CDs, I've chosen 10 discs that, in one way or another, offer useful, informative, or engaging content and deliver a tantalizing taste of tomorrow's interactive programming and information retrieval. To pick these top CDs, I evaluated about 80 discs released between November 1992 and November 1993. I didn't consider shareware, font, clip art, stock-photo, or stock-video CDs—in those cases, the disc is usually just a delivery medium. I also steered clear of games and interactive movies, since *Macworld* selects the best of those every year for our

Game Hall of Fame feature (see *Macworld*, January 1994).

As good as they are, I'd be remiss in celebrating any CD without first mentioning some considerable limitations to today's CDs in general. Despite recent hardware performance increases (see "Double-Speed CD-ROM Drives," *Macworld*, July 1993), the majority of software titles haven't caught up and, in most cases, move about as quickly as a line at the post office. And the discs frequently cost too much; \$40 to \$60 is a lot to pay for a children's book, regardless of how interactive it is.

My most serious gripes have to do with content, though. Too often, developers pay far more attention to

by James A. Martin

glitzy interfaces, QuickTime videos (whether they offer any valuable information or not), and "isn't this cool?" interactivity than they do to effective storytelling or to conveying information in a meaningful, easily accessible manner. As a result it's difficult to regard many of today's CD titles as anything more than kitschy ephemera.

But enough of this curmudgeon stuff. There's still some great material out there, and the following discs are shining examples of what's possible with today's technology—and (let's hope) of the kinds of programming and information resources we can look forward to when the information superhighway is finally built.

REFERENCE

BEST ENCYCLOPEDIA CD

Compton's Interactive Encyclopedia 2.0

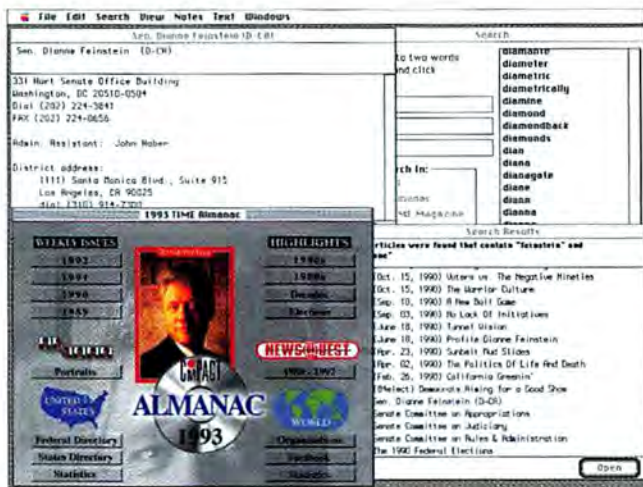
Compton's NewMedia; 619/929-2500, 800/862-2206. Consumer version \$395; educational version (called Compton's Multimedia Encyclopedia) \$495.

Last year, when weighing the differences between Compton's Multimedia Encyclo-

pedia (as the consumer version was then called) and The New Grolier Multimedia Encyclopedia, I gave the nod to the latter, since it was much more affordable (\$395 compared with Compton's \$795); had a more streamlined, professional-looking interface; and was much faster (see *Macworld*, March 1993). Plus, Compton's disc required that you devote up to 8MB of hard disk space to the program.

But things have changed. Compton's revamped Interactive Encyclopedia 2.0 has a competitive price, a vastly improved interface (via its simple but elegant Browser paths and tool bar), and a much faster response time, and the encyclopedia takes up only about 420K on your hard disk. Version 2.0 also includes a useful new time line (with direct links to articles, videos, and other items), higher-resolution pictures than the previous edition, help messages, plenty of videos, animations, narrated slide shows, and an online dictionary.

With all that going for it, Compton's Interactive Encyclopedia certainly gets the nod for Most Improved CD of the Year, and its excellent content sometimes casts a wider net than Grolier's. But before you rush out to buy Compton's encyclopedia, you should know that a promising update



Time Almanac 1993 This disc combines the contents of every *Time* magazine from 1989 through 1992 with a data-cramped almanac. In this example, a search on the words *Dianne Feinstein* uncovers a list of relevant *Time* articles as well as almanac data on the senator from California.

to The New Grolier Multimedia Encyclopedia (\$395) should be shipping by the time you read this, and Microsoft plans to release a Mac version of its popular Windows-based encyclopedia, Encarta (\$139), early this year (neither was available for my review).

BEST ALMANAC CD

Time Almanac 1993

Compact Publishing; 202/244-4770, 800/964-1518. \$99.95. (The 1994 edition should be available by the time you read this.)

For anyone with a need to research current events, recent history, American culture, or international politics, *Time Almanac 1993* is an excellent resource. The disc combines the entire text of every *Time* magazine from 1989 through 1992, along with selected articles going as far back as 1923; hundreds of photos, charts, and maps; and some 60 minutes of QuickTime videos from Cable News Network and other sources (some of them quite riveting, even in QuickTime).

The almanac's well-rounded scope means you can obtain both facts (in the form of almanac data) and opinions (via essays and articles) on a given subject. For instance, a word search on the name of

Senator Dianne Feinstein (D-Calif.), yielded 29 items, most of them *Time* articles, in which her name appears. Within the list of items was an entry from the almanac's U.S. statistics section, offering such information as her fax number, religion, the name of her administrative assistant, and the year she's up for reelection.

While other almanacs and reference works may cover much longer periods of time, this disc's concentration on the past few years gives it the ability to offer much more detailed—and rewarding—information on the subjects it does cover.

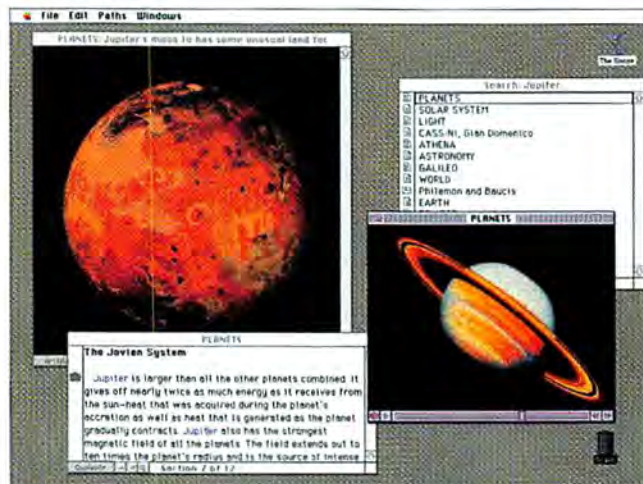
POLITICS AND HISTORY

BEST POLITICS CD

Clinton: Portrait of Victory

Time Warner Interactive Group; 818/955-9999, 800/593-6334. \$39.99. (The hardcover book version is sold separately; Warner Books/Epicenter Communications; 212/522-6982, 800/343-9204. \$19.45.)

Whether or not you voted for Bill Clinton, this is an involving, insightful documentary on the 1992 Democratic contender's campaign. The disc (and hardcover book) evolved



Compton's Interactive Encyclopedia Need some information on Jupiter? With Compton's Interactive Encyclopedia, you can quickly locate photos, charts, and text on the mysterious planet, which appear as a series of free-floating windows on your screen.

from *Time* photojournalist P. F. Bentley's exclusive, nearly unlimited access to Clinton and his minions. The idea was to document the day-to-day life of a political candidate using only black-and-white images; the result is a series of illuminating, fascinating pictures. Photography buffs will particularly enjoy the section in which Bentley describes exactly how he got the picture—aperture, f-stop settings, and all.



Clinton: Portrait of Victory This photo of the candidate was taken hours before his famous (or infamous, depending on your viewpoint) sax-playing appearance on "The Arsenio Hall Show." In the text box at right, photojournalist P. F. Bentley describes how he got the shot.

The disc includes the requisite QuickTime clips, but the photos (and the commentary) are the real attraction. The narrative is sometimes a bit too gushy toward our president, and you wonder exactly how candid some photos really are, but these are minor quibbles.

BEST HISTORY CD Seven Days in August

Time Warner Interactive Group; 818/955-9999, 800/593-6334. \$79.99.

Of the discs I surveyed, this one is my favorite, for it best exploits the real potential of CD-ROM as a medium that can add depth and perspective to a topic and promote a deeper level of understanding.

Seven Days in August takes advantage of Time Warner's vast media resources to absorbingly document that terrifying week in August 1961, when the Berlin Wall was erected. The interface,

which is a bit cluttered but navigable, enables you to explore this critical moment in the Cold War from a variety of perspectives. You can relive the week day by day, hearing Berliners tell stories of how their lives were changed; sit in on a roundtable discussion by political experts; and check out what was happening in America that week. For example, you can read that Sunday's newspaper comic strips, hear excerpts from the country's top ten records, and so on. There's even a game in which you get to guess which outfit Jackie Kennedy wore to which state affair.

While some of these activities may sound as if the disc is trivializing what was a pivotal moment in global history, their juxtaposition against the events in Berlin actually serves to broaden our understanding of the differences between the U.S. and other countries—and how Americans take their freedom for granted. Seven Days in August quietly and eloquently reminds us that, at a time when East Berliners were struggling with abject poverty and severely limited freedom, Americans were pondering the musical



Capitol Hill On your first day on the job as a virtual freshman member of the House, U.S. Representative Lynn Woolsey, D-Calif., shows up (via a QuickTime clip) to offer friendly advice. You can explore any item on your desk (phone, calendar, and so on) by clicking on it.

question "Does your chewing gum lose its flavor on the bed-post overnight?" while driving along in shiny new convertibles under sunny skies. What could be more telling than that?

BEST INTERACTIVE LEARNING CD Capitol Hill

The Software Toolworks; 415/883-3000; 800/234-3088. \$49.95.

Ever wondered what it would be like to be a member of Congress? With Capitol Hill, you can spare yourself the campaign promises and fac-

tory worker glad-handing—with just a few clicks of the mouse, you are now a member of the House.

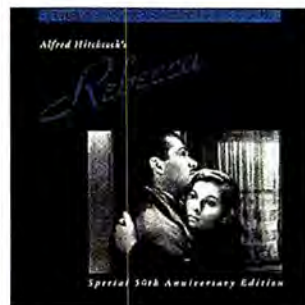
To guide you through your new career as a politician, Capitol Hill puts a virtual Personal Digital Assistant (PDA) at your disposal. The PDA is one of the more clever interactive interfaces I've seen on a CD. Click on the PDA's "Your Office" button, for instance, and you'll find a desk complete with, among other items, a telephone, calendar, and budget book, any of which can be explored via additional mouse clicks. Once you've read your mail, answered phone calls, looked over the budget, and voted on a proposal or two, you can take a tour of the Capitol's Grand Rotunda, clicking on any of the statues and paintings for a closer look.

Capitol Hill is that rare bird among CDs—it's easy to use, entertaining and educational (there's even a game for testing your newfound knowledge). While there are no sex or money scandals in which to become entangled (so much for total realism), the disc does what a top CD should do—it transports you out of your own world and puts you firmly in another. Now if it could just do the same thing with Jesse Helms, I'd really be happy.



Seven Days in August This interactive documentary lets you explore the events of August 1961, as the Berlin Wall was erected, in a variety of ways. Pictured here is the entry screen for the events of Thursday, August 10; clicking on any of the boxed images on this screen takes you along a different narrative path.

REBECCA



B This edition of *Rebecca* was transferred from a 35mm fine grain composite master print. The sound was recorded from a 35mm optical negative soundtrack.

FIND ▲ CLIP CAST CREDITS FEATURES ESSAY CHAPTERS ◀ ▶

Criterion Goes to the Movies Using this HyperCard-based guide to movies available on laser disc from The Voyager Company, you can research a movie's cast, credits, and the laser disc's features; read an essay on the film's importance to world cinema; and—best of all—watch a brief excerpt in QuickTime format.

ARTS AND LEISURE

BEST FILM-GUIDE CD Criterion Goes to the Movies

The Voyager Company; 212/431-5199, 800/446-2001. \$24.95.

Among the handful of movie and video guides available on CD, Criterion Goes to the Movies is decidedly the best. The disc is an obvious attempt to promote Voyager's Criterion Collection of films on laser disc, but who cares? The Cri-

terion line includes many of the world's great films (everything from the inspired Depression-era shenanigans of the Marx Brothers' *A Night at the Opera* to the bleak future depicted in *Blade Runner*), each of which is represented on the guide disc with thoughtful essays, information on cast and credits, plot synopses, and lists of the laser discs' special features. The straightforward interface lets you search by film title, person, language, awards, and other subjects.

The disc's main attraction

is its set of QuickTime clips—one excerpted from each film, about 125 in all. These QuickTime videos are among the best-looking I've seen. When played from a double-speed CD-ROM drive, each video's frames-per-second speed looks to be virtually real-time, with little if any audio dropout. Clips of wide-screen films (such as *West Side Story* and *Lawrence of Arabia*) maintain the original aspect ratio, and image resolution is crisp (particularly in 16- or 24-bit color). Criterion Goes to the Movies doesn't offer information on thousands of films, as most other movie guides do, but no other disc does a better job of bringing the movies to life.

BEST TRAVEL CD Oceans Below

The Software Toolworks; 415/883-3000, 800/234-3088; \$49.95.

Computer-simulated scuba diving? I was skeptical, too, but this disc, which cheerfully invites you to strap on a virtual air tank and explore deep underwater destinations, succeeds wonderfully in making you feel as if you're right there with all those other reef-dwelling crustaceans.

Produced by Amazing

Media (the creative talent behind Clinton: Portrait of Victory and other titles), Oceans Below features high-quality photographs and excellent underwater footage (in QuickTime format). You can check out the ground-level attractions of a destination, then take the plunge and explore (via QuickTime)



Oceans Below All hands are on deck as you begin your scuba-diving expedition. The icons at the bottom left of the screen help you navigate the program; once you've found the perfect diving spot, you can explore its mysteries with mouse-clicks and virtual scuba gear.

selected undersea objects by clicking on them. During my "dives" I discovered, among other things, a shark that doesn't have to swim to breathe, a gurgling bronze statue of Christ, and airplane wreckage purposely placed on the ocean floor by a Mexican film director—not bad, considering I didn't have to shell out any money on scuba equipment.

THE WORST CDS

Here's a sampling of some misguided and downright bad CD titles.

Better Homes and Gardens Healthy Cooking CD Cookbook There are some worthy recipes on this disc, but the sloppiness of its contents (the word *desserts* is misspelled in the table of contents!) and its absurdly gratuitous use of QuickTime (do we really need a video of how to boil water?) just go to show that, in this case, the book is infinitely better than the movie. (Multicom; 206/622-5530, 800/850-7272. \$59.95.)

A Hard Day's Night This is the first CD version of a full-length fiction film, and it's actually a decent product. But this 1964 Beatles celluloid escapade, while moderately entertaining, doesn't deserve such veneration. Why not a *Citizen Kane* or *Casablanca* CD?

(The Voyager Co.; 212/431-5199, 800/446-2001. \$39.95.)

London: The Multimedia Tour So you get to point-and-click your way around the U.K. capital—big deal. The content is uniformly shallow, and a jerky QuickTime video of a neon billboard promoting Wendy's hamburgers in Piccadilly Circus is not my idea of a gratifying multimedia experience. (Sony Electronic Publishing; 310/449-2367. \$59.)

Take Five This one should get the Unclear-on-the-Concept Award: a CD designed to relax you while you're at the computer. Call me a traditionalist, but it seems like it would be much more effective to just shut off the computer and take a tai chi class or something. (The Voyager Company; 212/431-5199; 800/446-2001. \$49.95.)

BEST MUSIC CD Microsoft Musical Instruments

Microsoft; 206/882-8080, 800/426-9400. \$79.95.

Aside from several undistinguished years of piano lessons in elementary school and an unfortunate encounter with a glockenspiel in junior high, my musical education has been virtually nonexistent. But I'm catching up quickly, thanks to this exquisitely designed, entertaining guide to the world of musical instruments.

This disc has the most

consistently attractive visual design of any CD I evaluated, from the table of contents to the detailed instrument diagrams. There's just the right amount of interactivity; for



Microsoft Musical Instruments With Microsoft Musical Instruments, you can hear what a glockenspiel sounds like and how its name is pronounced, study the diagram, then click on the icons at the bottom of the screen to find out more about the instrument.

each instrument, there are two sound icons—one plays back a musical sample generated by the instrument, the other offers a pronunciation of the instrument's name. The descriptions are terse but offer enough factual information to whet the appetite; the scope of the disc is broad (aside from symphonies, there are entries on rock bands, jazz ensembles, and Caribbean steel-drum groups); and the interface is lean and well-organized.

Best of all, Microsoft Musical Instruments is one of the fastest CDs around: click on an icon and you get almost immediate gratification. And that's a relief—after procrastinating on my musical education for so many years, I don't have a moment to lose.

CHILDREN/YOUNG ADULTS

BEST ENTERTAINMENT CD The Tortoise and the Hare

Broderbund Software; 415/382-4600, 800/521-6263. \$39.95.

There's been a small flurry of New Age CDs aimed at enticing the legion of burned-out

fast-trackers to "be in the moment," but no disc I looked at was more effective at making me want to spend my afternoons in a state of blissful procrastination than this one.

Aesop's fable about the race between a type-A rabbit and a dawdling tortoise is perfect for children—and it's positively inspirational for their overachieving parents. Broderbund's rendition of the story is simply a delight.

The fable's message—slow but steady is the way to go—is vividly brought to life through the disc's charming illustrations and clever use of interactivity. On one "page" (the disc is structured like a book; you go through the story page by page), the frenzied hare zooms



The Tortoise and the Hare Aesop's fabled tortoise, evoked by Broderbund Software, is a model for stress-free living as he spends his time listening to the birds sing and hanging out with friends.

past the imperturbable tortoise, who's whiling away the hours with his menagerie of friends, listening to the birds sing. Using your mouse, you can click on the animals in the image and watch as they react. Click on the beaver wearing his baseball cap backward, for instance, and he becomes a rappin' deejay, using a sawed-off tree trunk as his turntable.

There's a pervasive sense of fun in this version of the fable, but be forewarned: play this CD too often and you'll end up wanting to chuck it all for a log cabin in Montana.



The Oregon Trail Traveling along the Oregon Trail as a pioneer, you're kept up to date on weather and traveling conditions. At this point in the journey, you're out of food but unexpectedly spared starvation by a woman offering berries.

BEST EDUCATIONAL CD

The Oregon Trail

MECC; 612/569-1500, 800/685-6322. Consumer version \$69.95; educational version (includes teacher's manual) \$79.

As a pioneer in the Old West, I would have been a dismal failure. This is something I never knew about myself until I tested my mettle with The Oregon Trail, an interactive simulation that puts you in charge of a westward wagon in the nineteenth century.

Before you begin your journey, you're given a set of occupational choices—I chose teacher, my first mistake (the pay was as lousy then as it is now). Based on that choice, I had \$400 to spend on provisions; my second mistake was to blow nearly the entire wad at the beginning. As a result, I had to shoot deer when my food supply ran out, because I didn't have money to buy food, and I had to endure several white-knuckle river crossings—had I not spent all my money, I could have taken the ferry.

From that point,

things went downhill quickly; so many members of my party died that I wondered if MECC might be planning an interactive adventure featuring the Donner Party. In spite of my shortcomings as a trailblazer, I highly recommend The Oregon Trail. The disc not only teaches history and geography, it causes you to seriously consider the consequences of your actions—something most games and educational programs don't bother to teach children, or adults, for that matter. **m**

JAMES A. MARTIN, Macworld's senior associate editor for graphics, also chose last year's roundup of the best CDs.

TOP CDS



Of the CDs named to Macworld's top ten, there's one that stands out as a clear favorite—it's the disc to have on a desert island.

Best Overall CD

Seven Days in August Most CDs are long on glitz, short on content. Not this one—its multilayered approach to the building of the Berlin Wall offers meaningful insight into the Cold War and American culture. And technical support is excellent. **Company:** Time Warner Interactive Group. **List price:** \$79.99.

CPU BOOSTERS

You can inexpensively
increase your Mac's
system speed—but can
you do it safely?

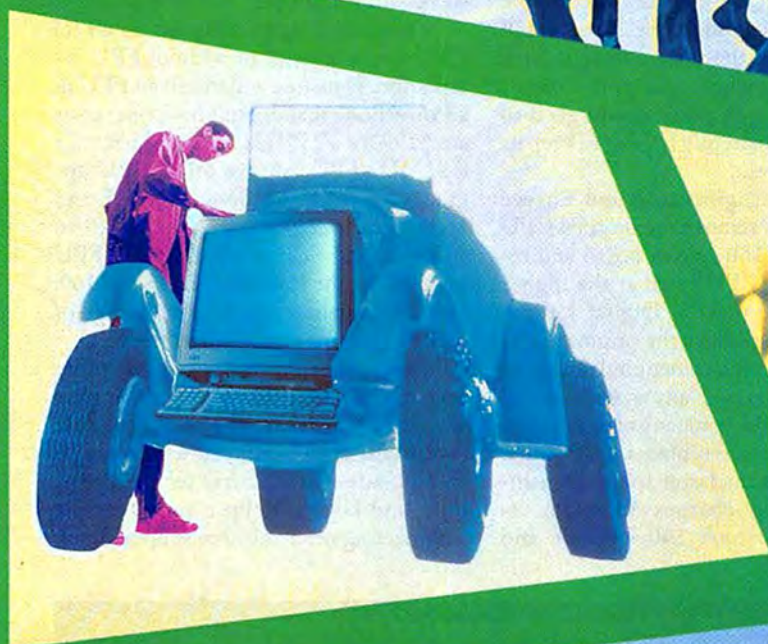
Everyone knows what it takes to make a Mac faster: money. Yet paradoxically everyone wants more speed without spending a lot. The answer, at least for some Macs, is a low-cost method pioneered several years ago by intrepid IIsi owners that now delivers 20 to 50 percent speed increases on certain PowerBook, Centris, and Quadra Macs. This method simply boosts the speed at which the Mac's CPU executes instructions, making the whole system go faster. The cost is under \$90 for the IIsi, under \$170 for Centris and Quadra models, and between \$380 and \$625 for PowerBooks. CPU boosting is not sanctioned by Apple or Motorola, since it can require system-board changes, and does not work on every Mac, but the companies who sell the upgrade parts and services report high satisfaction among their customers.

Where and Why Boosting Works

CPU boosting works only on models whose system boards, or at least most of the components on the system boards, were designed to operate at a faster speed than the CPU that Apple used with them. For example, the IIsi is eligible for CPU boosting because it uses many of the same chips as the faster IIfx. Other candidates include the PowerBook 140, 145, 160, 165, and 170; the IIfx; the Centris 610, 650, and 660AV; and the Quadra 610, 650, 660AV, 700, 800, 900, and 950.

In addition, CPU boosting relies on the chance that the speed rating of any individual CPU may be understated. A CPU, being a digital device, works in a pulsed fashion like a crew rowing a racing shell. Just as the coxswain calls out the rowing rhythm for the crew, a discrete chip on the system board governs the pace of the CPU's pulses. When the coxswain yells "Stroke!" at a faster pace, the crew rows faster and the boat goes faster. Replacing the chip, called a clock-crystal oscillator, with one that pulses at a faster pace makes the CPU work faster.

Accelerating the rowing pace makes the crew get hot and tired, and boosting the CPU likewise makes it get hot. Unlike the crew, the CPU can't sweat to cool off, but you can install a heat sink and possibly a small fan on top of the CPU to dissipate the extra heat. Fortunately, chips do not get tired or wear out prematurely from operating at a faster pace, as long as



they operate within the manufacturer's temperature specifications.

Regardless of extra cooling, there is a speed at which every CPU stops working. Motorola designs a CPU model to work across a range of speeds—16MHz to 50MHz (16 to 50 million pulses per second) for 68030s, and 20MHz to 40MHz for the 68040s. Every CPU manufactured is a candidate for the highest speed, but only some actually work at that speed. The bulk of the CPUs work at midrange speeds, and a small quantity work only at the slowest speed.

To determine a speed each CPU can handle, Motorola tests it during fabrication and stamps the speed rating on the finished CPU chip. But that doesn't mean every chip is tested to see how fast it can go. An entire batch of 68030s might be tested only at 25MHz to fill an order for 25MHz CPUs, for example. Were the batch tested at higher speeds, many of the CPUs would pass a 33MHz test, and some would pass at 40MHz or 50MHz.

When you boost the CPU speed, you are betting that Motorola and the manufacturers of other chips on the system board could have certified the chips at a higher speed. If you lose the bet and the boosted system doesn't work, there's no harm done provided you can return to the original speed. All the CPU boosters we investigated either are reversible or hedge their bets by replacing the CPU with a part certified at the faster speed.

Thus Macworld Lab found no reason to be concerned about the safety of CPU boosters as long as the booster provides some cooling for the CPU and is professionally installed. Boosters that don't require soldering can be installed safely by customers who follow the manufacturer's instructions carefully.

PowerBook Boosters

PowerBook owners can't accelerate their computers conventionally with expansion cards because PowerBooks have no general-purpose expansion slots. But several companies can transform a PowerBook 140 into a 170 or a 160 into a 180. The makeover is possible because the 140 and 170 share the same system-board design, as do the 160 and 180.

An upgraded PowerBook has all the processing power of the faster model but retains the original passive matrix screen. Only the screen and the name printed on the outside of the computer set an upgraded PowerBook apart from the faster model it essentially becomes.

A PowerBook upgrade is not a do-it-yourself project. You send your PowerBook to Digital Eclipse (510/547-6101), Dynamic Engineering (408/336-5531), or

Shreve Systems (318/424-9777), and they modify the system boards and send you back a faster PowerBook. The work takes one or two days. Shipping accounts for most of the time your PowerBook is away.

The companies follow slightly different procedures for modifying PowerBook 140 and 160 system boards, but they all change the clock-crystal oscillators to make the CPU work faster. They put a spongy heat-conducting material on top of the CPU to dissipate heat through the PowerBook's metal frame under the keyboard, just as Apple does on the 170 and 180. Then they flip the system board over and solder an FPU in the vacant space where Apple installs one on a 170 or 180. Besides making these major changes, the companies add and move some small components on the system board. Each company described different minor changes, although none would go into much detail, apparently hoping to keep its procedure secret.

Dynamic Engineering and Shreve Systems always remove the original CPU from a 140 or 160 system board and replace it with a CPU rated at the higher speed of a 170 or 180. Digital Eclipse prefers not to unsolder the original CPU and solder in a replacement unless necessary. Before making any system-board modifications, the company tests the original CPU and only replaces a CPU that doesn't work at the faster speed. Dynamic Engineering charges \$379 for its CPU25 PowerBook 140 upgrade and

\$625 for its CPU33 PowerBook 160 upgrade. Shreve charges \$329 for its 140 upgrade and \$369 for its 160 upgrade. Digital Eclipse charges \$399 for its F/25 PowerBook 140 upgrade and \$439 for its F/33 PowerBook 160 upgrade.

In addition to upgrading a 140 to a 170 and a 160 to a 180, which all three companies do, Dynamic Engineering will install a 33MHz CPU and FPU in any PowerBook for \$625, giving it the speed of a 180. This is an aggressive upgrade because the 140 and 170 do not have the same system boards as the 180, so you have no reason to believe Apple designed or tested them to operate at 180 speed. Dynamic says it has done this upgrade successfully more than 100 times.

Dynamic Engineering offers all its CPU upgrades with or without FPU installation. Dynamic will install an FPU in a PowerBook that doesn't have one; costs are \$299 for a 25MHz FPU and \$329 for a 33MHz FPU. Shreve offers FPU upgrades for the PowerBook 140, 145, and 160, with prices ranging from \$129 to \$189; Digital Eclipse offers a \$339 FPU upgrade for the PowerBook 145 and 160. Few Mac applications take advantage of an FPU, so you may not need an FPU.

None of the PowerBook upgrades are reversible, and all of them void Apple's warranty. However, the three upgrade companies all give one-year warranties on the upgrades. All offer free technical support, and Digital Eclipse and Dynamic Engineering offer toll-free support lines.

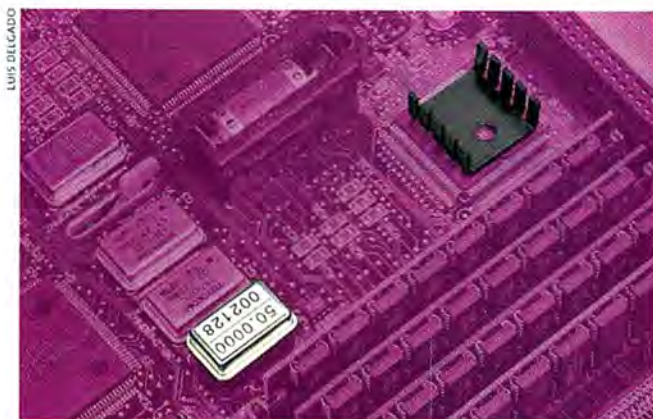
FIGURING THE BANG FOR THE BUCK

Part of deciding when to use a CPU booster or to buy an accelerator card or new Mac depends on your processing needs. If you need to double the speed of your Mac, you definitely should get an accelerator board or a new Mac. If you simply want a faster system, the CPU booster is often enough—at great prices.

But many people who just want the most speed they can afford aren't sure which method is more cost-effective. Here's how to tell.

Take the case of a Centris 610. For \$165 you can get the KS Labs Alacrity 610, which will boost your performance by about 40 percent. Or you can buy DayStar Digital's 40MHz Quad 040 with the required 610 adapter for about \$1500 via mail order, for a performance boost of about 100 percent. Think of each 10 percent increment as a bang. Thus, the bang-for-buck ratio with the Alacrity is \$41 per bang. For the Quad 040, it is \$150 per bang.

To calculate this performance boost, take the Macworld Lab Core-Performance Index's Common ranking for the acceleration option you're considering and subtract the ranking for the Mac you want to accelerate (see "How Much Do CPU Boosters Speed Up Your Mac?"). Divide that result by the original Mac's ranking. In the case of the Centris 610, the unaccelerated 610's ranking is 8.8, and the Alacrity 610 upgrade's ranking is 12.2. Doing the math $(12.2 - 8.8) \div 8.8$ results in $3.4 \div 8.8$, or 38.6 percent. You can use the Core-Performance Index numbers from any Macworld feature or review published since June 1993. Use the Scientific rankings instead of the Common rankings if FPU performance is important in your work.—Galen Gruman



Boosted IIsi To make a IIsi run faster also involves replacing the clock-crystal oscillator (highlighted at left) and adding a heat sink onto the CPU (highlighted at right). Some dealers also add a cooling fan.



Boosted Centris 610 To make a Centris 610 run faster involves clipping a faster oscillator (highlighted at right) onto the 610's clock crystal and then adding a heat sink and cooling fan to the 610's CPU (highlighted at left).

Centris and Quadra Boosters

To accelerate a Quadra or Centris, you can plug in a PDS cache card or a NuBus accelerator card, but you can boost the CPU for the same money or less—without using the Mac's expansion slot. What's more, the performance from CPU boosting compares favorably with the next cheapest acceleration method, adding a cache card.

Macworld Lab found that a KS Labs Alacrity CPU booster yielded noticeably faster results than a DayStar Digital FastCache Quadra cache card in all tests on a Centris 610, and yielded somewhat faster results in most tests on a Quadra 800. The Newer Technologies VSO booster delivered about the same performance as on a Quadra 700 except in drive-access tests, where the VSO was slower. The VSO does not boost the SCSI components on a Quadra 700 or 900 because, Newer found, those components might not perform correctly when boosted. The FastCache isn't subject to such problems because, like other cache cards, it speeds performance by letting the CPU operate more efficiently with memory.

CPU boosters can't achieve the same performance on every Centris 610 and other Macs because some individual CPUs and system boards contain chips that cannot be boosted as much as the ones Macworld Lab tested. A few can't sustain any useful amount of boosting. By comparison, an expansion card such as the FastCache Quadra would achieve the same performance on every individual computer of a particular model.

DayStar Digital (404/967-2077) makes the \$399 FastCache Quadra for most Centris and Quadra models (the Centris 610 and 660AV require a \$119 adapter). Newer Technologies (316/685-4904) makes the \$425 VSO for the Quadra 700, 900, and 950. KS Labs' \$165 Alacrity kits (614/374-5665) are available

for the Centris 610 and 660AV, and for the Quadra 610, 650, 660AV, and 800. (The Quadra 610 and 650 kits shipped just before this issue went to press, so we could not test them. A kit for the Centris 650 has been discontinued.) It plans no kit for the Quadra 605 because that Mac uses a different clock-crystal oscillator.

Not included with the Alacrity kits but recommended by KS Labs are fast RAM SIMMs: 70ns for the Centris 610 and 60ns for the other models. Without the faster RAM, the computer's memory system may be unable to transfer data to and from the CPU fast enough, and data can become corrupted. (PDS and NuBus accelerator cards generally do not require faster RAM.) But according to Macworld Lab testing, faster RAM does not noticeably improve performance with the Alacrity booster, and we had no problems with memory corruption.

Installing an Alacrity booster is a bit trickier than plugging in a PDS or NuBus card but requires no special skills and only a screwdriver. With your Centris or Quadra shut down, you open its case and carefully attach a clip that looks like a runty clothespin to the clock-crystal oscillator chip (see the photo "Boosted Centris 610") on the system board (it resides next to a NuBus slot). The patented clip has a socket on one side with a faster oscillator chip plugged into it. The clip is large enough that it may prevent a very thick NuBus card from fitting in a Centris 610, Centris 660AV, Quadra 610, or Quadra 660AV, or in the innermost slot of a Quadra 650 or Quadra 800.

On a Centris 610, you also stick a heat-sink-and-fan assembly to the top of the 68040 CPU. Macworld Lab found the thermal gel supplied with our test kit a little bit messy, but KS Labs has since switched to double-sided thermal tape. On a Centris 660AV, Quadra 610, Quadra 650, Quadra 660AV, and Quadra

800, you also press a small fan onto the fingers of the heat sink that Apple installed at the factory. Macworld Lab deemed this arrangement effective but inelegant, and it was actually a problem on the Quadra 800, where space was tight.

After you install the Alacrity booster, KS Labs recommends that you test your system in case it is one that can't stand CPU boosting. Symptoms include failure to start up, more frequent system crashes, incoherent display, incorrect calculations, inability to print on a network printer, or other network problems.

Macworld Lab experienced intermittent network trouble (with System 7 file sharing and with AppleTalk Remote Access) after upgrading a Centris 610 to 28.6MHz (from 20MHz). Network trouble did not affect Macworld Lab's Quadra 800 after upgrading to 40MHz (from 33MHz), although there was slight video flickering when we tested it with Sigma Designs' MovieMovie video-capture board. The boosted Quadra 800 didn't work with a DayStar FastCache installed, which was not surprising since the static RAM on the cache card might not be fast enough to handle the extra speed.

If problems surface, KS Labs suggests replacing the plug-in oscillator chip on the patented clip with a slightly slower one; for example, 25MHz for the 610. Of course, doing that would reduce performance. KS Labs sells extra oscillator chips at cost: \$5 each. If you are dissatisfied with the Alacrity's performance or compatibility on your Mac, KS Labs offers a 30-day money-back guarantee. The company also offers free technical support through a toll-free number.

Compared with the Alacrity, the VSO is a more complex device, but installing it takes about the same level of effort. The VSO is a SIMM that you snap into the Mac's ROM SIMM socket (which is not otherwise used). A wire leads away from



How Much Do CPU Boosters Speed Up Your Mac?

TASK-PERFORMANCE TIMES (by system class)

- Best result in each test.
- Business-tasks test suite.
- Entry-level-tasks test suite.
- Notebook-tasks test suite.
- Core-tasks test suite.

Products are arranged in decreasing order of overall performance.

Boldface indicates CPU boosters; other products are shown for comparison.

Times are in seconds. Shorter bars are better.

Use these results to compare the performance of systems within each class (business, entry-level, and notebook). For each class we used a different test suite, made up of real-world tasks routinely performed by that class's typical user. Thus, the results for one class cannot be compared with results for another class.

Processor

Indicates raw processing power, which affects almost all aspects of performance.

Drive Access

Indicates performance on tasks that rely heavily on the hard drive.

Video Display

Indicates performance on tasks that depend heavily on screen-redraw speed.

Floating Point

Indicates performance on tasks that heavily use a math coprocessor.

CORE-PERFORMANCE INDEX

Times as fast as a Classic (Classic = 1.0). Use these standard ratings of overall performance, based on a core test suite, to compare systems across classes. Common and Scientific ratings indicate overall performance for common applications and the Mac System, and scientific applications, respectively.

BUSINESS SYSTEMS

Quadra 800 w/ KS Labs booster	110	52	44	58
Quadra 800 w/ DayStar cache card	119	52	45	57
Standard Quadra 840AV	118	59	49	59
Standard Quadra 800	129	54	52	70
Standard Quadra 950	135	58	60	76
Standard Quadra 650*	136	57	53	75
Quadra 700 with Newer VSO	163	64	70	73
Standard Centris 650*	162	60	65	88
Centris 610 w/ KS Labs booster	144	57	57	NA
Standard Quadra 610	167	60	63	91
Standard Quadra 700	172	63	73	96
Ilfi w/ Newer VSO	183	65	97	95
Centris 610 w/ DayStar cache card	187	62	70	NA
Standard Centris 610	201	64	77	NA
Standard Ilfi	246	79	142	104
Standard Ili	467	111	173	200

Common Scientific

19.3	32.1
18.1	32.7
16.5	28.8
16.4	26.8
14.7	24.6
14.6	24.9
13.8	24.0
12.8	21.8
12.2	12.9
12.1	20.9
12.1	19.2
11.3	15.5
9.9	10.2
8.8	9.0
8.3	17.1
4.9	9.2

ENTRY-LEVEL SYSTEMS

Ilfi w/ Mac Experts booster and DayStar cache card	211	171	75	210
Standard Ili	303	210	52	52
Ilfi w/ DayStar cache card	263	202	110	264
Ilfi w/ Mac Experts booster	269	207	92	270
Standard Ili	341	253	129	340

5.4	5.4
4.9	9.2
4.3	4.3
4.2	4.3
3.3	3.3

NOTEBOOK SYSTEMS

Standard PB 180	34	55	85	42
PB 160 w/ Shreve booster	35	55	85	41
PB 160 w/ Digital Eclipse booster	35	55	83	42
Standard PB 165c	36	54	158	41
Standard PB 180c	36	52	167	42
PB 140 w/ Shreve booster	44	67	97	53
PB 140 w/ Digital Eclipse booster	43	69	98	53
Standard PB 145	48	62	97	278
Standard PB 145B	50	64	96	279
Standard PB 160	52	70	108	283
Standard PB 140	67	88	128	403

5.7	11.2
5.7	11.3
5.7	11.3
5.1	10.9
5.1	10.8
4.6	9.0
4.5	8.9
4.1	4.1
4.0	4.1
3.7	3.8
3.0	3.0

NA = Does not have FPU required for these tests. * Tested without memory interleaving active; when in use, interleaving typically boosts performance by 5 percent.

the VSO SIMM, and you clamp the wire onto a particular leg of the oscillator chip on the system board. In addition, you mount a fan on the factory-installed CPU heat sink and install software in your System Folder. The software patches the operating system to eliminate AppleTalk network difficulties and other problems Newer found during its testing of the VSO. The VSO has a 30-day money-back guarantee and includes free technical support via a toll-free number.

Any modification of the system board voids Apple's one-year warranty (but for owners of most of the Mac models covered in this article, warranties have already expired). Apple considers clip-on boosters to be a modification of the system board, especially since they require extra cooling. But it's not clear what effect the Alacrity boosters have on newer Macs still under warranty, since the boosters can be removed without a trace. Likewise, if you decide later to buy an Apple up-

grade that involves swapping system boards—for instance, a Centris 610 to a 660AV, or any boosted Centris or Quadra to a forthcoming PowerPC Mac—you can easily remove the Alacrity upgrade.

Mac II Boosters

Mac CPU boosting began years ago on the Ili as a do-it-yourself hardware hack, but you no longer have to wield a soldering iron to boost your Ili's CPU. You can ship your Ili to Mac Experts

(310/394-1223) for one-day installation of its Max IIsi booster, and some Mac service shops that do repairs at the component level will do the work on a carry-in basis. Either way, expect to pay \$90 to \$120 for parts and labor (Mac Experts charges \$89). That's still \$150 to \$200 less than the cost of a plug-in cache card for the same performance increase. In Macworld Lab tests, a IIsi boosted to 25MHz by Mac Experts was just about on par with a IIsi with a \$339 DayStar FastCache IIsi.

CPU boosting on a IIsi is completely safe when performed by skilled technicians. They take apart the system and remove the system board from the IIsi case. Next they unsolder the clock-crystal oscillator chip, pull it off the system board, solder a socket in its place, and plug a faster oscillator chip into the socket. Then they fasten a heat sink to the top of the CPU. Some technicians, wanting an extra measure of cooling, install a small fan as well. Other technicians are convinced the IIsi CPU stays cool enough without a fan or a heat sink and install neither. (Mac Experts installs a heat sink.)

Using a socket for the oscillator chip makes the CPU boost reversible, even by an average user: with the Mac switched off, you just replace the fast oscillator chip with a standard-speed chip.

CPU boosting does not work on every IIsi equipped with an FPU chip on a PDS or NuBus adapter card. Historically, the solution to this problem has been to replace the standard 20MHz FPU with a 25MHz FPU. Countering history, Mac Experts has determined that only the Apple NuBus adapter card has an FPU problem because the card has its own clock-crystal oscillator for the FPU. The Mac Experts solution, which adds \$30 to the cost of boosting a IIsi, is replacing that oscillator chip with a faster one.

After CPU boosting, a IIsi needs 80ns RAM. Although the standard IIsi works with slower, 100ns RAM, Apple shipped most IIsi computers with 80ns SIMMs.

CPU boosting leaves the IIsi's single expansion slot free for a PDS or NuBus card but causes problems with some PDS cards. Macworld Lab encountered no compatibility problems in its tests, but IIsi owners on Internet and America Online report after CPU boosting they have the least trouble with PDS cache cards, some trouble with video cards, and the most trouble with Ethernet cards. Mac Experts itself has encountered problems with the PSI cache card, which has been out of production for some time, and with the PDS card used with some Radius Pivot monitors. A Pivot connected to the IIsi's video port or to a NuBus card works fine. Asanté has a free fix for its Ethernet cards

that don't work, according to Mac Experts. Mac Experts offers a 30-day money-back guarantee on parts and labor. It also offers free technical support via a toll-free number.

If you're interested in boosting a IIsi CPU yourself, Mac Experts sells its Max IIsi kit separately, for \$29. There's a separate \$15 kit for upgrading the FPU oscillator on an Apple NuBus adapter

card. You supply the soldering experience and tools—and undertake the risks of altering the system board.

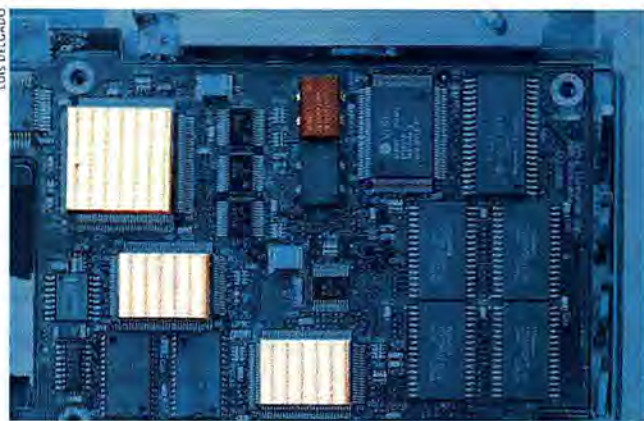
Newer Technologies' \$425 VSO is also available for the IIsi and IIfx. Installation requires no soldering—just snap a SIMM into the empty ROM SIMM socket, clamp a wire onto the oscillator chip, stick on a heat sink (a IIfx requires three), and install the VSO software. Newer advises against using a VSO in a IIsi whose expansion slot contains a board.

Are CPU Boosters Worthwhile?

CPU boosting entails a little more risk than plug-in cache cards and accelerator cards, but it offers several important benefits. It is the only way to accelerate the PowerBook 140 and 160. It speeds up the Mac IIsi, Centris 610, Centris 660AV, and Quadra 660AV without filling the single expansion slot on those Macs. And most CPU boosters cost less than the next cheapest acceleration method.

When comparing prices, be sure to consider the discounts that dealers generally give on cache cards and accelerator cards. You won't get a comparable discount on CPU boosters because they are sold direct. Also account for the cost of any RAM SIMMs you must replace with faster ones on a boosted Centris, Quadra, or IIsi. For example, a IIsi upgrade is not a good value if you have four 100ns SIMMs to replace (unless you plan to increase RAM anyway).

CPU boosting improves performance noticeably but not enough to push you back in your seat or make your hair fly. To decide if this much performance is worth the price of upgrading a PowerBook 140 or 160, go to a dealer and try working for 15 or 20 minutes on a PowerBook 145 as you now work on a 140, or work on a 180 as you now work on a 160.



Boosted PowerBook 160 To make a PowerBook 160 run like a 180, companies replace the system board's clock-crystal oscillator with one that runs at 33MHz (highlighted at top). They then add heat-conducting patches (the ribbed white squares) over components that need to have excess heat drawn away. An FPU is added to the back side of the system board (not shown).

You can assess the performance boost and compatibility of an Alacritty kit, VSO, or Max IIsi on your own Mac. Because these upgrades have 30-day money-back guarantees, all you risk is some shipping expense and the time you spend evaluating. You should give them a try if you have the slightest interest in the level of performance they offer. ■

LON POOLE is a Macworld contributing editor whose PowerBook 140 wants desperately to become a 180.

Research assistance by JIM FEELEY.

BEHIND OUR TESTS

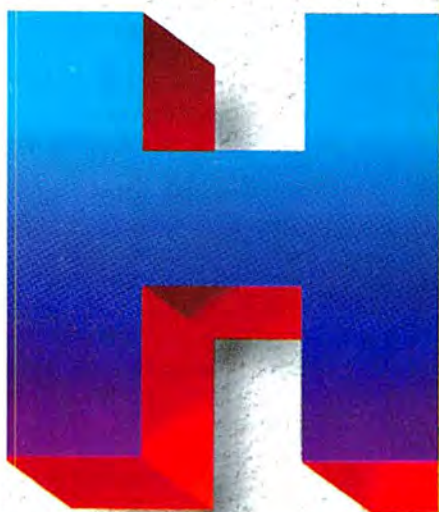


Macworld Lab evaluated CPU boosters with its standard task-oriented performance tests. These tests use a set of standard programs typical for users of each type of Mac—business systems (usually 68040-based Macs), entry-level systems (usually 030-based Macs), and notebook systems.

Macworld Lab also tested compatibility for these standard programs, for networking and telecommunications, and for different types of add-on hardware, such as video cards. Increasing the speed of the CPU's clock can affect the speed of other system-board components, which is why some products caused problems with LocalTalk.—Macworld Lab testing supervised by Mark Hurlow

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Software Development Update

PostScript® 3.0 For Windows™

DDI

Mr. Thomas K. Kinsch
Executive Director
222 Main Street
Dover, DE

Via Hand Delivery
Thursday, June 24, 1993

Dear Mr. Kinsch:
Thank you for your letter of June 23, 1993, regarding the PostScript 3.0 software development update. We are pleased to hear that you are interested in this software.

Sincerely,
John F. Pugh
Vice President

PostScript 3.0 is a new software development update that will allow you to create more powerful and efficient PostScript documents. It includes new features such as the ability to create more complex graphics and to use more colors. This software is available for Windows and Macintosh. For more information, please contact your local HP representative or visit our website at <http://www.hp.com>.

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BY JIM HEID

Those of you who are always completely satisfied with the speed of your hard drives may skip to a different article.

Now that he's gone, we can concentrate on what is often the weakest link in a Mac's performance chain. Even in the fastest Macs, data slows to a relative crawl when it reaches the spinning platters that hold data on a hard drive and the head actuator arms that grope across them.

You can, however, use a variety of tools and techniques to squeeze every drop of speed out of your spindles. You might even have everything

you need—you can perform some of the tricks described here using the setup software that accompanies most hard drives. For an extra measure of performance or to do advanced drive-tuning, turn to a utility package. Some utilities also streamline the performance of SyQuest, Bernoulli, and magneto-optical drives.

Optimizing a drive's performance involves some initial setup and some ongoing maintenance. The setup phases help ensure that the drive and Mac are communicating as fast as they can and that you're using the drive's space



DOUGLAS FRASER

HARD-DRIVE

SOFTWARE TOOLS AND TIPS FOR SQUEEZING THE

BEST PERFORMANCE OUT OF YOUR HARD DRIVE

efficiently. Ongoing maintenance means using a *defragmenting* utility to keep the drive's files arranged in a way that allows for the fastest retrieval.

Formatting: Basic Setup

All hard drives include a basic formatting utility that prepares the drive for use. Part of the preparation process involves installing the SCSI driver software that the Macintosh uses to communicate with the drive.

Hard drive vendors often boast that their SCSI drivers are faster than the competition's. Several companies counter with universal driver/formatter packages that work with any hard drive and promise to deliver better performance than the software that came with yours. Well, surprise: Macworld Lab tests conducted for the hard drive overview in this issue reveal that for most applications and mainstream drive capacities, there is little performance difference between drivers (see "Mainstream Storage," in this issue).

That's not to say that stand-alone driver/formatter packages such as Casa Blanca Works' Drive7, Surf City Software's Lido 7, FWB's Hard Disk Toolkit series, and La Cie's SilverLining don't have something to offer. If you have an older hard drive acquired in the System 6 era, updating its driver could provide a speed kick as well as System 7 compatibility. If you have an AV Mac, installing a driver that supports the new SCSI Manager's asynchronous transfer capabilities can perk up a third-party drive (see "Pushing AV Mac SCSI to the Limit").

If you use SyQuest removable drives, there's an even better argument for buying a driver package: compatibility. Every SyQuest drive vendor is responsible for supplying driver software that enables the Mac to access the cartridge, and one firm's software may be incompatible with another's. Insert a cartridge formatted under vendor A's driver into vendor B's drive and you could see the Query of Doom: "This is not a Mac-

intosh disk. Do you want to initialize it?"

Universal driver packages also include a handy control panel that lets you mount a cartridge on the desktop even if it wasn't inserted when you started the Mac. Most universal driver packages also let you use a removable-media cartridge with System 7's virtual memory feature—something System 7 doesn't normally allow. (Because virtual memory relies so heavily on the hard drive, however, turning it off with the Memory control panel is a good way to improve a Mac's performance.)

Some driver/formatter packages also allow you to specify an *interleave ratio*, which describes the organization of the wedge-shaped sectors that make up each track on a disk platter. With the fastest interleave ratio, 1:1, sectors are numbered and read or written consecutively. All of today's Macs and hard drives support a 1:1 ratio.

Older Mac models, however, must use a higher ratio because they can't keep up with the speed at which the

sectors fly beneath the drive's read-write heads. The Mac SE uses a 2:1 interleave ratio; the Plus requires a 3:1 ratio. With these ratios, the Mac plays a game of digital hopscotch, reading only every second or every third sector.

One final tip: Most driver utilities allow you to install a driver without requiring you to reformat the hard disk. One driver package—Surf City's Lido 7—deliberately doesn't support the friendly takeover approach because of the risk of data loss; Surf City knows that it's much safer to back up first and then reformat the drive with the utility.

Performance Tuning: Use Carefully

Driver packages normally set controller options automatically at formatting time: the utility determines what type of mechanism the drive uses and then adjusts its controller options to provide the best overall performance, based on tests done by the driver developer. But some programs, such as FWB's Hard Disk Toolkit and Bering Industries'

OPTIMIZERS

Disk Café, let you adjust the low-level controller settings that govern how the drive transfers data.

Can you really improve hard-drive performance with custom settings? You won't find out from these products' manuals, which describe the

ing the tasks you perform most. Then adjust the settings and check your stopwatch again. You may find a genuine improvement—or you may find that you've spent an hour just to save a few milliseconds.

In the end, adjusting drive parameters makes the most

Edition, Surf City's Lido 7, Casa Blanca's Drive7, Charis-Mac Engineering's Anubus, and Golden Triangle's Disk-Maker are straightforward and have good documentation. Ontrack Computer Systems' Disk Manager Mac needs a better manual.

virus can't infect an unmounted partition.

Partitioning also offers efficiency and performance advantages. When you save a file, the Mac bites off disk space in chunks called *allocation blocks*. The larger the hard drive, the larger the allocation block size. Block sizes start at 500 bytes and increase

AFTER TESTING, YOU MAY FIND THAT YOU'VE SPENT

options but provide little advice for using them.

To be fair, the manuals can't provide specific recommendations for every mechanism. More to the point, different applications tax a drive in different ways—an option that improves data retrieval in FileMaker Pro might not speed saves in Photoshop. Only by testing a drive with your applications and documents can you find the best combination of low-level settings—and there's a good chance those settings are the defaults anyway.

Still, there are two general rules of thumb. To improve performance with large files—opening Photoshop documents, for example—be sure that *prefetching* is enabled. This is a data-access technique that involves reading not only the block of data that the Mac explicitly requests, but also one or more subsequent blocks; the hard drive stores, or caches, the extra blocks in its memory buffer. If the Mac needs the cached blocks—and if you're working with a large image file, it probably will—the hard drive supplies them from its buffer. Some drive mechanisms allow you to specify the number of blocks that are prefetched. Increasing this number can improve performance, too.

But extensive prefetching can actually slow down small, random-access data transfers—the kind that occur when you're retrieving records from a database, for example. To speed these tasks, try increasing the number of cache segments.

Before adjusting any low-level settings, back up your drive and do some tests, tim-

AN HOUR JUST TO SAVE A FEW MILLISECONDS

sense for people who constantly perform disk-intensive tasks and who own high-capacity (1GB and up) mechanisms, which have a larger number of adjustable parameters. If this describes you, buy Hard Disk Toolkit—Disk Café's manual is inferior, and the product is built around a bizarre and confusing coffee metaphor. (Disk Café's three utilities are named Cappuccino, Disk Café, and Kitchen. You tell me: which does what? Although it's true that a hard drive is good to the last drop, Bering should switch to decaf and rethink these names.)

If you just want a basic formatter/driver package with removable-media support, any of the products listed in "Surveying Drive/Formatter Utilities" will do the job. FWB's Hard Disk Toolkit Personal

Partitioning: Divide and Conquer

All hard drive formatting utilities support *partitioning*—the ability to divide the hard drive into a number of smaller-capacity *volumes*, each of which appears on the desktop as if it were a separate drive. (If you have an older drive with software that does not support partitioning, this is another good reason to buy a universal formatter.) Most utilities include a control panel or desk accessory that lets you mount and unmount partitions and often perform other tasks such as locking partitions.

One reason to partition a drive is to improve security: most utilities let you encrypt and password-protect partitions as well as lock them to prevent modification. And a

by 500 bytes for every 32MB of drive capacity: 1K on an 80MB hard drive, 4K on a 230MB, 16K on a 1GB.

Here's the rub: Blocks cannot contain information from more than one file; so even if a file contains only one character, the Mac gives it an entire allocation block. The combination of a large hard drive and small files—for example, E-mail messages, memos, small databases—is particularly wasteful: storing 500 tiny files on a 1GB drive wastes about 8MB. The solution is to create smaller partitions to hold smaller files.

Partitioning also boosts performance by reducing the amount of searching the Mac must do to locate a particular piece of data. It takes less time to find a file on a 20MB partition than to find the same file

PUSHING AN AV MAC SCSI TO THE LIMIT

To get the best performance from external hard drives connected to Apple's AV Macs, work with the new SCSI Manager 4.3, the portion of the Mac's system software that communicates with SCSI devices. SCSI Manager 4.3 works with the fast SCSI circuitry in an AV Mac to allow for particularly speedy data transfers—as long as the hard drive's SCSI driver supports the new SCSI Manager.

An AV Mac's built-in hard drive does have a SCSI Manager 4.3-compatible driver. If you're connecting a third-party drive to an AV Mac, however, you can boost its performance by 20 to 30 percent by updating its driver to a 4.3-compatible version. At this writing, most driver developers were preparing to ship new versions of their drivers that support the new SCSI Manager. These updates weren't available for testing, but de-

velopers I talked with claim their 4.3-compatible drivers will yield a larger performance gain than Apple's, particularly with high-end drives. The real performance potential of the new SCSI Manager won't be realized, however, until application software developers rework their programs to take advantage of its capabilities.

Speaking of high-end performance, Apple's PowerPC Macs will bring special SCSI considerations to the table. On the first PowerPC machines, the SCSI Manager and SCSI drivers will run in emulation mode, so your existing drivers should work normally. Eventually, however, Apple will release a native-mode SCSI Manager that will benefit from native-mode SCSI drivers. At that time, you'll want to update to native-mode drivers for best performance.

SURVEYING DRIVE/FORMATTER UTILITIES

Company	Phone	Product	List Price	Partitioning/ Protection/ Encryption	Allows Partition Resizing without Reinitializing	Allows Access to Low-Level Drive Parameters	Includes Defragmenting Feature
Bering Industries	408/379-6900	Disk Café	\$59.00	●/○/○	○	●	○
Casa Blanca Works	415/461-2249	Drive7	\$79.95	●/●/○	○	○	○
CharisMac Engineering	916/885-4420, 800/487-4420	Anubus	\$129.95	●/●/○	○	○	○
FWB	415/474-8055	Hard Disk Toolkit	\$199.00	●/●/●	●	●	○
		Hard Disk Toolkit	\$79.00	●/●/○	●	○	○
		Personal Edition					
Golden Triangle	619/279-2100,	DiskMaker	\$89.00	●/●/○	○	○	○
	800/326-1858						
La Cie	503/520-9000	SilverLining	\$149.00	●/●/○	●	●	●
MacPeak Research	512/327-3211	Spot On	\$99.95	●/●/○	○	○	○
		SuperSpot	\$149.95	●/●/○	○	○	○
Ontrack Computer Systems	612/937-1101,	Disk Manager Mac	\$69.95	●/●/○	●	○	○
	800/752-1333						
Software Architects	206/487-0122	Formatter1	\$49.95	●/○/○	○	○	○
Surf City Software	714/289-8543	Lido 7	\$95.00	●/●/○	●	some	●

● = yes; ○ = no.

scattered across a 230MB drive—just as it would take longer to find an article if an encyclopedia were printed as one huge book instead of being partitioned into numerous smaller ones.

There's more. The tracks on the outer edges of a hard drive's platters generally have faster transfer rates than those on the inner edges. As a result, you can squeeze an extra drop of speed out of a drive by storing your System Folder and other often-used files on a partition that uses the outer tracks.

How can you tell which partition uses the outer tracks? Easy. Partitions are written from the outer edges of the drive platters toward the inner edges, so the first partition you create will be the fastest.

Partitioning Tools

All driver/formatter packages support partitioning, but only four of the products I looked at allow you to change an existing partition's size without erasing its contents: Surf

City Software's Lido 7, La Cie's SilverLining, and the two versions of FWB's Hard Disk Toolkit series.

Some hard drive utility packages also include partitioning features: Symantec Corporation's Norton Utilities for Macintosh, or NUM (\$149; 408/253-9600, 800/873-4384); and Alsoft Power Utilities (\$129; 713/353-4090, 800/257-6381). Alsoft Power Utilities and NUM let you create resizable partitions. But all of these products create *soft partitions*, which are not physically separate partitions, but rather invisible files located on the hard drive's main partition; soft partitions can be lost if the drive's main directory is damaged. (Alsoft Power Tools includes a program that recovers lost soft partitions.)

A driver/formatter utility, by comparison, creates true, *hard partitions*, each of which is a separate, physically contiguous area of the disk, each with its own directory. Besides the potential performance advantage outlined earlier, hard par-

titions offer another plus: if you need to switch between different system versions, you can put a different System Folder on different partitions and then use the Startup Disk control panel to specify which one the Mac should use at start-up time.

Optimizing: Squelch Those Seeks

Of all the things that take place within a hard drive, one of the most time-consuming is the *seek*—in which the drive's read-write heads move from one track to another to find data. Other things being equal, a drive with a shorter seek time will be faster than a drive with a longer one.

If you've been reading your hard drive utility ads, you probably have nightmares about the specter of *file fragmentation*. It's what happens as you add and remove files to a hard drive over time. When recycling disk space freed up by deleted files, the Mac may scatter newly saved files across discontinuous

tracks. Reading such a file requires more seeks and more time—just as it takes you longer to seek out an article that is scattered throughout a magazine instead of being printed on consecutive pages.

But as hard drives become faster, fragmentation is becoming a bit like ring around the collar—a problem whose seriousness is exaggerated by those who sell remedies for it. With today's hard drives, fragmentation doesn't impair performance to the extent that it used to. Partitioning can reduce its effects, too, since on a partition, files are fragmented over a smaller area.

Still, if you are sensitive to your Mac's performance, over time fragmentation can make a drive feel sluggish—particularly in applications, such as Aldus PageMaker or Microsoft Word, that refer to the disk frequently. I often notice the problem in Open and Save dialog boxes—over time, the drive chatters more and more as I move into and out of nested folders.

Doing away with fragmentation has other benefits. If you use System 7 virtual memory, the amount of available virtual memory is limited to the amount of contiguous free disk space. If you're preparing a master hard drive for CD-ROM production,

optimization occur at a particular time or let Disk Express II optimize automatically when the percentage of fragmented files reaches a specified value.

Because disk optimizers are included with utility packages, you should evaluate your other needs in order to deter-

Other Routes to Faster Performance

Here are a few more ways that you can improve a hard drive's performance:

- Rebuild the Desktop file now and then. This invisible file stores the information that's necessary to display

these comments for you; Datawatch's SuperSet includes a rebuilding utility that preserves comments.

- Do not use a large memory cache. The cache in the Macintosh's Memory control panel is not particularly effective. ("If we didn't [have] internal information from Apple that they were redoing

BESIDES BEING THE BEST ALL-AROUND OPTIMIZER, POWER

UTILITIES INCLUDES SEVERAL USEFUL UTILITIES

one of the last steps in the production process involves defragmenting the master hard drive so that the CD-ROM's files are contiguous. Finally, if a drive's directory becomes damaged, a file-recovery utility stands a better chance of rescuing a file whose data is contiguous rather than fragmented.

Defragmenting Tools

One way to defragment a hard drive is to back it up, initialize it, and then restore its contents, beginning with the System Folder and your most-often-used applications and documents. An easier way, however, is to use a defragmenting utility, sometimes called a disk optimizer.

Some universal formatter packages—La Cie's SilverLining and Surf City's Lido 7—include defragmenting features. Disk optimizers are also included with Fifth Generation Systems' Public Utilities, Symantec's NUM, Datawatch Corporation's SuperSet, Alsoft Power Utilities, and Central Point's MacTools.

The optimizers that accompany the latter group of utilities offer smart features that strategically position certain system files for best performance. Alsoft Power Utilities' Disk Express II optimizer is particularly clever—it defragments a disk in the background while you work, and it keeps track of the files you use most and places them physically closest to the drive's directory (see "Smart Optimizing"). To speed the Mac's start-up, Disk Express II also organizes system extensions so that they're physically stored in the order in which they load. You can specify that

mine which package provides the best mix for you. If you do not already have a file-recovery program, you should consider NUM, SuperSet, Public Utilities, or MacTools. If you are already protected, Alsoft Power Utilities is the best choice. Besides being the best all-around optimizer, Power Utilities includes several useful utilities, including MasterJuggler, which streamlines working with fonts and sounds, and MenuExtend, which lets you arrange your Apple menu in a hierarchical structure.

the contents of disks and folders. Over time, it can become fragmented and unnecessarily large, saddled with icons for files long since deleted.

To rebuild the Desktop file, hold down the ⌘ and option keys while restarting the Macintosh. When the message appears asking whether you want to rebuild the desktop, click on OK. There is one catch, however: you will lose any comments added to Get Info windows. Fifth Generation's Public Utilities includes a program that saves and then restores

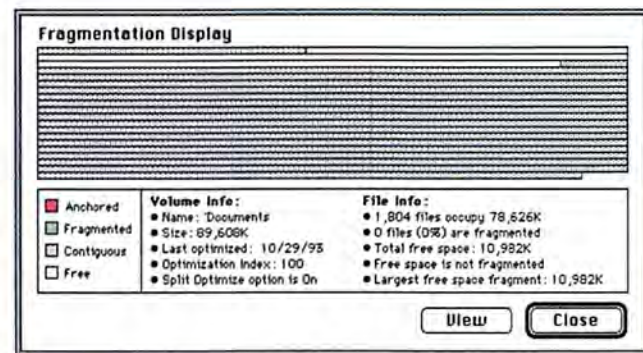
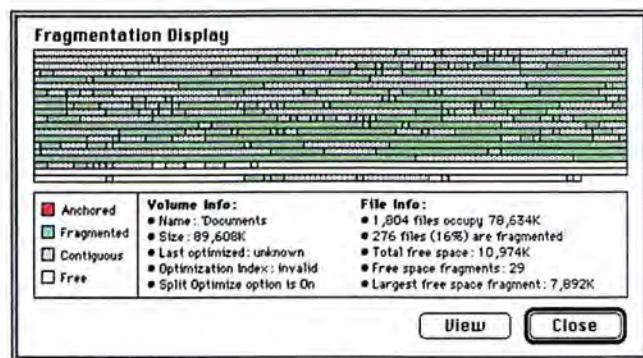
it, we'd be figuring out how to bypass it," one driver developer told me.) Keep your memory cache small—between 32K and 128K.

- Consider a Finder booster. Several products are available that are designed to modify the Finder's file-copying routines to provide better performance. Two examples are Symantec/Fifth Generation's CopyDoubler (\$59; 504/291-7221, 800/873-4384) and Victor Tan's shareware Speedy-Finder (\$20; available through user groups and online services). If you spend a lot of time copying files to or from file servers or cartridges, one of these products will save you time.

- Use folders and aliases extensively. The milliseconds that you might gain by using a finely tuned and defragmented drive are lost—with interest—when you spend minutes searching for lost or buried files on a poorly organized desktop.

- Buy a faster hard drive. If you're slogging along with the 80MB drive that accompanied your Mac, supplement it with a 230MB or larger drive. You'll be amazed at how much faster it is.

Of course, as you get accustomed to a fast drive, you'll start wishing it were faster still. When that happens, turn to the tools and techniques I've described here to give it a midlife speed kick. **m**



Smart Optimizing Most defragmenting utilities provide a graphical display that shows how a disk is fragmented. Alsoft's Disk Express II, shown here, monitors file usage and optimizes a disk so that frequently used files are closest to the disk's directory. Both of these windows show the same drive—before optimizing (top) and after (bottom). In the top window, the green areas indicate fragmented files.

Contributing editor JIM HEID writes *Macworld's* monthly *Working Smart* column. His latest book is *Macworld Complete Mac Handbook Plus CD* (IDG Books Worldwide, 1993).

Don't Be
Sparecat

"If you use graphics on the Macintosh, you need this package." — MacWeek, November 1993

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Circle 5 on reader service card

EDITED BY JAMES A. MARTIN

Graphics

THE LATEST IN DESIGN, PUBLISHING, AND PREPRESS

Taking a Long Look at Short-Run Color

THANKS TO A NEW GENERATION OF short-run color-printing systems, designers and publishers can walk into a service bureau with a disk and leave with up to 500 copies of high-quality process-color brochures, posters, and newsletters—often for less than \$1 per page. And turnaround times for higher process-color print runs—say, 20,000 copies—can take less than three days.

New short-run color-printing systems combine prepress functions such as rasterization, imposition, and imaging with printing engines that can quickly produce the kind of quality you'd get with a commercial offset-printing press (support for 133-lpi screens and 11-by-17-inch output on coated and uncoated stock, for example). The combination of prepress technology with offset-printing quality enables publishers to print a variety of documents in process color at short print runs. Previously, because of the high per-page costs associated with traditional color offset printing, a publisher's only cost-effective options for print runs of 20,000 and under were black-and-white printing or laser color copier output.

Some service bureaus with the Heidelberg GTO-DI, for instance, are charging less than \$600 for 2500 single-sided, four-color 11-by-17-inch sheets for a three-day turnaround. By comparison, traditional offset printing for the same job would cost about \$1500 and take about a week. (The GTO-DI uses laser diodes to etch images directly on blank plates mounted on the sheet-fed press, and prints images up to 13 inches by 19 inches on sheets up to 14 $\frac{1}{16}$ inches by 20 $\frac{1}{2}$ inches.)

Meanwhile, the DCP-1 printing system for Belgium-based Xeikon uses dry-toner, plateless electrophotography on its color web printing press. The DCP-1 prints at 600 dpi but can boost the out-



put's appearance to look like 2400 dpi, and it prints CMYK on both sides of the paper at the same time. The DCP-1 also has the ability to add custom information to a particular portion of each page—each copy of a brochure can be individually addressed, for example.

Agfa's Chromapress combines the DCP-1 imaging engine with Agfa's own control, screening, and RGB-CMYK conversion software. The system's ChromaPost software lets you inexpensively proof the final output on the press; output costs have not been set.

Indigo's E-Print 1000 is a sheetfed digital-offset press that prints up to six colors (CMYK plus two others) at an enhanced 800-dpi resolution. E-Print can also place completely different information and images on every page of a job—as a result, you can customize each copy of a print run for its intended recipient.

E-Print's integrated Booklet Maker collates, staples, and stacks booklets containing up to 100 pages. Indigo says that one 8-by-11-inch page costs about 45 cents. The cost per page stays the same for any number of copies. Both the Agfa and the Indigo systems provide while-you-wait service for runs between 1 and 500 copies.

Jim Medalia, owner of New York City's Digital Exchange service bureau, believes that the short-run color-printing systems will primarily appeal to publishers who need low-cost, fast turnaround, and to those who need 100 to 2000 printed copies that include highly customized information. "You can print catalogs and brochures targeted to specific neighborhoods, age groups," and so on, Medalia says. Agfa, 201/440-2500; Heidelberg USA, 718/830-7800; Indigo, 617/721-7301; Xeikon, 011 32 3 443-1311.

—JIM FEELEY

Going Online for Graphics

EASTMAN KODAK HAS LAUNCHED Picture Exchange, an online service that lets graphic designers, photo researchers, advertising agencies, and others quickly search through thousands of digitized stock photographs.

Picture Exchange offers modem access to digital images from stock-photo agencies; each agency is making 5000 to 20,000 images available online. At press time Picture Exchange offered photos from 15 agencies, among them FPG International, PhotoBank, and The Stock Shop.

Using Kodak's Picture Exchange software (\$399) and a 14.4-Kbps modem (the service also supports 9.6-Kbps and ISDN transmission), you can prow for photos via menus, icons, and Boolean-type keyword searches at \$85 per hour. You can view images that match your search criteria in three different thumbnail sizes: small (32 by 48 pixels); medium (64 by 96 pixels); or large (128 by 192 pixels). To take a closer look at a higher-resolution file, though, you must download the JPEG-compressed design proof (256 by 384 pixels). Kodak charges a \$9 fee for each proof you download; some stock agencies charge a fee of up to

\$40 on top of that. Most photos are in Kodak's Photo CD format, scanned from 35mm slides.

Once you've chosen a photo, you fill out a request form online. The form is forwarded electronically to the appropriate stock agency. After you negotiate the usage fee with the agency over the phone, the agency sends you a transparency of the image.

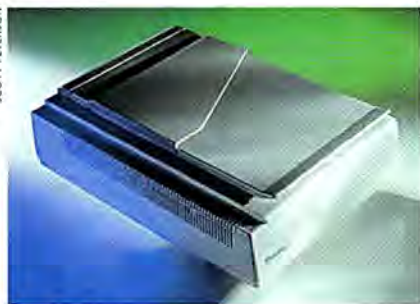
According to Eastman Kodak, Picture Exchange is faster and less expensive than dealing with a stock-photo agency in the usual way. In the past you would call a particular agency, tell it what kind of



Picture Exchange lets you search for photos using specific keywords such as *old cars* and *sunny weather*.

photo you wanted, and pay a \$75-to-\$90 research fee. The agency would then mail transparencies matching your criteria; if anything was lost or damaged, you were liable for fees of \$1500, or even higher, per image. Kodak, 716/724-2424, 800/579-8737.—J.A.M.

Scanning Color and Saving Dollars



Relisys's Reli 9600DPI scanner

THE COST OF 24-BIT COLOR FLATBED scanning continues to drop, thanks to the recent introduction of Hewlett-Packard's revamped, repriced \$1179 ScanJet IICx (see *Graphics* news, January 1994) and new product announcements from Relisys, Agfa, and Microtek.

- Relisys has released several new flatbed models using cold-lamp technology,

which promises high-quality color resolution, dust-free scanning, and lower power consumption. The scanners require no warm-up time, and they shut off automatically when the scanner is idle. Relisys's three-pass Avec Colour models are the \$799.99 Avec 1200DPI, which offers 600-dpi optical resolution (1200-dpi interpolated); the \$1099 Avec 2400DPI (600-dpi optical, 2400-dpi interpolated); and the \$1299 Avec 4800DPI (800-dpi optical, 4800-dpi interpolated).

Relisys is also introducing two one-pass scanners, the \$1595 Reli 2400DPI (600-dpi optical resolution, up to 2400-dpi interpolated) and the \$3495 Reli 9600DPI (1200-dpi optical, 9600-dpi interpolated). Relisys, 408/945-3113, 800/945-0900.

- Agfa's StudioScan is a single-pass scanner with 600-dpi optical resolution

IN BRIEF

Worldwide Publishing Consortium

Apple CEO Michael Spindler recently announced the nonprofit Worldwide Publishing Consortium (WWPC), which Apple is cosponsoring with Eastman Kodak, SuperMac, Radius, Linotype-Hell, Aldus, Adobe Systems, and others. The intent is for major equipment makers and software developers to codevelop products aimed at publishing and graphics users, and to foster standardization among those products and across platforms. Publishers and multimedia developers are encouraged to join the WWPC, which also plans a publishing lab for compatibility testing. WWPC, 408/438-3630, 800/865-9972.

Photo CD for Prepress

Eastman Kodak has announced Print Photo CD, which will store platform-independent CMYK files on a Photo CD. Kodak is developing the CMYK format with Crosfield, Linotype-Hell, and Scitex to ensure standardization across systems. Print Photo CD, scheduled to be available in mid-1994, will also offer an inexpensive way to move complex graphics files from desktop computers to service bureaus. 716/724-4000, 800/235-6325.

NADTP Help Directory

The National Association of Desktop Publishers (NADTP) now has a Member Helpline Network, a directory of NADTP volunteers who answer technical questions for other members regarding the software or hardware they use. Annual NADTP membership is \$95; the directory is \$3. 508/887-2246.

that can interpolate up to 2400 dpi. It ships with Agfa's scanner driver, FotoSnap; and FotoLook, a driver that lets you control exposure, unsharp mask, and dithering. StudioScan's street price is around \$1100. Agfa, 201/440-2500.

- Microtek's single-pass ScanMaker IISP includes the Dynamic Color Rendition system (DCR), Microtek's color-calibration and -correction system. The DCR system contains an IT8 reflective color-target as well as color-calibration and correction software. The street price should be from \$849 to \$949. Microtek, 213/321-2121.—CATHY ABES

Expert Graphics

GRAPHICS PROFESSIONALS SHARE THEIR SECRETS

by Cathy Abes

Artist: Bill Rieser has worked as a freelance illustrator since 1979. Since he became a Mac illustrator in 1990, his clients have included PepsiCola, the National Basketball Association, Warner Bros., and American Express.

How It Was Done: For the illustration that opens this month's feature "Top 10 CD-ROMs," Rieser began by scanning in an actual CD, which he used to create each of the CDs in the illustration. For the CD above the trophy, he saved the scan in Photoshop, selected all, copied, and then pasted the copy into a new file window that was exactly the same as the original. Rieser frequently uses this technique because it allows him to create any number of exact copies, alter them as needed, and paste them over each other in perfect alignment.

On one copy, Rieser adjusted the color levels on each channel—red, green, blue—individually, with Photoshop's Color Balance and Curves commands. Then he made two copies; on the first one he created two dark funnel shapes on the CD, which he copied and pasted into the second copy. Next, he deleted the center and outside circles of the first copy, leaving only the two funnels. These he copied and pasted into the second copy and he made them perpendicular to the first set of shapes. Next he posterized the image (to six brightness values), adjusted the color balance with the Variations command, and applied the Offset command.

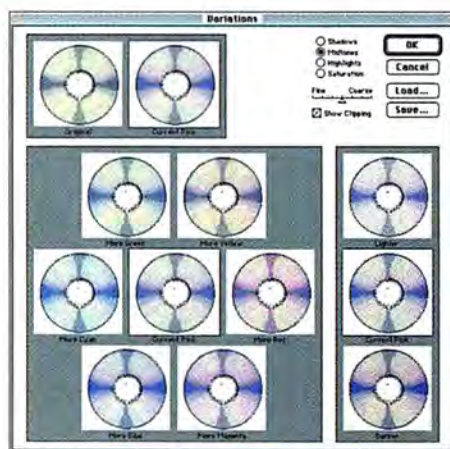
To create the dot-pattern texture used in the background and in the crown-shaped sound burst, Rieser created a new 75-dpi 5-by-5-inch Photoshop file in Grayscale mode with a black background. After drawing a shape with the lasso tool, he inverted the background and deleted it twice. This made the dots smaller and created more of a gradation between black and white.

After changing the image to Bitmap (from the Mode menu), Rieser made it into a halftone. He imported it into the FreeHand illustration, colorized it, and pasted it inside the crown shape. **m**

1 The original CD, scanned in at 300 dpi and scaled at 100 percent. From this, Rieser made two exact copies that he would later composite to create the final CD image.



2 Rieser used Photoshop's Threshold command to create two dark funnel shapes on the first copy, which he then copied and pasted into the second copy using Composite Controls.



4 Rieser used Photoshop's Variations command (under the Adjust submenu of the Image menu) to experiment with the CD image's color balance, saturation, and contrast by changing its shadows, midtones, and highlights.

THE TOOLS

Hardware: Quadra 800 with 40MB of RAM and a 425MB internal hard drive; SuperMac 19-inch Trinitron monitor; SuperMac Thunder/24 color graphics board; PLI SyQuest 44MB removable-cartridge drive; MicroNet 128MB Rewritable Optical drive; Microtek 300Z color scanner; AppleCD 300 CD-ROM drive; LaserWriter Pro 630 printer.

Software: Adobe Photoshop 2.5.1; Aldus FreeHand 3.11.



3 After deleting the center and outside circles in the first copy (leaving only the two funnel shapes), he copied and pasted the shapes into the first copy. Then he rotated them 90 degrees to make them perpendicular to the first set of shapes. With Composite Controls, he adjusted the opacity (to 40 percent) and removed the white areas around the black shapes.

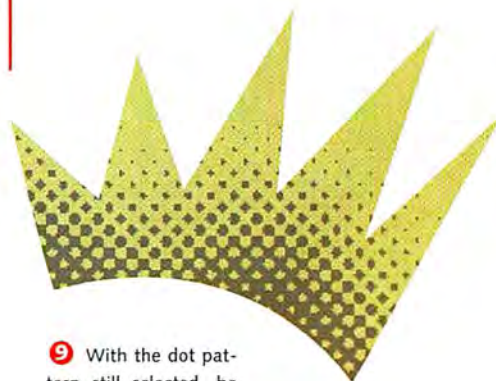


5 Next he used the Offset command (under the Filter menu) to create a 3-D effect by slightly misaligning the three channels (red, blue, green) from each other. Then he added the CD's center.

6 On a black background, Rieser drew an irregular shape using the lasso tool with a feather radius of 40 to soften the edge. After choosing Inverse (under Select), to make the background white, he pressed delete. To feather the selection further and erase more of the black center, he deleted it again.

7 Rieser selected Bitmap (from the Mode menu); in the Bitmap dialog box, he left the resolution at 75 dpi and checked Halftone Screen. In the Halftone Screen dialog box, he set Frequency to 10, Angle to 45 degrees, and Shape to round.

8 After saving the file as TIFF, he imported it into the FreeHand illustration, placing it over the crown shape. Then he selected the color he wanted for the dot pattern (dark green) from the color palette and chose Fill.



9 With the dot pattern still selected, he chose Cut, then selected the crown shape, and chose Paste Inside.

The Right Font



WHERE TO FIND THE BEST TYPEFACES FOR

o, it finally happened. A few weeks ago I walked into my local artists' supply store and saw a rack of digital fonts on display. It was Letraset's Fontek series, a wonderful collection of display and decorative faces. I pulled out \$40 and bought a font, remembering with no fondness at all the days when I'd bought Letraset's press-on letters from just such a store.

My font-buying experience was an anomaly, however; Macintosh fonts are still sold largely through catalogs and brochures, which means that searching for just the right typeface for your publishing job can be a chore. So I've done some of the searching for you—by browsing countless catalogs and testing fonts from dozens of vendors (for information on what I looked for when testing fonts, see the sidebar "Evaluating Fonts").

The result is the following buyers' guide, divided into two sections: "Text Faces" and "Display and Decorative Faces." Font vendors with typeface collections or designs that I highly recommend are marked with a symbol (❖); the other companies listed are recommended sources for reliable typefaces. Recom-

mended vendors offering specialty faces—math, music notation, foreign language, and pictorial—are listed in the table, "Specialty Faces: A Buyers' Guide." In addition to the vendors listed here, several companies sell collections from Adobe and other popular libraries, often at a substantial discount. Resellers include Precision Type (516/864-0167, 800/248-3668), Fonts West (415/777-3011), FontHaus (203/367-1993, 800/942-9110), and FontShop (416/348-9837, 800/363-6687).

TEXT FACES

❖ **Adobe Systems** The founders of Adobe invented PostScript, and Adobe remains one of the leading suppliers of PostScript fonts. Adobe's in-house designers, including Robert Slimbach (Minion, Utopia, Adobe Garamond, Sanvito) and Carol Twombly (Trajan, Charlemagne, Lithos, Viva), have created some excellent typefaces. In addition, Adobe licenses faces (325 families and counting) from foundries including Bertold, Linotype-Hell, and Monotype, making the Adobe Type Library an excel-



YOUR PUBLICATION OR PRESENTATION

lent source for text families. Many of Adobe's faces (Adobe Caslon, Adobe Garamond, Centaur, Formata, Minion, Nofret, Perpetua, and Utopia among others) include expert collections, making them a good choice for professional typesetters. Finally, Adobe pioneered the Multiple Masters technology, which allows you to create thousands of weights and widths from a single master design. **Phone:** 415/961-4400, 800/833-6687. **Format:** PostScript; floppies or CD-ROM. **Price:** \$145 to \$350 per family. Type On Call CD-ROM \$99 (includes the ability to unlock any two of eight preselected families); \$25 to unlock a single font; \$69 to \$179 to unlock additional families. Adobe Font Folio CD-ROM (1600 fonts, unlocked) \$14,000. Adobe Value Pack (65 fonts) \$60. Adobe Type Basics (65 fonts) \$198. **Includes:** Font downloader utility (with all fonts); Type On Call CD-ROM includes Adobe Type Browser, Adobe Type Manager, and Adobe Acrobat Reader; Adobe Font Folio CD-ROM includes ATM and Adobe TypeAlign.

Agfa Division, Miles The Agfa-Type Collection CD-ROM includes the

entire Adobe Typeface Library, a collection of Agfa's own faces, plus faces from other foundries. While Agfa offers some good text faces, its own collection doesn't offer the variety of the Adobe collection; still, its CD provides a comprehensive source for Macintosh fonts. **Phone:** 508/658-5600, ext. 2131, 800/424-8973. **Format:** PostScript or TrueType; floppies or CD-ROM. **Price:** \$95 to \$370 per font package; \$99 for CD-ROM (includes 20 unlocked headline faces and a symbol font); \$95 to \$370 to unlock other families. **Includes:** Online catalog, type tutorials, kerning editor, type-specimen printing utility, font downloader, and other utilities.

Autologic Like many other typesetting equipment vendors, Autologic has moved into the digital font world. The company sells the Adobe and Bitstream type libraries, as well as some PostScript faces of its own, on its APS-Type-Scripter/L CD-ROM. Autologic's PostScript font collection is high quality, but doesn't offer many faces that you can't find in other type libraries. **Phone:** 805/498-9611, 800/457-8973. **Format:**

BY ERFERT FENTON

PostScript; CD-ROM. **Price:** \$99 for CD-ROM (2500 locked fonts); \$40 to unlock each font (quantity discounts available).

❖ **Bitstream** Unlike many of the other type vendors listed here, Bitstream started out as a digital type foundry. With more than 1000 faces, the Bitstream Typeface Library is a good source for text and display type. While some faces are licensed from ITC and other foundries, most are Bitstream's versions of popular faces, bearing Bitstream's own typeface names (for example, Swiss is Bitstream's version of Helvetica). Bitstream also offers a number of original designs, such as Bitstream Charter and Bitstream Arrus. Faces contain an average of 400 to 500 kerning pairs. If you want a wide variety of text faces, Bitstream is a good choice. **Phone:** 617/497-6222, 800/522-3668. **Format:** PostScript or TrueType; floppies or CD-ROM. **Price:** \$32.25 per face; entire library \$10,995.

❖ **Carter & Cone Type** Although Carter & Cone Type offers only one text family, ITC Galliard, it's worth mentioning here. While you can buy Galliard from a number of type vendors, only Carter & Cone's version has been retooled by Galliard's designer, Matthew Carter. Carter & Cone's ITC Galliard CC includes roman and italic styles with optional supplementary characters: old-style figures, superior and inferior figures for fractions or footnotes, ligatures, alternative characters (such as flourished letters), small caps, and ornaments. Carter & Cone also offers Mantinia, a titling face designed to look good with Galliard. **Phone:** 617/576-0398, 800/952-2129. **Format:** PostScript; TrueType available on request. **Price:** ITC Galliard Roman CC \$40 (\$85 including five supplementary fonts); ITC Galliard Italic CC \$40

EVALUATING FONTS

For this buyers' guide, I considered both the technical and aesthetic characteristics of each vendor's fonts. To perform my quality tests, I printed samples of selected fonts from each company at 300 dpi and 600 dpi. I used Spectacular, a type-specimen printing utility from FontHaus, to print character sets, and QuarkXPress to print sample text blocks. I also dissected fonts with Altsys's Fontographer program to see how they were constructed; a font with too many points on character outlines can hang up a printer that has only 2MB of RAM. Among the practical questions I ask myself when testing fonts are these.

- Does a font include the standard character set, including letters, numbers, punctuation, symbols, and—if appropriate—special characters, such as ligatures? (Text faces must meet different criteria than decorative faces, of course, since the latter often lack a complete complement of characters.)

- If a company offers font families, do they include a useful variety of styles and weights? One vendor offered several weights, but failed to provide italic fonts for many of its families, thus limiting their utility.

- Is the screen font legible? One company's screen fonts were virtually unreadable at any size, while another's displayed several characters incorrectly on screen, even though they print correctly.

- Does the font print legibly at various sizes, including the relatively small 8-point?

- On the aesthetic side, I consider the following factors. How uniform is a face's color? Does a face contain an adequate number of kerning pairs? If a face is a given company's version of an established typeface, how does its execution compare to a printed sample of the face (for example, an ITC-sanctioned design)?

(\$75 including four supplementary fonts); \$150 for six roman and five italic fonts.

Lanston Type If you're searching for digital versions of classic faces by Caslon, Goudy, and other venerable type designers, consider Lanston's collection. Lanston has taken on the exacting task of creating digital faces that closely match their metal ancestors. Overall, the company has done a wonderful job; color is uniform (color is the overall shade of gray perceived in a block of text), and fonts include a complement of special characters such as swashes, ligatures, old-style figures, small caps, and long and short descenders. Some of the faces have delicate stems and other elements that don't translate well into laser-printed type, so you're better off setting these faces at a higher resolution. (In a bizarre twist of typographic history, Lanston Type is cutting ITC Stone, which was originally a digital face, into hot metal.) **Phone:** 604/253-6333, 800/663-8760. **Format:** PostScript. **Price:** \$35 to \$360 per individual face; \$75 to \$295 per family.

❖ **Linotype-Hell** If you print fonts on an Apple LaserWriter, chances are you're familiar with Linotype's faces. The 13 core fonts in the original LaserWriter were from Linotype, and many of the faces in the Adobe library are designs licensed from Linotype's extensive library. Linotype-Hell offers classic faces as well as contemporary designs; its CD-ROM includes the typeface library from

Elsner+Flake Designstudios. **Phone:** 516/434-2000, 800/633-1900. **Format:** PostScript; floppies or CD-ROM. **Price:** \$25 per font (individual weights or styles sold separately with a minimum order of 10 fonts); families \$95 to \$370; Concert CD-ROM (1600 faces) \$11,495. **Includes:** CD purchase includes font downloader, and menu-shortening and keyboard-layout utilities; Symantec/Fifth Generation Systems' Suitcase font- and system-resource-management utility; and AppleCD 300 CD-ROM drive.

❖ **Monotype Typography** Monotype has been in the typesetting business for nearly 100 years and has successfully made the transition to digital fonts. In addition to selling fonts from Adobe's library (many Adobe fonts are Monotype designs) and The Font Bureau, Monotype offers its own series, Monotype Classic Fonts, which include new designs and revivals of vintage faces. Monotype is an excellent source for well-crafted faces, both old and new. **Phone:** 312/855-1440, 800/666-6897. **Format:** PostScript and TrueType; floppies or CD-ROM. **Price:** \$80 to \$290 per face or family; Monotype ValuePack (57 fonts) \$89; Monotype Fun Fonts (25 fonts) \$39.99; Monotype Typeface Library CD-ROM \$49.95 (8 faces) plus \$25 to \$40 per face (depending on the number ordered) to unlock more.

❖ **Stone Type Foundry** If the name Stone sounds familiar, you're probably thinking of the ITC Stone family,

- 1) Minion Regular
- 2) Bitstream Arrus
- 3) ITC Galliard CC
- 4) Linotype Didot
- 5) Monotype Janson
- 6) Silica Regular

Text Faces Here's a sampling of text faces from the following foundries: (1) Adobe, (2) Bitstream, (3) Carter & Cone, (4) Linotype-Hell, (5) Monotype, and (6) Stone Type Foundry.

sold by Adobe and other vendors. Stone's creator, Sumner Stone, now has his own type foundry and has released a condensed text family called Stone Print, which was designed for *Print, America's Graphic Design Magazine*. If you want to fit a lot of text into a newsletter, brochure, or other limited space, and don't want it to look cramped, this condensed face is an excellent solution. Stone Type Foundry also offers a new slab serif family called Silica, which Stone drew directly on the computer screen (with no preliminary sketches on paper). **Phone:** 415/324-1870. **Format:** PostScript; floppies. **Price:** Stone Print family (six styles and weights) \$275; Stone Print Extra Package (small caps, old-style figures, fractions) \$150; Silica family (six weights) \$275; individual fonts \$59.

URW With 3000 fonts for \$895, the URW TypeWorks Collection CD-ROM sounds too good to be true. In fact, the number of fonts is a bit exaggerated, since each font comes in six variations: regular, outline, inline, relief, drop shadow, and round. That comes out to 500 fonts, which in turn are members of 120 typeface families. Boil it down and it's still a good deal. An automatic-kerning utility creates 1000 kerning pairs per face. If you're looking for a comprehensive collection of good-looking fonts (with the bonus of style variations), URW TypeWorks is a good choice. (I'm not much of a fan of styles such as outline and drop shadow, since they tempt amateur publishers to commit design atrocities; I would have preferred to see URW's designers devote their efforts to creating some expert sets.) A second volume, TypeWorks 2, was not available in time for review. **Phone:** 603/882-7445, 800/229-8791. **Format:** PostScript or TrueType; CD-ROM. **Price:** TypeWorks CD, volumes 1 and 2, \$895 each; reference guide \$79. **Includes:** Kerning utility.

DISPLAY AND DECORATIVE FACES

❖ **Adobe Systems** Adobe's display and decorative faces include old standbys such as Banco, Mistral, and University Roman, as well as eye-catching creations by contemporary designers, among them ITC Anna (designed by Daniel Pelavin in 1991) and ITC Beesknees (David Farey, 1991). Carol Twombly's 1990 Lithos is definitely a contender for Most Popular Font in the Universe, gracing everything from album covers to throw rugs. (See the Adobe entry under "Text Faces" for buying information.)

❖ **Agfa Division, Miles** The AgfaType Collection CD-ROM includes

- 1) ITC ANNA
- 2) Pelican
- 3) Bitstream Oz Handicraft
- 4) GOUDY STOUT
- 5) Bodega Serif Oldstyle
- 6) Parade Script
- 7) Mambo Medium
- 8) FARFEL
- 9) Marguerita
- 10) Spumoni
- 11) Dom Casual Shadow

Display and Decorative Faces Here's a sampling of decorative and display faces from (1) Adobe, (2) Agfa, (3) Bitstream, (4) Castle Systems, (5) The Font Bureau, (6) FontHaus, (7) FontShop, (8) Image Club, (9) Letraset, (10) Letter Perfect, and (11) URW.

decorative and display faces from the Adobe Type Library, Agfa's own library, The Font Bureau, and others. Each of Agfa's 14 Typographers Edition collections contains a varied selection of attention-grabbing headline and decorative faces. (See the Agfa entry under "Text Faces" for buying information.)

Alphabets This small foundry currently offers ten display faces: two based on the 1920s designs of Rudolf Koch; an Egyptian slab serif; a sans serif called Oz; and a set of six wood-type faces. The quality is excellent and the prices are reasonable. I am looking forward to seeing more faces from Alphabets' designers. **Phone:** 708/328-2733, 800/326-8973. **Format:** PostScript; floppies. **Price:** \$44.95 per face; \$74.95 per family; \$74.95 to \$134.95 for bundles of two faces or families.

❖ **Bitstream** The Bitstream Typeface Library offers hundreds of display and decorative faces, including classic and contemporary designs. Recent additions to Bitstream's library include Richard Lipton's new Cataneo, an attractive calligraphic face, and George Ryan's delightful Bitstream Oz Handicraft (see the "Display and Decorative Faces" sample). Alas, Bitstream has ventured into the

realm of cuteness with its new Li'l Bits Font Packs (\$19.95 each), but many readers no doubt will welcome a source for "Star Trek" fonts. (See the Bitstream entry under "Text Faces" for buying information.)

❖ **Castle Systems** Castle Systems presents more than 30 font designs; many are re-creations of faces from the 1920s, 1930s, and 1940s. Styles range from whimsical (Fat Freddie and Goudy Stout) to classical (Goudy Trajan and Schneidler Initials). If you're looking for a display face that stands out, try Castle Systems. **Phone:** 415/459-6495. **Format:** PostScript and TrueType. **Price:** \$69 for first font ordered, \$30 for each additional font.

Digital Typeface Corporation DTC offers three type volumes, with 100 faces per volume. Each volume includes text, display, and decorative faces. Some of the faces are DTC designs; others are licensed from ITC, URW, and Letraset. The faces are reasonably priced and of good quality, but DTC's collections don't offer anything special in the way of variety or innovation. **Phone:** 612/944-9330, 800/947-8880. **Format:** PostScript. **Price:** \$295 per volume.

EmDash Several of the fonts from EmDash emulate handwriting; Archi-Text, which evokes an architect's printing style, is one of my favorites because its bold strokes look more hand-printed than computer-generated. EmDash's fonts are quite affordable: 24 fonts (in 9 families) for \$65. **Phone:** 708/441-6699. **Format:** PostScript or TrueType. **Price:** \$65 per package; second package \$45.

Emigre Type curmudgeons hate them; cutting-edge graphic designers love them. Whatever your opinion of Emigre's fonts, you have to admit they're innovative. Emigre font designer Zuzana Licko has dared to postulate that our standards for legibility may change over time (after all, books aren't printed in black letter any more). She may have a point. Take a look at Emigre's collection if you're tired of traditional faces. **Phone:** 916/451-4344, 800/944-9021. **Format:** PostScript and TrueType; floppies. **Price:** \$59 to \$125 per font.

❖ **The Font Bureau** Founded by David Berlow and Roger Black in 1989, The Font Bureau began by creating custom fonts for publications that were making the transition to digital fonts (clients include *Time* and the *Wall Street Journal*). The small foundry now offers more than 150 retail fonts, which include some of the freshest display and decorative faces around. Inspirations for The Font Bureau's faces cover a lot of territory: 1920s faces, letters cut from paper, graf-

SPECIALTY FACES: A BUYERS' GUIDE

Company	Specialty and Pictorial Fonts	Foreign-Language Fonts	Accented Character Sets	Phone	Toll-Free Phone
Agfa Division, Milles	animals, astrology, borders, business, chess, creditcards, dingbats, fractions, games, holiday, international symbols, logos, math, medical, military, music, ornaments, religion, travel, TV listings	none	phonetic	508/658-5600, ext. 2131	800/424-8973
Adobe Systems*	animals, astrology, audio, borders, chess, dingbats, fractions, games, holiday, international symbols, maps, math, music notation, ornaments, warning	Cyrillic, Japanese	phonetic	415/961-4400	800/833-6687
Allotype Typographics	chemistry	Georgian, Greek	Eastern European	313/480-3666	none
Automated Graphics	math	none	none	312/384-3833	none
Bear Rock Technologies	bar code	none	none	916/672-0244	800/232-7625
Bersearch Information Services	none	Cyrillic	none	303/674-8875	800/851-0289
Blue Sky Research	math	Cyrillic	none	503/222-9571	800/622-8398
Casady & Greene	key caps, music notation	Cyrillic	Eastern European	408/484-9228	800/359-4920
Coda Music Technology	music notation	none	none	612/937-9611	800/843-2066
DVM Publications	music notation	none	none	609/853-5580	none
Ecological Linguistics Software	chess, Mayan glyphs, sign language	Arabic, Burmese, Cambodian, Cyrillic, Georgian, Greek, Hebrew, Hindi, Korean, Japanese, Laotian, Tibetan, Thai, others	phonetic, European, Eastern European, Greek, Vietnamese	202/546-5862	none
Electric Typographer	animals, novelty, primitives	none	none	805/966-7563	none
FontHaus	animals, birds, borders, crossword, dingbats, food, holiday, household items, international symbols, ornaments, primitives, transportation	none	none	203/367-1993	800/942-9110
Font World	none	Arabic, Cyrillic, Greek, Hebrew	European, Eastern European, Pacific Rim	716/235-6861	none
Lazy Dog Foundry	dingbats, initial caps, novelty, ornaments; will make custom font from your handwriting	none	none	612/291-0306	800/876-9807
Letraset USA	dingbats, ornaments	none	none	none	800/343-8973
Lingvist's Software	math	Arabic, Cambodian, Cyrillic, Georgian, Greek, Hebrew, Hindi, Korean, Laotian, Tibetan, Thai Vietnamese, others	phonetic, European, Vietnamese	206/775-1130	none
Linotype-Hell	astrology, audio, borders, chemistry, chess, dingbats, fractions, games, holiday, international symbols, maps, math, music notation, ornaments, textiles, warning	Cyrillic, Greek	phonetic, Eastern European	516/434-2000	800/633-1900
Monotype Typography	astrology, borders, dingbats, ornaments, sports, transportation	none	none	312/855-1440	800/666-6897
Nisus Software	math	none	none	619/481-1477	none
Pacific Rim Connections	none	Chinese, Japanese	none	415/697-0911	800/745-0911
Page Studio Graphics	astrology, braille, chess, crossword, family tree, fractions, key caps, maps, road signs, sports, textiles, travel, TV listings, semaphore, sign language, warning	none	none	602/839-2763	none
Signature Software	will make a custom font from your handwriting	none	none	503/386-3221	800/925-8840
Treacyfaces	crossword	none	none	203/389-7037	none

*The Adobe Type Library is also available from Agfa, Autologic, FontHaus, FontShop, Linotype-Hell, and Monotype. For contact information, refer to company listings in the article.

fit, and the numbers stamped on tickets at parking garages, to name a few. **Phone:** 617/742-9070. **Format:** PostScript or TrueType. **Price:** \$40 to \$60 per style.

The Font Company The Font Company features more than 2000 faces on its Type Library CD-ROM. The library includes The Font Company's own cuttings of popular text, display, and decorative faces. Text faces have about 440 kerned pairs, keeping manual kerning to a mini-

mum. The Font Company's faces are generally well crafted, but the collection is unexceptional when compared with some of the other large libraries. **Phone:** 602/998-9711, 800/442-3668. **Format:** PostScript; floppies or CD-ROM. **Price:** \$39.95 for one face; discounts available for two or more.

♦ **FontHaus** FontHaus sells faces from some 40 sources, including Adobe, Linotype-Hell, Monotype, and other pop-

ular foundries, as well as smaller outfits such as Castle Systems, Lazy Dog, Letter Perfect, The Font Bureau, and Treacyfaces. In addition to these faces, it offers FontHaus FoundryExclusives, designs licensed only to FontHaus. If you're looking for new designs, FontHaus is the way to go; the company is constantly updating its library, which includes the latest creations of some of today's best type designers. You can order FontHaus's catalog for \$5, or



Specialty and Miscellaneous Faces Shown here are a few samples of pictorial and other specialty fonts. (1) Linotype Game Pi, (2) Tommy's Type from Electric Typographer, (3) Birds from FontHaus, (4) Keys from Page Studio Graphics, (5) Mythos from Adobe's Wild Type package, (6) Organics from Letraset's Fontek DesignFonts series, (7) Uck 'N' Pretty from FontShop's *Fuse* journal, and (8) Log-ger, a public-domain font by David Rakowski.

subscribe to its quarterly newsletter *x-height* for \$18 per year. **Phone:** 203/367-1993; 800/942-9110. **Format:** PostScript, some TrueType; floppies. **Price:** \$29 to \$59 per font; \$29 to \$289 per family.

❖ **FontShop** FontShop doesn't simply sell fonts. This company solicits original designs from some of the finest contemporary type designers in the United States and Europe. In FontShop's catalog (\$35), you'll see familiar typeface favorites from well-known foundries such as Adobe and Bitstream alongside faces from smaller shops such as Emigre, Letter Perfect, and The Font Bureau. FontShop's exclusive FontFont collection features new faces from designers such as Neville Brody and David Berlow. If FontFaces are still too tame for you, you can subscribe to *Fuse* (\$69 per issue), FontShop's quarterly journal of experimental typography (each issue includes four avant-garde faces—see "Specialty and Miscellaneous Faces" for a sample). **Phone:** 416/348-9837, 800/363-6687. **Format:** PostScript; floppies. **Price:** \$29 to \$69 per font; \$119 to \$419 per family.

❖ **Image Club Graphics** Image Club offers about 230 typefaces, many of them display and decorative. Some of the company's faces were created by in-house designers, while others are licensed from sources such as ITC and Letraset. Image

Club is a good source for low-cost decorative and display faces; individual fonts sell for as little as \$15 (minimum order \$50). **Phone:** 403/262-8008, 800/661-9410. **Format:** PostScript and TrueType; floppies or CD-ROM. **Price:** FontPaks \$89 to \$199; Art & Type Vendor CD-ROM \$99 plus \$13 to \$125 to unlock individual fonts or families; LetterPress CD-ROM (660 unlocked fonts) \$1799; individual fonts or families \$15 to \$125.

❖ **Lazy Dog Foundry** For a varied and unusual collection of display and decorative faces, check out Lazy Dog Foundry. This outfit offers re-creations of faces from the 1920s and 1930s and several fonts that look like cursive or printed handwriting. Their Cheese Dog and Running Dog collections present the cream of the crop from shareware and public-domain font archives. **Phone:** 612/291-0306, 800/876-9807. **Format:** PostScript or TrueType; floppies. **Price:** Type of the Twenties & Thirties, volumes I to IV \$99.99 per volume or \$39 per face; Running Dog volumes. I to VII \$99.99 per volume or \$39 per face; Cheese Dog, volumes I to X \$99.99 per volume or \$39 per face; handwriting fonts \$199.95 per font.

❖ **Letraset USA** Letraset's Fontek collection consists of 192 display and decorative faces. It's impossible to describe a representative design, since styles include scrawled handwriting; re-creations of 1920s faces; bold industrial lettering; swirly 1950s script; and even a scruffy-looking font inspired by how text looks when it comes off a fax machine. Many of the Fontek faces were designed in the 1990s, and most are lively, eye-catching, and fun. Fontek is my favorite collection of display and decorative faces. **Phone:** 800/343-8973. **Format:** PostScript and TrueType; floppies. **Price:** \$39.95 per face. **Includes:** Character Chooser utility (similar to Key Caps DA).

❖ **Letter Perfect** Letter Perfect has about 20 display, decorative, and handwriting fonts—a charming mix of both fun and classy faces. New faces include Manito, which resembles letters chiseled in wood; DeStijl, a square, industrial face; and Kolo, a fluid Art Nouveau face. **Phone:** 206/851-5158, 800/929-1951. **Format:** PostScript or TrueType; floppies. **Price:** \$45 per font; \$65 to \$175 per family; \$595 for entire library.

❖ **Treacyfaces** Treacyfaces' original typeface designs are clean and distinctive. If you're tired of seeing the same old faces, consider the Treacyfaces library. Typefaces have between 1700 and 4000 kerning pairs, and include special characters such as fractions and the Mac key symbol. **Phone:** 203/389-7037. **Format:**

PostScript or TrueType; floppies. **Price:** \$49 to 170 per face or family.

❖ **URW** With six style variations—regular, outline, inline, relief, drop shadow, and round—for each of 500 fonts, URW's TypeWorks CD-ROM makes even URW's text faces into striking display and decorative designs. Even if you do not use outlines, inlines, and so forth, both TypeWorks CDs provide a good selection of traditional display faces. **Phone:** 603/882-7445, 800/229-8791. **Format:** PostScript or TrueType; CD-ROM. **Price:** URW TypeWorks Collection \$895. **Includes:** Kerning utility. **m**

ERFERT FENTON is a *Macworld* contributing editor and the author of *The Macintosh Font Book* (Peachpit Press, 1991).

TOP TYPEFACE COLLECTIONS



When evaluating typefaces, I looked at factors such as outline pairs, and inclusion of expert sets. With so many type vendors licensing and selling fonts from their fellow foundries, it's hard to pick the single best collection. Overall, however, one collection stands out for text faces: the Adobe Type Library.

Best Text Face Collection

Type On Call CD-ROM The Adobe Type Library (1700 fonts and counting) offers a well-rounded collection of classic and modern text faces. And Adobe now lets you unlock individual fonts rather than having to purchase entire type families. **Company:** Adobe Systems. **List price:** \$99 (includes the ability to unlock any two of eight preselected families); \$25 to unlock a single font; \$69 to \$179 to unlock additional families.

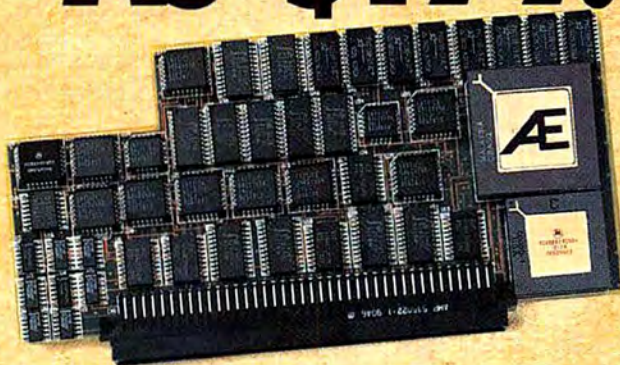
Best Display/Decorative-Face Collection

Fontek With a wide variety of contemporary designs, including numerous script faces, this 192-font collection should have something to suit every taste. **Company:** Letraset USA. **List price:** \$39.95 per face.

Best Bargain Collection

Monotype ValuePack For \$89, you get a good variety of text faces—the 7 text families include regular, italic, bold, and bold italic—as well as display faces and a dingbat font (for a total of 57 fonts). **Company:** Monotype Typography. **List price:** \$89.

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EDITED BY DAN LITTMAN

At Work

THE LATEST TOOLS FOR BUSINESS COMPUTING

Document-Management Tools Evolving

NEW TECHNOLOGIES ARE CROPPING up to help manage and distribute documents electronically.

Farallon's Replica follows the Acrobat/Common Ground model with Replica Creator, a printer-driver-like utility for creating documents; and Replica Viewer, for reading documents. To avoid ugly surprises that occur if the machine running Viewer lacks fonts used in a Creator document, Creator embeds TrueType fonts in its documents (for PostScript fonts it embeds font bitmaps). Replica can search text, password-protect files, and encrypt data, and on the Mac, Replica can distribute documents with Microsoft Mail or Farallon's Timbuktu (documents are interchangeable between Macs and Windows). Creator lists for \$99, and Viewer is freely distributable. Replica should be shipping as you read this. (For details on competing products, see "Brave New Documents," *Macworld*, January 1994.)

Visioneer has integrated PaperMax, a small (12½-by-3-inch) scanner, with MaxMate, software for annotating scanned documents, combining scanned and electronic documents in MaxMate stacks (no relation to HyperCard stacks), and searching the annotations or distributing the stacks with E-mail. All images



ANDREW FAULKNER

are bitmaps, so font availability is not an issue, and the MaxMate viewer can be distributed freely. Mac versions of PaperMax and MaxMate should ship in the second quarter of 1994, with links to QuickMail and AOCE, for \$499. Farallon, 510/814-5100; Visioneer, 415/812-6400.—D.L.



TOM GIBSON

Visioneer's diminutive scanner is designed to bring paper documents into an online document-storage environment.

Newton Watch

DEVELOPERS CONTINUE TO BRING software to market for Apple's pocket-size computer, the Newton MessagePad.

Slate's Day-Timer Meeting & Expense Pack, containing two programs based on the Day-Timer notebook planner, is shipping. Meeting Assistant is a meeting-agenda planner that integrates

with the Newton's built-in calendar, provides space to note what happened at a meeting, and can print an agenda or minutes. Expense Assistant has a grid for recording daily business expenses and can keep multiple expense reports open—separate reports for several clients, for example—and print in standard formats. The \$129 Day-Timer Pack is available from Apple's Newton software publishing division, StarCore.

Advanced Mobile Systems' Tax Plan provides a quick look at your tax situation. Enter income, deductions, and other standard tax information, and the program figures out what you're likely to owe the IRS come April 15. Tax Plan lists for \$49.95. Advanced Mobile Systems, 414/962-6631; Slate, 602/443-7322; StarCore 800/708-7827.—D.L.

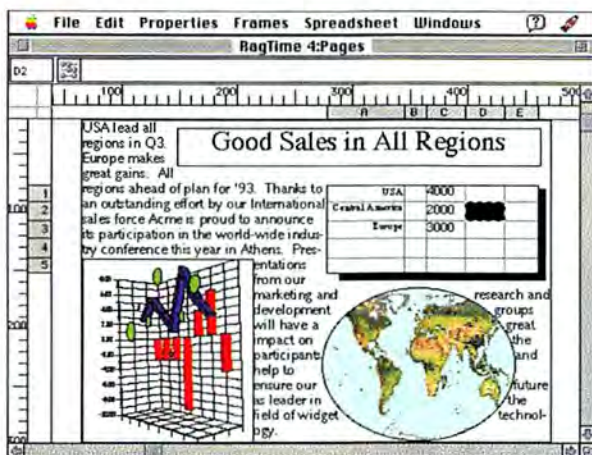
RagTime to Swing Again

RAGTIME IS A EUROPEAN SUCCESS story that never caught on in the United States because its niche was so hard to define. It did too much to be a desktop publishing program, too well to be a mere integrated package. RagTime version 4 will attempt to persuade Americans of its utility by offering even better integration of productivity and publishing tools.

For example, RagTime 4's new drawing tools include all of the standard implements, and any object that you draw can serve as a frame containing text or a spreadsheet; a spreadsheet cell can contain a text frame—or even an entire spreadsheet, especially useful for complex tables—or a spreadsheet cell can import a drawing depending on calculation results (useful for database publishing).

Other RagTime 4 news: The Inventory window records information about everything in a document—frame con-

tents, text formats, layouts—and can be used to generate tables of contents or create templates. Text frames can contain multiple columns, which reduces the need



A typical RagTime document might have a spreadsheet frame linked to a 3-D graph frame, both superimposed on a text frame.

to draw connections between frames. Text can be footnoted, spreadsheets can calculate arrays, and anything can be rotated any which way. New graph types include bubble, spider, high-low, and true 3-D. RagTime 4 is AppleScript-controllable and recordable, and its menus can be customized.

RagTime 4 should ship this spring. Pricing was not set at press time, but RagTime 3 is \$595. MacVonk Canada, 403/232-6545.—D.L.

Industrial-Strength Bar Codes

SYNEX IS COMBINING THE STRENGTHS of its bar-code and label-printing products in Bar Code Pro Label Printing. The package provides tools to design and print labels of all kinds with all kinds of bar codes on them.

Bar Code Pro Label Printing supports 17 common bar-code symbologies, including UPC (A), which is widely used in retail; ITF-14, common in shipping; and Code 25, used in inventory management. The package comes with templates for Avery labels, has text and drawing tools for designing label layouts, and can read delimited text files to produce mail-merged labels. It can modify its output to print bar codes to specification on a wide variety of printers.

Bar Code Pro Label Printing should be shipping as you read this for \$195. Synex, 718/499-6293.—D.L.

Two-Page Gray-Scale

MIRROR TECHNOLOGIES IS ABOUT to ship a monitor that seems custom-designed for the business user. The Mirror 2-Page Gray-Scale Display is a 19-inch gray-scale monitor that runs off the built-in video on all Quadras and Centrises (except the 700 and 900) to display 1024 by 768 pixels. It uses a Philips tube and refreshes at 75Hz. The number of gray scales depends on the amount of video RAM; however, most users working on spreadsheets, word processors, and other applications that create text-intensive, scrolling-intensive documents will probably want to set the system to black and

white for best performance and to reduce eyestrain. The 2-Page Gray-Scale Display should be shipping as you read this for \$699. Mirror, 612/633-4450.—D.L.

IN BRIEF

■ PowerBook Security

usrEZ's new low-price disk-locking program takes advantage of the mediocre display quality of some PowerBooks to thwart anyone watching you enter your password. cypherPad displays a keypad on screen, which on a passive matrix display is just about impossible to see at even a slight angle, where you enter your password with mouse-clicks (keyboard entry is also an option). cypherPad can also blank out the screen with a single mouse-click. It is shipping now for \$49. 714/756-5140.

■ M.Y.O.B. Does Payroll

BestWare (formerly Teleware) is splitting the new version, 4.0, of Mind Your Own Business into two flavors: one that has new payroll features and one without payroll. The payroll system can calculate tax deductions based on where employees live and work. It has no limit on deductions and provides a customizable paycheck stub to accommodate them. M.Y.O.B. 4.0 also adds batch support to its to-do list and a link to Timeslips. With payroll, it is \$199.95, or \$59.95 to upgrade from 3.0. Without payroll, it is \$99.95, or \$49.95 to upgrade. 201/586-2200.



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Working Smart

How to Cut Your Mailing Costs

IF YOUR BUSINESS DOES A LOT OF MAILING, you can use your Mac to help the United States Postal Service speed your correspondence on its way—and save yourself a bundle in the deal. Preparing mailing labels that the Postal Service's automated sorting equipment can read, using special software to make sure your addresses are current and accurate, and presorting your mailings can all earn you postal discounts.

The Postal Service offers discount rates to any organization that uses these delivery-streamlining schemes. It used to be that only big commercial mailing houses took advantage of the discounts, but now small businesses and nonprofit organizations can take advantage of them too, thanks to software and hardware that puts what was once a costly, specialized service on the desktop. Indeed, bulk-mailing software is having the same impact on the direct-mail world that page-layout software has had on the publishing world. (The effects are being felt in service bureaus as well: a growing number of service bureaus and printshop chains use these programs to provide mailing services.)

As with publishing, the migration to the desktop gives businesses more control over their efforts. But taking the direct-mail plunge isn't easy—you have to contend with forms, many of them arcane, and regulations that seem insane. There is, for example, only one officially sanctioned way to put rubber bands around bundles of letters. Mailing software can help with most of it (although not with the rubber bands). And if you decide to let a commercial mailing house do your mailing after all, the background I'll provide will help you understand what you're paying for.

Know Your Mailing Options

The Postal Service offers so many mailing options it is impossible to describe them all. But here's a quick overview.

- First-class mail gets there in two to five days. Cost: 29 cents for the first ounce and 23 cents for each ounce thereafter.

- Second-class mail is for periodicals. Qualifying for periodical rates is complicated—it's based on how often a magazine is published, its ratio of advertising to editorial, who is allowed to subscribe to it, and myriad other factors. Delivery time: generally faster than third class and slower than first class. Cost: 16 to 37 cents per pound or 10 to 20 cents per piece.

- Third-class mail represents the bulk of direct mail, encompassing everything from subscription offers to catalogs. Delivery time: three to ten days. Cost: 13 to 19 cents per ounce.

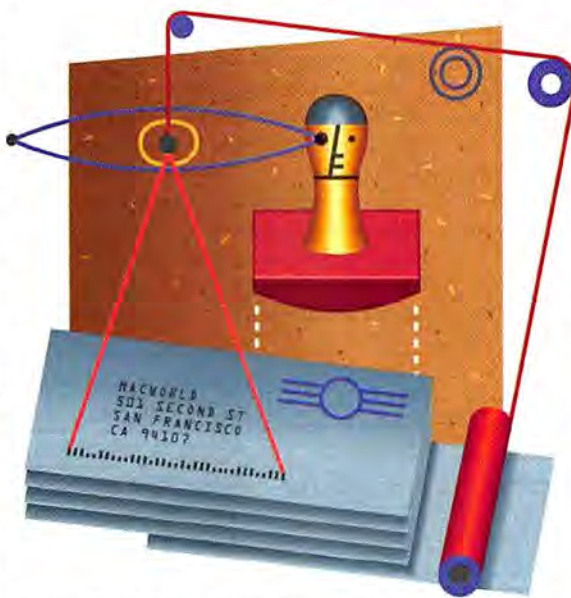
- Fourth-class mail is the so-called book rate, reserved for bound, printed

or weigh at least 50 pounds. You also need to deliver the mailing to a Bulk Mail Center, a Postal Service facility that handles third- and fourth-class bulk mail—no dumping it in the corner mailbox. And in some cases, the farther the mailing goes, the more it costs, so it may pay to do your printing near the mailing's destination.

For bulk mailing, you must also presort the mail—bundle together all pieces going to the same zip code groups. For example, to qualify for a three-digit presort discount, all catalogs going to San Francisco would be bundled together in a 941 stack. For a five-digit presort discount, catalogs would be bundled by neighborhood—catalogs going to

Macworld's neighborhood, for example, would be in a 94107 stack. Large bulk mailings are often sorted by carrier routes as well, the streets or areas to which mail is delivered. Sorting by carrier route can earn you steep discounts, but to qualify, your mailing must meet stringent sorting requirements.

There's more to presorting than this, but you get the idea: the more you do, the less the Postal Service has to do, so the more you save. But you have to do it right—and that's where mailing software earns its keep.



material weighing 1 pound to 10 pounds. Delivery time: four to ten days. Cost: 2 to 36 cents per pound or 44 to 59 cents per piece.

There is a wide range of prices for some classes of mail, and many factors determine how much different organizations pay for the same mailing. Nonprofits pay less than commercial mailers, and bulk mailers pay less than small-scale mailers. Bulk mailing earns you a steeper discount, but to qualify for bulk rates, your mailing must have at least 200 pieces

Mac Mailing Software

Programs such as Satori Software's Bulk Mailer Plus, Synex's MacEnvelope Professional, and Software Publishers' AccuZip6 combine database-management features that let you enter and edit addresses with printing features that produce envelopes or mailing labels in the appropriate formats. All mailing programs can also import from general-purpose database managers.

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At first glance, a mailing program seems similar to a general-purpose data manager, but there are big differences. Claris's FileMaker Pro, ACI US's 4th Dimension, and their ilk are generalists, able to manage anything from a client list to an accounting system. Mailing programs are specialists designed for the rigors of bulk mailing.

To save on printing and postage, mailing programs sport slick features for snaring duplicate entries. Satori's Bulk Mailer Plus is particularly clever about duplicates: its Close Calls options can snag phonetically similar names (such as Jean and Gene) as well as names with similar spellings (as in Barr and Barre). And you can tell the program to display suspected duplicates before deleting them so you can verify that they really are duplicates.

A significant difference between mailing programs and data managers surfaces at printing time. Not only do mailing programs have preset printing formats for envelopes and mailing labels, they also can print the POSTNET (Postal Numeric Encoding Technique) bar codes that the Postal Service's automatic sorters scan. Including the correct POSTNET bar codes on bulk-mailing pieces can earn you a lower rate.

A Field Guide to Bar Codes

POSTNET bar codes come in several flavors (see "Anatomy of an Address"). The most basic is a bar-code version of the addressee's five-digit zip code. A step up is the zip+4 bar code, which reflects the addressee's nine-digit zip code; the extra four digits include more specifics about the delivery location.

The most complex POSTNET bar code is the Delivery Point Bar Code. Also called the Advanced Bar Code, this code includes not only the zip+4 bar code, but also the walk sequence number, usually the last two digits of the street address or post office box, to reflect the order in which letter carriers deliver the mail—crisscrossing streets, for example, or working their way across a bank of mailboxes. Organizing mail into the correct walk sequence is the final stage in the manual sorting process that takes place in your local post office; when bulk mail is presorted and encoded with Delivery Point Bar Codes, this last sorting stage is eliminated—and you save money. In 1993, the Postal Service eliminated bar-code discounts for anything less than the full Delivery Point Bar Codes (though there is still a presort discount for mail that is sorted to the zip+4 level).

MacEnvelope Professional can print yet another type of bar code, the Facing Identification Mark (FIM), which is most

often used on business-reply cards and envelopes. Among other things, the FIM tells the post office's equipment whether the piece contains a POSTNET bar code and whether it bears a stamp that requires cancellation.

Proofreading Your Database

Here's where the gap between mailing software and other database managers turns into a canyon. Several mailing programs can actually correct the addresses in a mailing list, adding accurate zip+4 codes and more. They do so by supporting the Postal Service's Coding Accuracy Support System, or CASS. When you've finished entering and editing a mailing list, you run it through a utility that the Postal Service has CASS-certified, and the utility checks the mailing list against a CD-ROM containing correct address spellings and formats as well as zip+4 codes for all valid addresses in the country.

This massaging process can also help root out duplicates. Say a given address was entered twice—once as Post Office Box 743 and once as Box 743. The CASS utility will change both to PO BOX 743, making it possible for the mailing-list program to spot the entries as duplicates.

A CASS-certified utility isn't for the occasional, small-scale mailer. For starters, the software isn't cheap. Because zip+4 codes are always changing, the Postal Service requires CASS software vendors to update their CD-ROMs quarterly (the utilities won't run after their expiration dates). Software Publishers' CASS-certified AccuZip6 retails for \$899, and a one-year subscription to AccuZip6's CD-ROM is an additional \$200, while Satori Software's Bulk Mailer CASS, designed as a companion piece to the \$450

Bulk Mailer Plus, costs \$150 per quarter or \$525 per year (Bulk Mailer CASS can clean up text files as well as Bulk Mailer databases).

Another CASS-certified package is Semaphore Corporation's ZP4, which costs \$125 per quarter. Unlike AccuZip6, Bulk Mailer Plus, and MacEnvelope Professional, ZP4 doesn't maintain an internal database, but instead uses Apple events to batch-process mailing lists created in other programs; ZP4 can also check individual records in MacEnvelope Professional (to CASSify a complete MacEnvelope Pro database, you'd have to export it as a text file, process it, and reimport it). ZP4 can also clean up FileMaker Pro mailing lists and can be controlled with AppleScript or UserLand Frontier. Bulk Mailer CASS, AccuZip6, and ZP4 all print the form that the Postal Service requires as proof that your mailing list has been CASSified.

If you want the low mailing rates that CASS certification allows but you can't justify the cost to do it yourself, there's another option: send your mailing list on disk to the Postal Service's National Customer Support Center in Memphis, Tennessee, for a free one-time CASSification service. The disks must be in MS-DOS format, but fortunately the Mac's ability to read and write DOS disks makes this obstacle surmountable—if you can structure your database according to the Postal Service's requirements. Satori's Bulk Mailer Plus can export mailing lists in the required format, as can Synex's Mac To Memphis And Back. (To get either program's output onto DOS disks, use the Apple File Exchange program, which comes with the Mac, or a utility such as

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ANATOMY OF AN ADDRESS

A typical bulk-mailing piece might contain the components shown here. ① The Facing Identification Mark is used by the Postal Service's equipment to determine whether the piece contains a POSTNET bar code or a stamp that requires cancellation. ② The permit imprint indicates that the postage is being paid with a bulk-mail permit. Postage meters and precancelled stamps can also be used for bulk mailings. ③ The endorsement indicates how the mailing pieces have been presorted (a three-digit endorsement is shown here).

④ The address appears all in capital letters, which are easier for the automated sorters to scan. Street and state abbreviations must adhere to Postal Service regulations. ⑤ The POSTNET bar code is used by automated sorting equipment to route the mailing pieces.



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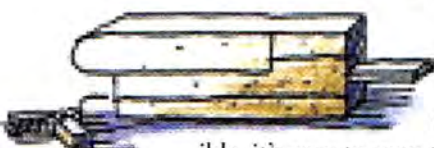
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Apple's PC Exchange, which lets DOS disks appear on the Mac's desktop.) The exact requirements are described in a free Postal Service brochure, "Address File Standardization on Diskette" (PS Form 5603). For a copy, call 800/238-3150 and ask for Diskette Processing Services.

Printing Time

Most of the predefined label formats provided by mailing programs are for Avery labels—the most common peel-and-stick labels for computer printers. Avery labels are available for laser and dot matrix printers, so you can use your existing printer to address your mailing pieces.

If you don't want to tie up the office printer with this grunt work, consider CoStar's AddressWriter, a compact dot matrix printer for envelope printing. The AddressWriter's envelope feeder holds up to 100 envelopes or 200 postcards; with an optional label feeder it can print one-up labels. For higher-volume addressing, CoStar sells the Address Express, a faster, ink-jet printer that handles envelopes and labels. Both printers attach to a serial port, and CoStar also sells an AppleTalk network adapter. Both printers include a version of MacEnvelope.

Mailing houses and other high-volume mailers rely on fast direct-address printers, which can slap thousands of addresses per hour onto envelopes and bound matter such as catalogs. Datatech's Scriptomatic DP1185E (\$5795) can address up to 3000 parcels per hour; the DP1190 (\$7720) handles 5000 addresses per hour. Bryce Office Systems' BOS 10KE (\$15,995), distributed by Datatech, can address up to 10,000 pieces an hour and accepts everything from envelopes to bound materials up to 1/8-inch thick. These machines may be too expensive for your business to buy, but Bulk Mailer Plus 4.1 can link to these machines at your local mailing house (Datatech, 215/825-6205 or 800/523-0320). Like the Postal Service, most mailing houses charge less the more steps you prepare ahead of time.

Mailing software can help with hard copy, too. The Postal Service wouldn't be a government agency if it didn't require plenty of paperwork—when you deliver your mailing, you need to supply forms that describe it and the mailing methods you're using. AccuZip6 has the most complete set of Postal Service forms, followed by Bulk Mailer Plus, with MacEnvelope Pro a distant third. These programs can also print the tags and labels that you must attach to each sorted bundle of mail.

For More Information

If you're contemplating the bulk-mail plunge, you'll need more background than

WHERE TO BUY

AccuZip6 1.8.5 \$899;
CASS CD-ROM \$200 per year;
Software Publishers, 714/374-0460, 800/233-0555.

AddressWriter \$399; **Address Express** \$499.95; **AppleTalk Interface Box** \$199; **Pin Feed Attachment for AddressWriter** \$75; CoStar Corp., 203/661-9700, 800/426-7827.

Bulk Mailer Plus 4.1 \$450;
Bulk Mailer CASS \$525 per year, \$150 per quarter; Satori Software, 206/443-0765.

MacEnvelope Professional 1.1 \$250; **Mac To Memphis And Back 1.0** \$150 (as part of **MacEnvelope Pro Toolbox 1.0** \$250 with **List Cleaner, Merge/Perge, Genderizer, and List Sampler**); Synex, 718/499-6293, 800/447-9639.

ZP4 \$125 per quarter; Semaphore Corp., 408/688-9200.

I can provide here. The best source of information is the Postal Service itself: its \$56 *Domestic Mail Manual* is the comprehensive guide to mailing in the United States. Write to Superintendent of Documents, U.S. Government Printing Office, 941 N. Capitol St. NE, Washington, DC 20402, or call 202/783-3238. A smaller, more digestible publication, *Third-Class Mail Preparation*, is free and available where you obtain a bulk-mail permit, usually at your city's Business Main Entry Unit or Bulk Mail Acceptance Unit. While you're there, ask the postmaster about bulk-mailing discounts for your business's specific needs.

Which program should you buy? I found Satori's Bulk Mailer Plus the easiest to learn and use. AccuZip6 has a steeper learning curve and a less approachable interface but is more powerful: it supports a larger array of mailing options and even includes a built-in word processor for creating customized form letters right in your database. Semaphore's ZP4 is an excellent choice if you're already using a database program to store your mailing lists, particularly if the database program supports Apple events. **m**

Next Month: Backup Strategies

Contributing editor JIM HEID has been writing about the Mac since its introduction. His most recent book, *Macworld Complete Mac Handbook + CD*, is published by IDG Books Worldwide.

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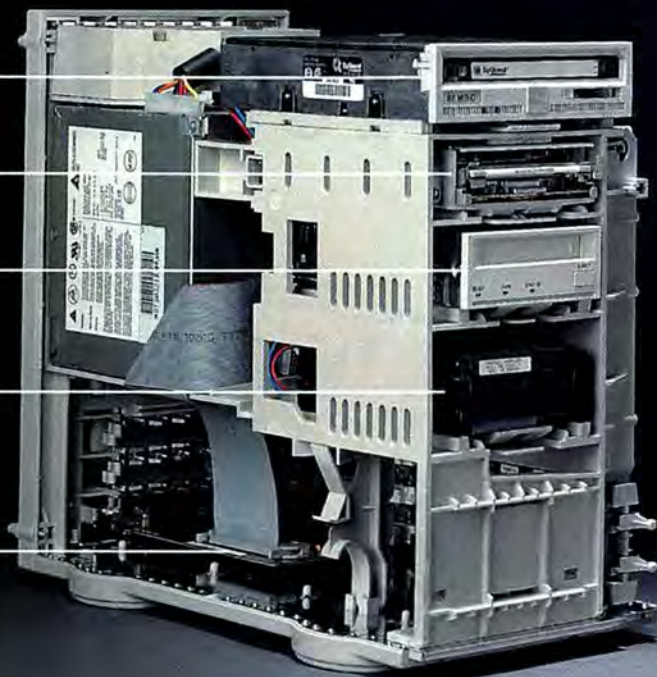
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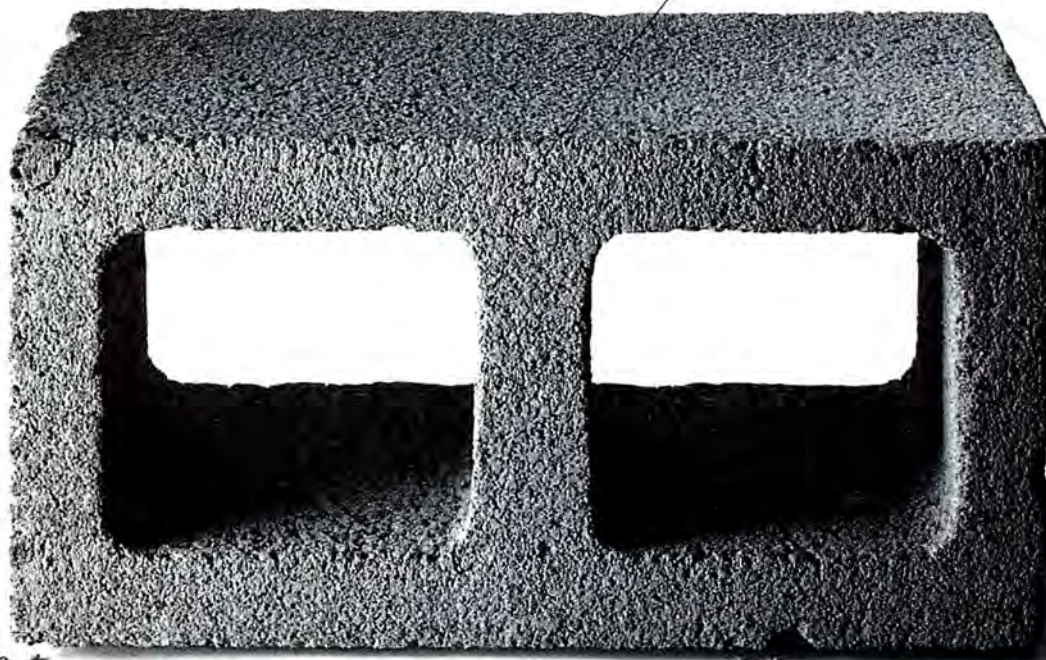


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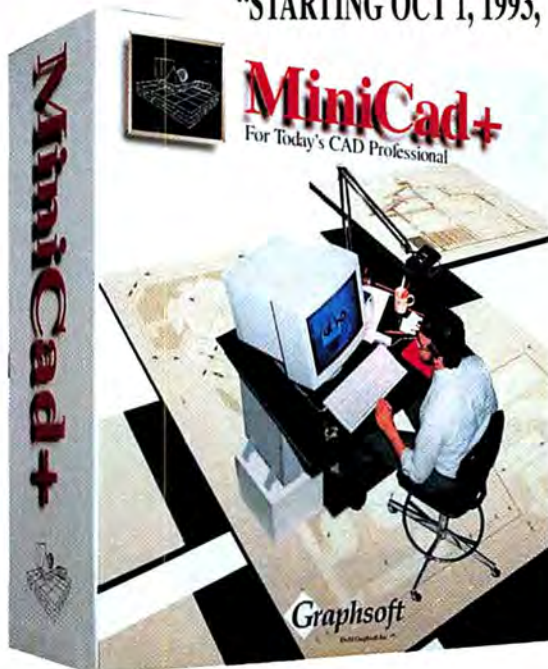
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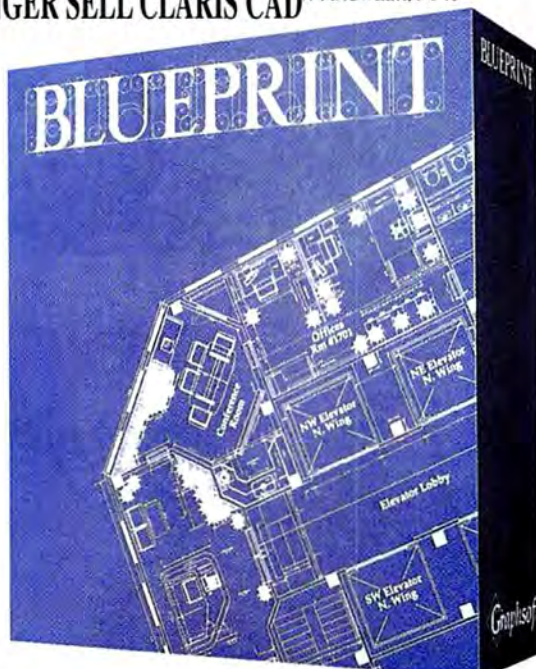
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- ☐ selection by properties
- ☐ auto-insert symbols in walls
- ☐ hierarchical symbol library
- ☐ add & subtract surfaces
- ☐ fractional feet and inches option
- ☐ fillets
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- ☐ editable fills
- ☐ beziers
- ☐ wall-join
- ☐ chamfers
- ☐ tolerancing
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Integrated Database/Spreadsheet:

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Programmability:

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- ☐ wall-join
- ☐ chamfers
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Quick Tips

Tips, Tricks, and Shortcuts

A TIP LAST NOVEMBER SHOWED HOW to apply an alternate color to overlapping areas—in particular, where text characters converted to graphic elements overlap—in an Aldus FreeHand drawing. J. Brendan Regan of South Bend, Indiana, suggests an improved method (see the sidebar, “Alternating Overlapped Colors, Part 2”), which potentially creates fewer, simpler paths for faster screen and printer rendering. This method handles objects with transparent openings, such as the letters *o* and *e*, even if the background is not a solid color. It also leaves no loose objects in the back needing to be grouped with objects in the front to keep the entire effect together should it need to be repositioned later.

Surfing the Internet

Q What's the best way to connect to the Internet, primarily for E-mail and file transfer? I am also interested in running Unix on the Mac.

Gary Brandt
Chicago, Illinois

A All the major commercial online services have gateways to Internet E-mail. This means you can send and receive Internet E-mail using America Online (800/827-6364), AppleLink (408/974-3309), BIX (800/695-4775), CompuServe (800/848-8990), Delphi (800/695-4005), GEnie (800/638-9636), and MCI Mail (800/444-6245). Each service charges different rates for accessing Internet E-mail, and with some services certain restrictions apply. For example, America Online has no surcharge for Internet E-mail but limits messages to 30K or so and doesn't permit you to attach files.

Of the major commercial services, only BIX and Delphi provide access to FTP (file-transfer protocol) sites and their gigabytes of freeware, shareware, commercial demo software, and assorted Macintosh information. Delphi also offers full access to the Internet, including

Usenet news and Telnet. America Online plans to add FTP access in 1994, and by the time you read this, expects to have added Usenet and two standard Internet services for information retrieval, Gopher and WAIS (wide area information server).

Internet access is also available by modem through various public-access providers in the United States and Canada (with a few sites in other countries).

The cheapest and most common type of public access is also the hardest to use—it requires you to remember and type cryptic Unix commands, or if you're lucky it may have a hierarchical-menu interface.



You can use any terminal program on your Macintosh (such as MicroPhone, ClarisWorks, or the shareware ZTerm) to connect to the terminal-access site. Once you're connected, you can forget about pull-down menus, windows, buttons, and the mouse.

Less common but more efficient for basic E-mail and news is UUCP (Unix-to-Unix CoPy) access. With a UUCP program on your Mac (such as Mac/gnuucp, uucp, and UUCP Connect), you prepare E-mail messages while your modem is not connected and running up connect

charges. Later (perhaps on a regular schedule you set up) the program connects to the UUCP site, sends your outgoing E-mail, and receives your incoming E-mail and news articles.

To access the Internet with a Macintosh interface via modem, you need an account with a public-access provider that offers either PPP (Point to Point Protocol) or SLIP (Serial Line Internet Protocol) service. You also need Apple's MacTCP control panel and Macintosh applications such as Eudora for E-mail and Fetch for FTP file transfer. Other Mac applications give you access to news and more Internet information.

Explaining all this in detail would take a book, which fortunately has been written. *Internet Starter Kit*, by Adam C. Engst (Hayden Books, 1993), includes detailed descriptions of everything I've mentioned and more. You also get a disk with all the software you need for MacTCP access to the Internet and two weeks free trial connect time with full Internet access.

As for Unix on the Mac, I've heard of two versions: Apple's A/UX, and MachTen from Tenon Intersystems (805/963-6983). Apple has also announced plans to release another version, PowerOpen, in the second quarter of 1994 for the forthcoming PowerPC Macs.

Substitute FPU

Q We were told there would be no problem using Adobe Illustrator 5.0 on our Centris 610 with no FPU, but there is. Illustrator doesn't install its Pathfinder filters without an FPU. We tried the shareware FPU emulator named PseudoFPU and the machine broke down. We tried Software FPU but it wouldn't install. Then we were told to buy *continues*

an FPU, but no one could tell us where in the computer to install this chip!

*Claus Boman
Copenhagen, Denmark*

A SoftwareFPU 2.4 lets you use software that requires an FPU, such as Illustrator's Pathfinder, Offset Path, and Outline Stroke filters, on a Mac with a 68020 or 68030 Mac that lacks a hardware FPU. Version 2.43 works with these Mac models: LC and LC II, III, and 520; IIsi; IIvi; Performa 200, 400, 405, 410, 430, 450, 460, 466, 467, 550, 600, and 600CD; Color Classic and Color Classic II; Classic II; PowerBook 140, 145, 160, and 165c; and PowerBook Duo 210, 230, and 250. PseudoFPU is an older version of SoftwareFPU that works on fewer Macintosh models. Notably missing from this list are all the 68LC040 Macintoshes (Quadra 605 and base model 610; Centris 610 and base model 650; LC 475; and Performa 475 and 476). A bug in the 68LC040 CPU chip keeps it from working properly with SoftwareFPU 2.42 (as a result, version 2.43 is designed not to work with the chip at all).

Motorola has fixed the bug in 68LC040 chips having a mask revision number of 03E23G or higher. These chips should work with SoftwareFPU 2.42 and 2.44; the latter should be available by the time you read this. Unfortunately, the new chip is not yet in production, pending Apple's certification of it.

SoftwareFPU does not speed up the calculation of floating-point arithmetic and transcendental functions, as a hardware FPU does. You can add a hardware FPU to a Centris 610 either by replacing its CPU with a full 68040 or by installing a 68040 accelerator board. Replacing a CPU is easy for a trained technician but is no job for an average computer user.

SoftwareFPU is available electronically on CompuServe and America Online. You can also obtain it by sending \$10 to the author, John Neil & Associates, P.O. Box 160699, Cupertino, CA 95016-0699, but delivery may take up to 60 days.

Confirm Startup Items

TIP Here's a trick for System 7 users who sometimes want items in the Startup Items folder opened and sometimes don't. Make a duplicate of an application and make an alias of the duplicate. Then drag the duplicate application to the Trash and empty the Trash. Place the alias of the application you just deleted in the Startup Items folder, and give the alias a name that alphabetically precedes the other items in that folder. When the Finder encounters the alias, it displays an alert telling you it could not find the alias's



ALTERNATING OVERLAPPED COLORS, PART 2

In an Aldus FreeHand 3.1 drawing, a region where elements overlap ordinarily has the same color as the foremost element. Here's a technique submitted by J. Brendan Regan of South Bend, Indiana, for giving overlapping text characters (or any overlapping element) an alternate color.

Power

1. Enter the text you want to color (for example, the word *Power*), convert it to paths, fill it with a color (blue here), and set its line color to none.



2. Use the Split Element command to make each letter an individual element. Manipulate the letters to get the look you want—resizing, overlapping, giving alternate overlapping letters an alternate fill (red here). Decide whether the even-numbered or the odd-numbered letters have simpler paths. The o and e are curved and have compound, or joined, paths, making them more complex than the w and r.



3. Clone one of the simpler elements (for example, the w), and fill the clone with the color you want for the overlapping regions (yellow here).

You can do some extra work in steps 3 through 5 to simplify the paths of the clones before pasting them inside, reducing the work the computer and printer must do to render the paths. Simplification has negligible benefits on simple illustrations and powerful computers or printers, but complex illustrations or slower hardware will display and print faster. After making and coloring a clone in step 3, delete the part of the clone's path that does not overlap the adjacent element. Then do step 4. If the clone overlaps another element, then before pasting that element inside the clone in step 5 you must make a new clone, color it, and prune it so the remaining fragment of the clone overlaps the other element properly. For example, you would prune away the right side of the yellow w clone before pasting it inside the o. Then you would prune away the left side of another yellow w clone and paste that fragment inside the e.



4. Cut the clone, bring to the front an element that the clone overlaps (for example, the o overlapped by the w), and use the Paste Inside command to paste it inside the overlapping letter—here, the o inside the w.



5. If the clone overlaps another element (as the e overlaps the w here), select that element, bring it to the front, and paste it inside again.



6. Repeat steps 3 through 5 with the remaining simpler elements (just the r in this example). If your result doesn't match this one, your front-back relationships got jumbled somehow. Bring the w to the front and send the r to the back.

original item. You click Stop to cancel opening the start-up items or click Continue to finish opening them.

*Milo Sharp
Fairbanks, Alaska*

If you watch your Mac closely during start-up, you can suppress opening of start-up items by pressing the shift key when the Finder's menu bar appears,

as mentioned in a tip in December 1992. (Pressing shift earlier, when start-up begins, also turns off all extensions, the disk cache, and virtual memory.) Once the opening of start-up items has begun, you can cancel it by pressing $\text{⌘} + \text{⌘}$ (period). The Mac immediately stops any start-up sound it is playing and skips all start-up items it has not already opened. However, it does not cancel applications that have

continues

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Circle 1 on reader service card

already begun opening. It's too late to press ⌘- (period) after the Mac has partially opened all start-up applications in quick succession and has gone back to give each one time to finish opening. —L.P.

Processing a Batch

TIP Here is a useful technique for performing an identical process on many files. It works for any sequence of operations, from applying a complex sequence of Photoshop filters to pasting a custom icon (see "A Batch of Custom Icons").

First you put all the files you want to process into an empty folder named Before, open the folder, and set it to view by name. Also create a folder named After. Then create a macro that performs the operations you want to apply to each file.

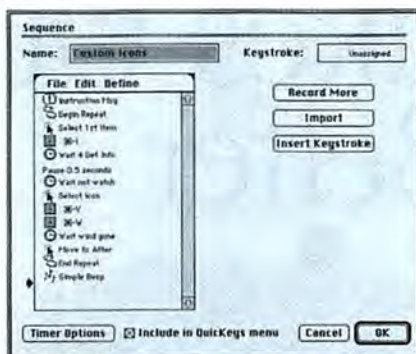
Now here's the trick: At the beginning of the macro, before the process begins, include a step that opens the first file in the Before window. At the end of the macro, include a sequence that saves and closes the file and returns to the Finder, and then moves the first file in the Before window (the file just processed) to the After folder. Of course you don't open, save, and close each file if the macro process takes place in the Finder, but you must move the processed file from the Before window to the After folder.

Finish the macro by adding steps that make it loop until all the files have been moved from the Before folder to the After folder. In QuickKeys, use the Repeat extension to define the beginning and ending points of the loop. If your macro program doesn't have a repeat or loop option, try adding at the end of the macro the keystroke that activates the macro itself.

If you want to rename a batch of files, you must modify this technique slightly. Instead of viewing the Before window by name, view by date. A file does not move if you change its name while viewing by date, but if you change its name while viewing by name, it may move, sabotaging the batch process.

Another variation of this technique allows user interaction while processing each file. For instance, suppose you want to colorize one element that appears in each graphic file in a folder, but the element is in a different place in each graphic. You can't fully automate this batch process, because you must manually select the element to be tinted in each file. But by judiciously choosing the macro's starting point, you can process the batch of files semiautomatically.

First you prepare the Before and After folders as described above. Open the first file in the Before window and select the element to be tinted in that file. Now start recording the macro. Tint the selection



A Batch of Custom Icons This QuickKeys macro loops to replace the icons of items in the active Finder window with a custom icon the user previously copied to the Clipboard. After replacing an item's icon, the macro drags the item to another folder. The macro displays instructions before beginning the loop, and beeps after finishing the loop. (You copy the custom icon before starting the macro.)

red, save and close the file, switch to the Finder, move the first file from the Before window to the After folder, open the new first file in the Before window, and finally include a step that simply makes your Mac beep. Stop recording the macro.

You can now use the macro to finish processing the batch of files in the Before window. Select the element to be tinted in the next file (which should be open as a result of recording the macro), and activate the macro. Sit back and read your favorite computer magazine. Each time the Mac beeps, select the element you want to tint, and activate the macro again.

Tom Bojarczuk
São Paulo, Brazil

Standing Memory Reservation

TIP With several programs open at once on my 8MB LC II, I often have to quit an application to open another. I could live with that, but every time I print a document, PrintMonitor opens automatically and stays open for a while to print my frequently complex documents. If I need to open another application while PrintMonitor is open, I might not be able to—even if I quit an open program—because PrintMonitor has fragmented the Mac's memory. The largest unused block of memory might be too small for the program I need to open, and so might the block that would be available if I quit another open program, but both unused blocks together would be enough if I could consolidate them by quitting PrintMonitor.

To prevent this problem, I have my Mac automatically reserve 100K for PrintMonitor during start-up, before any other programs are opened. I accomplish this by putting a copy of PrintMonitor in the Startup Items folder along with an alias of

the program I least want to quit. I add a blank space to the beginning of the name of the PrintMonitor copy so it comes first alphabetically in the Startup Items folder, and set the minimum memory size of the PrintMonitor copy to 100K with the Finder's Get Info command.

The renamed PrintMonitor copy opens first during start-up, followed by the other start-up program. Then the PrintMonitor copy closes because there is nothing to print. The block of memory thus freed remains available for the original PrintMonitor (in the Extensions folder), whose minimum memory size is set to 96K. That lets it fit in the 100K space even if that space shrinks by 1K or 2K as sometimes happens. Since PrintMonitor no longer fragments memory, I can quit and open programs without postponing background printing.

This technique won't work if I open desk accessories, which take 20K each, while PrintMonitor is not open and leave them open. It also won't work if I quit the other program that opened during start-up and open another program while PrintMonitor is not open. In that case, the newly opened program takes the space reserved for PrintMonitor and part of the space used by the now closed application.

Jérôme Crêteau
Lachine, Quebec, Canada

Secret Status Options

TIP In Adobe Illustrator 5.0, the status line in the bottom-left corner of the document window can display the data, current tool, amount of memory available, or the number of undos and redos used and remaining. If you press the option key while clicking the status line, the pop-up menu that normally lists just these four options lists seven more, including the moon phase, the current national debt, a pair of eyeballs that follows the pointer, and even the number of shopping days until Christmas.

Jeff Eaton
Wheaton, Illinois

We pay from \$25 to \$100 for tips published here. Send questions or tips on how to use Mac computers, peripherals, or software (by mail or electronically) to *Quick Tips*, Lon Poole, at the address listed in *How to Contact Macworld* at the front of the magazine (include your address and phone number). All published submissions become the property of Macworld. Due to the high volume of mail received, we're unable to provide personal responses. **m**

LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. His latest book is *Macworld Guide to System 7.1*, 2nd Edition (IDG Books Worldwide, 1993).



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Circle 90 on reader service card

EDITED BY ELIZABETH DOUGHERTY

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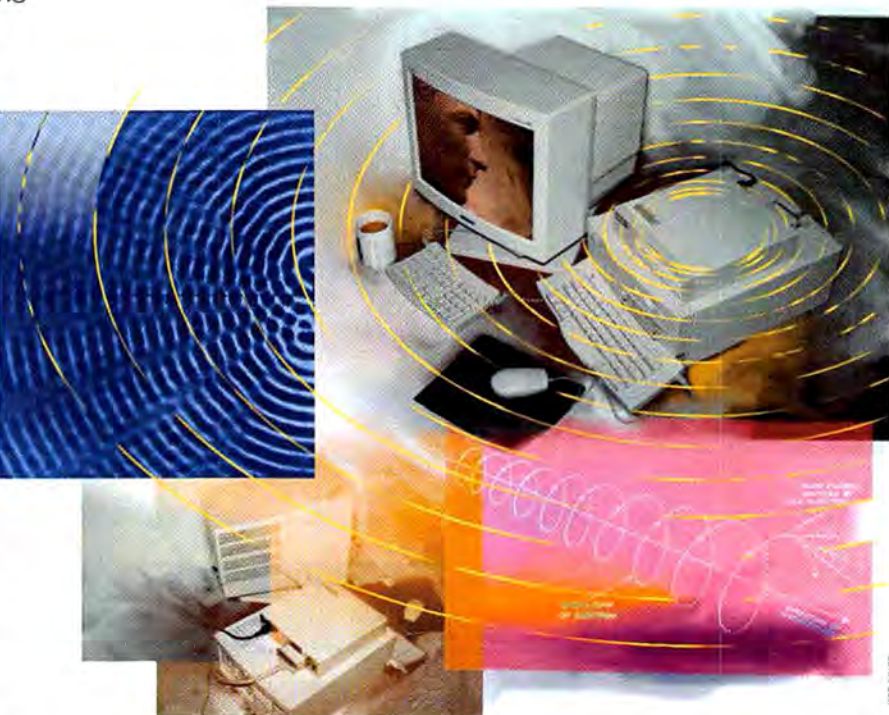
NOMADIC USERS WITH PORTABLE computers are making wireless LANs a plausible alternative for mainstream network installations. Not coincidentally, wireless options for Macintosh LANs are increasing, with two new infrared LAN products and a line of radio-frequency adapters announced recently.

Infrared technology today accounts for about 20 percent of wireless LANs. Infrared can transmit data at much higher rates, but it can't penetrate office partitions or walls. It's ideal for setting up a network in an unobstructed room; in a room with partitions it's often installed so the transmitters and receivers are in the same line of sight. The majority of wireless LANs, however, use spread-spectrum radio technology, a transmission method that resists interference and eavesdropping and can coexist with other devices using the same range of frequencies.

The new Grouper product line from Digital Ocean (913/888-3380) uses radio transmission in the unlicensed 902MHz-to-928MHz frequency band. The Grouper can be used to set up stand-alone wireless LocalTalk networks or to connect wireless Macintosh users to hardwired LocalTalk networks. The \$699 Grouper 100LT, for desktop Macs and PowerBooks, is slated to ship in January 1994. Grouper versions for the PowerBook Duo and the Newton MessagePad, and a NuBus card, are planned for release in the first quarter of 1994. An Ethernet version, dubbed Starfish, is scheduled for release in the second quarter of 1994.

InfraLAN (508/266-1500) has introduced a 10-Mbps Ethernet version of its Cableless Local Area Networking system. An optical node and transceiver for desktop Macs costs \$1025; it was planned for December 1993 release.

Photonics Corporation (408/955-7930) announced Cooperative, a \$295



external infrared device, about the size of a mouse, that connects Macs at LocalTalk speeds. Cooperative can be used with any combination of desktop Macs, PowerBooks, and peripherals. An adapter card called Cooperative Access is available (\$49), linking users on Cooperative LANs to existing wired networks. Both products were scheduled for December 1993 release.—MARTHA STRIZICH

PowerTalk E-Mail Gateways

STARNINE TECHNOLOGIES HAS UN-veiled a trio of new products designed to help electronic-mail users take advantage of Apple's PowerTalk (see "AOCE—

Apple's Plan for Groupware," *Macworld*, November 1993).

Mail Link for PowerTalk/QM provides a link between PowerTalk and CE Software's QuickMail, creating a single mailbox that holds both PowerTalk and QuickMail messages.

Mail Link Internet for PowerTalk will let Macs with System 7 Pro connect to E-mail services on Internet. This gateway will also work on other Unix-based systems because it employs Simple Mail Transport Protocol (SMTP) and Post Office Protocol Version 3 (POP3), which are TCP/IP mail protocols in use at many universities and corporations. StarNine expects this version of Mail Link to be available in the first quarter of 1994. Single-user versions of either the QuickMail or Internet program cost \$99 (\$399 for five users, \$599 for ten users).

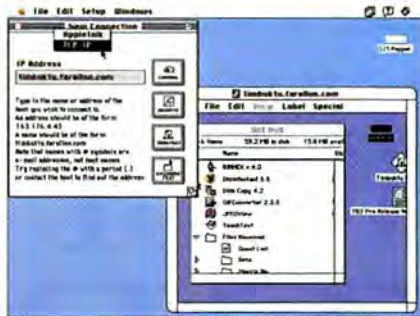
Within 60 days after Apple releases its PowerShare Collaboration Server messaging software, StarNine will ship Mail Link for PowerShare/MS to link PowerShare and Microsoft Mail. The cost will be \$595 for 10 users, \$2995 for 100 users; a site license will cost \$12,995. 510/649-4949.—MARTHA STRIZICH

Timbuktu over TCP/IP

ANY WORLD TRAVELER KNOWS THAT an extra language comes in handy. Farallon Computing has taken that thought to heart in developing Timbuktu Pro, the latest in its line of remote-control and file-sharing tools. Timbuktu Pro supports TCP/IP and Apple Remote Access, and features faster screen-sharing performance, support for Apple's PowerTalk directory services, and enhanced security options in the form of a new password-protection scheme and activity log.

According to Farallon, Timbuktu Pro makes possible remote control and file exchange over Internet; net managers groping for nitroglycerin pills at the thought may want to investigate the companion Timbuktu Pro Administrator's Toolkit. With this package, managers can implement and enforce secure-password and access-privilege policies.

Timbuktu Pro is currently shipping for \$199; Administrator's Toolkit is available free with every 100-copy pack of Timbuktu Pro (\$5500), or separately for \$699. 510/814-5100.—CAMERON CROTTY



Timbuktu Pro lets a remote user control a Mac over a TCP/IP network or via Apple Remote Access.

Apple Ethernet Board

APPL COMPUTER'S NEW ETHERNET card can bring some older Mac models up to par with new models that have Ethernet support built in. The \$179

Apple Ethernet NB (NuBus) Twisted-Pair Card includes a standard 10BaseT network port (RJ-45), which allows for quick and easy installation and network management. The card ships with optimized software that, in many cases, matches the throughput of Macs with factory-installed Ethernet.

For networks that require other forms of Ethernet media, such as thin-coax or fiber-optic cable, or that need an AAUI port, Apple has also reduced the price of bundles that include either the existing Ethernet LC or NB Card and a choice of Apple Ethernet media adapter (thin-coax, twisted-pair, or AUI). The Ethernet NB Bundle now costs \$279, and the Ethernet LC Bundle now costs \$179. 408/996-1010.—NANCY DUNN



Silver Streak 10-Mbps Ethernet transceivers make installation relatively simple by using standard silver-satin phone wire.

Plug-and-Play Ethernet

WITH THE GROWING POPULARITY of phone-wire-based networks come more Mac choices: Silver Streak AUI/AAUI Connectors from Tut Systems send and receive 10-Mbps 802.3 Ethernet signals over standard silver-satin telephone wire. As with Farallon Computing's EtherWave 10BaseT product, Silver Streak's use of phone wire simplifies installation. You plug the Silver Streak transceivers into your Ethernet cards and hubs or routers, pull the wire, and terminate the LAN—using tools you can get at a hardware store.

Silver Streak Connectors plug into AUI or AAUI ports; each network segment can be up to 185 meters from the hub or router and can support 30 nodes. The transceivers, which cost \$99 each and were scheduled for release in January 1994, have LED traffic and collision indicators and two RJ-11 jacks. Companion

IN BRIEF

■ **One Line for Voice, Fax, LAN** Looking for a free ride? Sprinter, a network-access device from Micom Communications, lets a company transmit voice and facsimile calls over the same phone lines the company uses to send its LAN traffic. Sprinter compresses speech and fax transmissions to as little as 2 Kbps. It uses a technique called dynamic bandwidth allocation to grab chunks of bandwidth for a voice or fax call as needed, and it automatically reallocates the full bandwidth when the call has been terminated. 805/583-8600.

■ **Crosstalk 2.0 for Mac** Digital Communications Associates (DCA) has released a Mac version of its popular asynchronous communications software, Crosstalk for Macintosh 2.0. It supports Apple's Communications Toolbox and provides compatibility with the Windows version to the extent that a user of Crosstalk for Macintosh can use scripts written for Crosstalk for Windows. It also lets users communicate with multiple systems concurrently. The \$295 program offers many file-transfer protocols, including Xmodem, Ymodem, and Zmodem, and Crosstalk supports more than 20 terminals. Upgrades or competitive trade-ups cost \$49. 404/442-4000.

■ **Opal Emulations Plus** Replacing Via Systems' original Opal Emulation and Opal Developer packages, this \$295 communications software can emulate and connect to PICK, Unix, DEC, ADDS, ANSI, Data General, Wang, and Prime systems. The Report Grabber captures data from host systems and converts it to local Mac formats. TCP/IP Telnet and Apple Communications Toolbox support is built in, as are Apple events and a scripting language. 719/579-6800.

products that were scheduled for release in February 1994 include the Silver Streak 10BaseT Converter (\$199), which connects a Silver Streak Ethernet network to a 10BaseT network; adapter board and transceiver bundles (\$249); and an interface to MH series hubs from Tut Systems (\$99). 510/682-6510.—CAMERON CROTTY

Finding and installing the right server for your network can be an arduous and daunting task. Fortunately, Apple has taken some of the fear out of server-buying by bundling preconfigured hardware and new software that make old Apple servers look like antiques.

The Apple Workgroup Server 60, Apple Workgroup Server 80, and Apple Workgroup Server 95 bundles combine specially tuned versions of AppleShare with the most appropriate Macintosh CPU configurations. The bundles (and the company's recommendations for using them) are a bit limiting at times. But they are well thought out, and good values, particularly for system administrators who insist on the convenience and relative ease of use of AppleShare-based products. And by using machines from across the Quadra product line, Apple has made the Work-

tion-launch tests suggest that the differences in typical file-and-print-service performance between the Apple server bundles are relatively small and a little unpredictable—in some cases the higher-end configurations performed more slowly than less costly configurations. Unpredictable results increase the importance of other critical buying considerations: what you plan primarily to use the server for (communications service, file-and-print service, or database service), how large a network you manage, and how much money you want to spend.

Hardware Options

I evaluated all three Apple Workgroup Servers (AWS):

- The AWS 60, the entry-level server based on a Quadra 610, running AppleShare 4.0 under System 7.1
- The AWS 80, a good com-

Apple combines the right hardware with new software to vastly improve performance

group Server bundles attractive for a wide range of AppleTalk networks.

More important, the two new versions of AppleShare—4.0 and Pro—allow the Apple Workgroup Servers to perform basic server functions in one-fourth to one-third the time required by the same hardware under AppleShare 3.0. File-transfer and applica-

munications and general-purpose file server based on a Quadra 800, running AppleShare 4.0 under System 7.1

- The AWS 95, the high end of the product line; based on a Quadra 950 with a PDS (Processor Direct Slot)-based card providing additional processor caching and SCSI acceleration; running AppleShare Pro under A/UX, Ap-

WORKGROUP SERVER BREAKTHROUGH

ple's implementation of the Unix operating system.

Apple already announced that it will release PowerPC-based versions of its servers during the first half of this year. Initially, PowerPC server applications will probably run emulated 680X0 code, rather than native PowerPC code, however. Consequently,

their initial performance should be close to that of current servers, if not a little slower. Eventually, as applications and operating systems go native, the PowerPC-based servers should operate much faster than 040-based units.

Each of the current server options arrives with system software already installed, on-

board Ethernet, a mouse, and for the AWS 60 and 80, AppleShare 4.0 software (see "Apple Workgroup Server Options"). You'll need to add either an Apple AUI Ethernet transceiver (about \$100) or a LocalTalk connector (about \$25), to link the server to a network; and you must add server software for all but one AWS 95 configuration. Optionally, you can add a keyboard and monitor.

• **Apple Workgroup Server 60** Compared with the other two servers (or with assembling the hardware and software yourself), the AWS 60 (\$2699 with 8MB of RAM, a 230MB hard drive, and AppleShare 4.0) is a bargain. This straightforward server is a smart choice for relatively small workgroups and for administrators who don't want the headaches of complex server management.

The low-profile AWS 60 has the smallest case among the Workgroup Servers, and the only one easily stacked, although that benefits large companies with cramped computer rooms more than the schools and small businesses at which this model is aimed.

Two factors make the AWS 60 a bad candidate for expansion and hardware augmentation: It offers a single PDS, which can be converted to accommodate short Nu-

Bus-2 cards. And the case's low clearance won't accommodate a full-height hard drive. The AWS 60 is meant for—and best used for—simple file-and-print service, and possibly light-duty database applications.

One drawback of the AWS 60's hardware is an antiquated on/off push button, located on the front, which is sometimes mistaken for a disk-eject button. Like the Macintosh Plus and Classic, the AWS 60 must be physically turned off after a shutdown has been issued, which hampers remote management.

• **Apple Workgroup Server 80** The AWS 80 (\$4369 with 8MB of RAM, a 500MB hard drive, and AppleShare 4.0) offers three full-size NuBus expansion slots. Partly for this reason, Apple recommends the AWS 80 for use as a communications server. With NuBus Ethernet or Token Ring adapters and the Apple Internet Router Basic Connectivity Package (\$499), the AWS 80 can route network traffic between Ethernet, Token Ring, LocalTalk, and remote network segments. Add a NuBus serial card and the AppleTalk/X.25 Wide Area Extension (\$799), and the AWS 80 can double as a gateway to X.25 packet-switched networks. With Apple's SNA ps gateway software (\$1219



Apple's Workgroup Servers, from top to bottom: the AWS 60, AWS 80, and AWS 95.

PHOTOGRAPHS BY SEAN SULLIVAN

by **Bill Woodcock**

for ten users), the AWS 80 can serve IBM 3270 terminal sessions from a coax/twinax card, Token Ring, or serial connection.

Alternatively, by using Apple Remote Access (ARA) MultiPort Server software (\$1799 with one serial card), the AWS 80 can support 4 AppleTalk remote network connections through the dial-in software's bundled NuBus serial card. (Two more serial cards each supporting 4 modems can be added for a total of 12 dial-in ports.) Just don't try all of this at once! Not only will you run out of slots, you'll slow your system to a crawl.

The AWS 80 offers a 4mm DAT tape option that includes Dantz Development's Retrospect Remote backup server software, which makes the server an ideal, cost-effective tool for automated network backup.

server restarts when the button is depressed, not when it is released.

• **Apple Workgroup Server 95** With four available NuBus slots, the AWS 95 (\$10,349 with 32MB of RAM, a 1GB hard drive, AppleShare Pro, and a tape-backup unit) might seem the best choice for communications services. But most of the communications and AppleTalk networking software Apple sells for AWS-based communications servers is based on the Mac Operating System, so it can't run under the AWS 95's Unix operating system.

In any case, the SCSI acceleration that distinguishes the AWS 95 would not be put to effective use in something like a router, which depends much more on fast access to memory. (The AWS 80's faster, interleaved memory would make it a better router than the AWS 95.) On the

(By the end of February, Apple should begin shipping one more version of the AWS 95, which will use improved versions of AppleShare Pro and A/UX, and will have space for five internal drive mechanisms.)

The database configuration differs from the file-and-print-service configuration in several ways. It ships with no AppleShare software and comes with two internal hard drives—a 230MB drive for the A/UX system software and database application, and a 1GB data drive. This configuration includes 48MB of RAM (upgradable to 256MB)—enough to comprehensively cache frequently used data.

The AWS 95 PDS Card distinguishes the AWS 95 from a Quadra 950. The card adds two accelerated SCSI buses to the two already provided by the AWS 95 motherboard and comes equipped

between disk, memory, and the network. They provide the greatest benefit when multiple users are simultaneously accessing large files on different parts of the served disk, as in a multiuser database. Although the AWS 95's four SCSI buses can theoretically support up to 20 devices, Apple recommends you use only the AWS 95 PDS Card's two higher-performance buses (which allow a total of 14 devices, 7 devices per SCSI chain). In some cases you may be limited to 7, since not all software distinguishes between devices at the same address but on different buses.

Macintosh Quadra 900 and 950 owners can upgrade to the AWS 95 bundle by buying the AWS 95 PDS Card (\$2219 alone, or \$3909 with 4mm tape backup unit), AppleShare Pro (\$2399), and A/UX system software (\$785) separately. The card installs

Eventually PowerPC-based servers should operate much faster than current 040-based servers

A small but welcome advantage of the AWS 80 hardware is a Mac IIcx/IIci-style locking power button, which automatically restarts a server that's powered down. One caution: Save your configurations before locking down the button because the

bright side, A/UX lets Unix-savvy administrators provide a wide range of TCP/IP networking services.

Apple provides three basic configurations of the AWS 95: two are for file-and-print service, the other one is for database service.

with an expandable processor cache (up to 512K). One of the SCSI buses is for internal devices only, while the other has both internal and external connectors. Both buses offer SCSI DMA and Disconnect/Reconnect, features that transfer data more efficiently

easily enough, but A/UX-based AppleShare print-and-file servers can achieve greater performance gains for the money if you simply add RAM.

The AWS 95's large case offers easy access to the SIMM, PDS, and NuBus

Apple Workgroup Server Options

Server ¹	Product- Information Phone	Apple Price ²	Quadra Model Based On	RAM (Installed/ Maximum)	Internal Hard Drive	Expansion Slots	Bundled System Software
AWS 60 M1780LL/B	800/776-2333	\$2699	610	8MB/68MB	230MB	1 PDS ³	System 7.1
AWS 60 M1781LL/B	800/776-2333	\$3599	610	8MB/68MB	500MB	1 PDS ³	System 7.1
AWS 80 M1784LL/A	800/776-2333	\$4369	800	8MB/136MB	500MB	3 NuBus	System 7.1
AWS 80 M1677LL/A	800/776-2333	\$5979	800	8MB/136MB	500MB	3 NuBus	System 7.1
AWS 80 M1681LL/A	800/776-2333	\$6999	800	16MB/136MB	1GB	3 NuBus	System 7.1
AWS 80 M1685LL/A	800/776-2333	\$7279	800	16MB/136MB	1GB	3 NuBus	System 7.1
AWS 95 M6855	800/776-2333	\$5409	950	16MB/256MB	230MB	4 NuBus	A/UX 3.01 (16-user license)
AWS 95 M6895	800/776-2333	\$10,159	950	48MB/256MB	230MB and 1GB	4 NuBus	A/UX 3.01 (16-user license)
AWS 95 M6875	800/776-2333	\$10,349	950	32MB/256MB	1GB	4 NuBus	A/UX 3.01 (16-user license)

NA = not applicable. ¹ All models include on-board Ethernet, SuperDrive, mouse, and appropriate system software. Keyboard, monitor, and Ethernet transceiver sold separately.

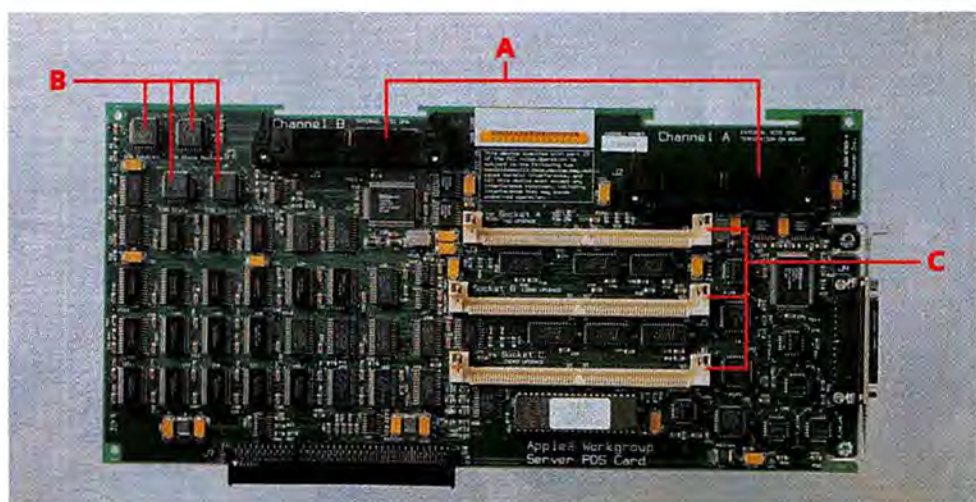
slots, and all the drives conveniently slide out together on a tray at the top of the machine. But the AWS 95 has only two removable-drive bays (occupied by the SuperDrive and tape drive)—the single drawback to the hardware. Since both A/UX and AppleShare Pro software ship exclusively on CD-ROM, that option is conspicuously absent from the high-end server.

New Server Software

The two latest versions of Apple's server software—AppleShare 4.0 and AppleShare Pro—differ in two significant ways: the number of users each can support (150 for 4.0, 200 for Pro, Apple claims) and the operating system each requires (System 7.1 for 4.0 and A/UX 3.01 or higher for Pro).

AppleShare 4.0 AppleShare 4.0 offers base features similar to those of its predecessor, AppleShare 3.0, but raises the limit of users to 150 from 3.0's 120. (Apple estimates the maximum of active users at 30 for version 4.0, up from 15 under version 3.0.) Most important, Apple has limited version 4.0 to 68040-based Macintoshes to achieve dramatic speed increases over version 3.0.

This speed advantage derives, in part, from Apple-



Apple PDS Card Distinguishes AWS 95 The Apple Workgroup Server 95 PDS Card makes the Quadra 950 a better large-group server. The card adds two accelerated SCSI buses (A) for faster data access and greater expandability; Direct Memory Access (DMA) (B), which offloads I/O tasks from the CPU; and an up-to-512K second-level memory cache (C), which stores frequently accessed data and instructions.

Share 4.0's read-ahead caching scheme. Augmenting the 3.0-style caching, which stores repetitively used data in RAM, 4.0's read-ahead cache watches as clients begin to read files from the server's disk; the cache then reads ahead before clients have a chance to request the rest of the file. Once the server reads a large chunk of the file (64K by default) into memory, the server can feed this data out to the client as it's requested, while attending to other clients' disk-reading needs.

In addition, version 4.0's folder and icon caches store

Finder directory information displayed on client machines and augment the performance of folder-opening and navigation for clients browsing server volumes.

AppleShare Pro Unlike AppleShare 4.0, AppleShare Pro requires A/UX. Pro operates under A/UX for performance reasons. Unix handles SCSI operations more effectively than does the Mac Operating System, supports hard disk partitions larger than 2GB, provides sophisticated multitasking, and is much less prone to system crashes and hangs.

Therefore, AppleShare Pro can handle 200 concurrent log-ins and 50 active users. More important, it can manage the 80GB of data that the AWS 95's potential 20 SCSI devices can serve up, and Pro efficiently uses the AWS 95's maximum 256MB of RAM. AppleShare Pro also keeps track of as many as 5000 simultaneously open files for reading or writing.

The Unix multitasking operating system lets AppleShare Pro read and write data to SCSI devices asynchronously—that is, the machine need not wait for a request to be filled before dealing with other tasks. Consequently, it can handle user requests for cached information at literally the same moment that it's

reading other data from disk into caches, or writing users' changes back out to files. While this probably doesn't translate into a great speed improvement for any individual user, it does mean that AppleShare Pro can handle many more users simultaneously without bogging down. Like AppleShare 4.0, Pro allows read-ahead caching, and A/UX performs its own caching as well.

(Network administrators often wonder whether machines running AppleShare should be used for more than one server process simultaneously, particularly with the improved caching schemes in AppleShare's new versions. The answer is no. While it may be tempting to try to handle E-mail and print service on the same machine that does your file service, the reduction in reliability and performance creates more management hassles than most administrators feel are justified by the cost savings.)

Although AppleShare Pro will operate on any machine capable of running A/UX 3.01, Apple only recommends and fully supports AppleShare Pro hosted on the AWS 95 (or an upgraded Quadra 900 or 950). But if Apple's advice doesn't deter you, a system using AppleShare Pro, A/UX 3.01, and one of the lower-

Other Bundled Software	CD-ROM/4mm Tape Drive	Second-Level RAM Cache
AppleShare 4.0	no/no	NA
AppleShare 4.0	yes/no	NA
AppleShare 4.0	no/no	NA
AppleShare 4.0, Retrospect Remote	no/yes	NA
AppleShare 4.0, Retrospect Remote	no/yes	NA
AppleShare 4.0, Retrospect Remote	yes/yes	NA
Retrospect Remote A/UX	no/no	128K
Retrospect Remote A/UX	no/yes	512K
Retrospect Remote A/UX, AppleShare Pro	no/yes	512K

² Apple's estimate of street price. ³ Convertible to 7-inch (short) NuBus-2 slot.

AppleShare Options

Version Requirements	Product-Information Phone	Suggested Retail Price ¹	System Software Required	Maximum Users Per Server	Maximum Active Users	Hardware
AppleShare 3.0.3	800/776-2333	\$1199	System 7.X	120	15	any Mac except PowerBook
AppleShare 4.0	800/776-2333	\$1899	System 7.1	150	30	68040-based Mac
AppleShare Pro	800/776-2333	\$2399	A/UX 3.0.1 or later ²	200	50	wide range ³

¹ As sold separately. For server bundles, see the table "Apple Workgroup Server Options." ² Sold separately for \$785. ³ Most units in the Quadra and Mac II lines, and the SE/30.

priced Quadras with a full 68040 CPU can be pulled together for considerably less than any of the AWS 95 server bundles. Beware, however, that self-styled configurations do not enjoy Apple's special 24-hour technical support for server customers.

ten times, again averaging the elapsed times.

During these tests, five Macintosh IIx computers continuously read 1MB files from the server to provide background load. All of the tests were performed on an isolated Ethernet network

AWS 80 surprised me by slightly bettering the AWS 95 on file transfers (63.6 seconds to 65.1 seconds, respectively). This demonstrates that the most expensive servers aren't necessarily the ones that provide the best performance in routine use.

on file-transfer tests than equally priced AWS 80 machines. (There is a small problem with the AWS 95's basic manual: it purports to target neophyte administrators, yet it documents a server configuration that users of the basic system would never encounter.

Apple Workgroup Servers using AppleShare 4.0 or Pro are a big step forward

Comparing Performance

I tested the performance of several Apple Workgroup Server bundles: the AWS 80 (8MB and 16MB units), which runs AppleShare 4.0, and the AWS 95 (in 128K cache/16MB RAM, 256K/16MB, and 512K/32MB versions), running AppleShare Pro. (The current 25MHz 68040 version of the AWS 60 was unavailable at the time of my testing, but it should perform somewhat below the level of the AWS 80 and AWS 95, which use 33MHz 68040 processors. The AWS 95 PDS Card is incompatible with AppleShare 3.0 and 4.0.)

Additionally I tested several combinations of high-end Macintoshes and AppleShare software, including the Centris 610 (8MB of RAM) running AppleShare 3.0; the Quadra 800 (in units with 8MB and 16MB of RAM) running AppleShare 3.0 and AppleShare Pro; and the Quadra 950 (16MB and 32MB units) running AppleShare 3.0 and 4.0.

I ran two types of tests on each combination of hardware and software. Using the Finder, I transferred a 10MB file from the server to a Quadra 950 client three times, averaging the elapsed times. Next, I launched Adobe Photoshop

segment, and elapsed times were measured at the network level, using a copy of EtherPeek, AG Group's packet-analysis tool.

The tests make clear the huge performance improvements offered by AppleShare 4.0 and AppleShare Pro. All machines running the new software completed the tests in about one-third to one-fourth the time needed by a Quadra 800 running AppleShare 3.0 on file transfers, and in about one-third to about one-sixth the time required by the 3.0-based unit on the application-launches.

For example, the Quadra 800 with 8MB of RAM completed the file-transfer test in 276.1 seconds while running AppleShare 3.0, but took only 57.6 seconds under version 4.0. The same machine took 54.0 seconds to launch Photoshop under 3.0, but only 8.8 seconds under 4.0. This is a stunning improvement, considering that the Workgroup Server bundles make the new versions of AppleShare just as cost-effective as building a comparable system from scratch using AppleShare 3.0.

Although the AWS 95 (with 32MB of RAM) slightly outperformed the AWS 80 (with 16MB of RAM) in the application-launch test, the

Yet, if you really need the capacity to support many users and many simultaneous transactions, nothing beats the AWS 95. While my tests showed that adding more than 8MB of RAM to an AWS 80 does little to increase performance, A/UX allows the AWS 95 to continue to better its performance by using up to its maximum of 256MB of RAM.

The AWS 80 Stands Out

Despite the increased complexity of network administration, the Apple Workgroup Servers using AppleShare 4.0 or Pro are a big step forward. The AWS 60, at the low end of the spectrum, is a superb deal; it should perform basic server functions in one-third the time—or less—than the fastest AppleShare 3.0 servers for far less money than a 3.0 system would cost to build.

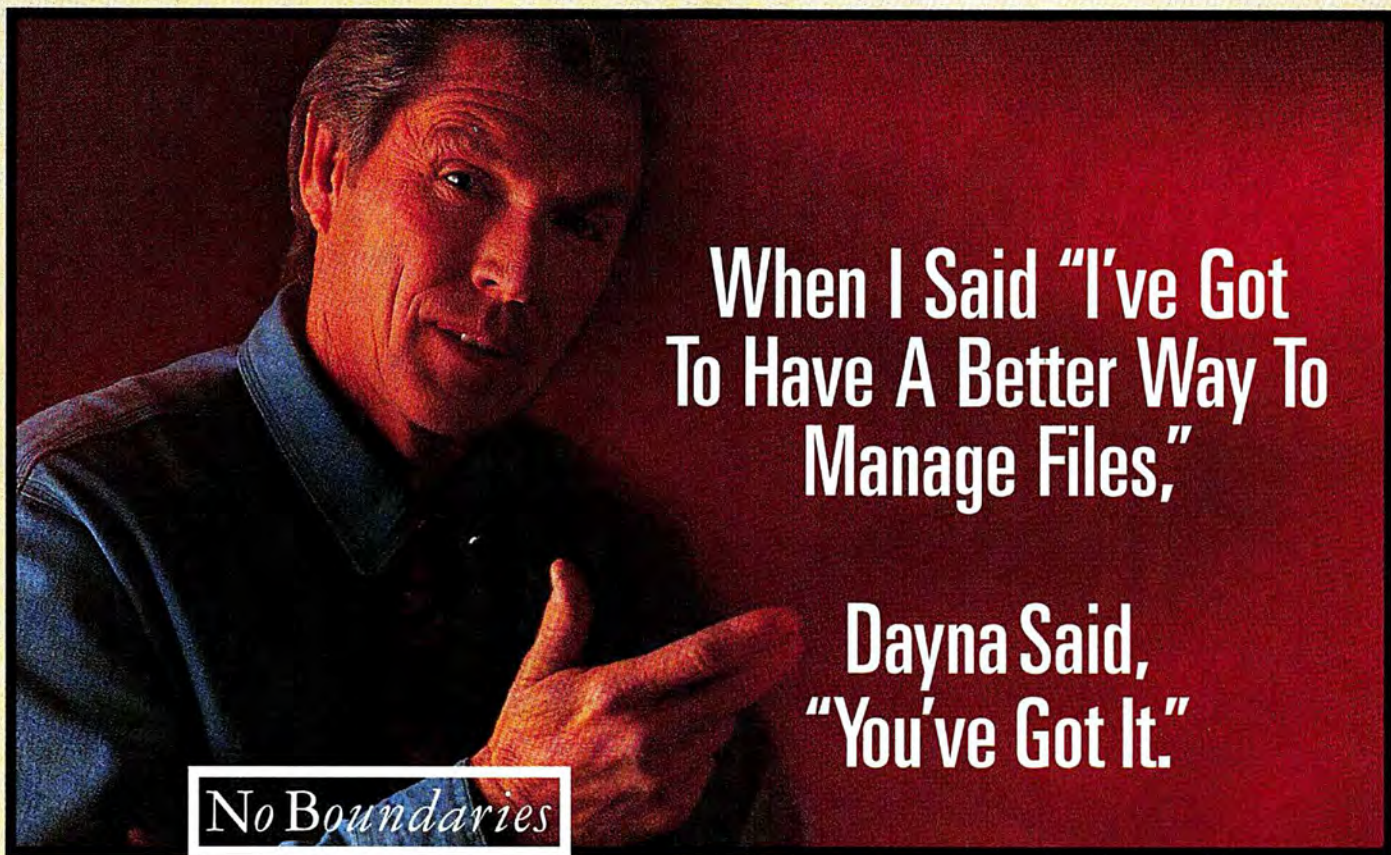
For the most demanding networks, the AWS 95 is an entirely justifiable purchase. It supports far more disk storage and RAM than any other Macintosh-based server and adds caches that speed operations such as multiuser database service. But it appears most sensible to purchase the server in its high-end configuration or not at all, since the low-end and midrange configurations tested slightly slower

The introductory A/UX manual that ships with the AWS 95, however, clearly explains all the major concepts and features of the Unix operating system and gives easy-to-follow directions.)

But the best value in Apple's server line is the Apple Workgroup Server 80, offering speed and versatility as a communications or file-and-print server. For typical server functions, the AWS 80's RAM expandability is adequate for most networks, and its three NuBus slots and System 7-based operation give you the flexibility of using the AWS 80 as a communications server—all for a fair price.

Overall, the Apple Workgroup Server bundles (including the new versions of AppleShare) represent a leap ahead for Macintosh server technology—a leap that PowerPC technology will eventually extend. If you pick carefully, Apple offers excellent servers for most any Apple-Talk network. **m**

BILL WOODCOCK is the principal in Zocalo Engineering, a network consulting firm based in Berkeley, California, and is author of *Networking the Macintosh* (McGraw-Hill, 1993). He is also a member of the board for the Apple Network Manager's Association.



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Dept Ratios	1 Files	Folder	11/16/93 10:37
Focus Groups	4K	Microsoft Word do...	11/09/93 21:45
PowerPC	502K	Persuasion 2.1 do...	05/24/93 09:28
Process presentation	3 Files	Folder	01/13/93 11:09
Research	48K	Microsoft Excel d...	11/02/92 13:59
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PowerBook

Notes

The PowerBook as a Tape Recorder

WHAT ARE THE LEAST-USED FEATURES of the PowerBook? Surely the microphone and the sound-input jack. When was the last time you talked to your PowerBook? I mean talked intelligently; cursing a dying battery doesn't count.

In fact, a PowerBook has quite flexible sound-recording and sound-processing capabilities. A PowerBook can easily replace a tape recorder and a telephone answering machine. Before you dismiss sound recording, remember that everyone can convey ideas much more quickly and naturally by talking than by typing.

Hardware

All PowerBooks except for the 100 have a sound-input jack. The 140, 145, and 170 came with an external microphone; the 145B has no microphone. The 160, 165, and 180 have a built-in microphone near the screen hinge and a sound-input jack; the Duos have a built-in mike but no input jack unless you attach a suitable dock.

The built-in mike doesn't work particularly well for two reasons. First, it is typically too far away, so your recorded voice is a little muffled, and second, the spinning hard drive acts as a built-in noise source. Apple's external mike (about \$19) works much better, but you have to hold it close to your mouth and put up with a dangling cable. The speaker built into all PowerBooks is adequate for listening in quiet rooms, but in noisy environments stereo headphones work better. Small earbud-type headphones for portable stereos, widely sold for about \$10, work fine, aside from possible connector problems (see "Audio Connector Problems").

The Ear Phone Streamline, \$99 from Jabra Corporation (619/622-0764), conveniently combines microphone and earphone in one small device that fits in your ear; it comes with two connectors for



audio in and out. The Ear Phone has PowerBook-compatible connectors, but the microphone is too far from your mouth to work very well. A separate microphone and stereo headphones are preferable, especially in noisy environments.

Recording Software

You can record ten seconds with System 7's Sound control panel. But anything more requires a sound-recording package.

Sound software for the PowerBook falls into several categories: dictation, network, annotation, editing, and music. Each group has its own pros and cons. Dictation products record to the hard disk but do not allow cutting and pasting because of the difficulty of moving multi-megabyte sequences of sound. Sound-editing products can work on disk-based sound, but very slowly. RAM-based editors cut and paste much faster but are limited to a few minutes of sound at most.

Most of the software described here can record with a choice of sampling rates and compression ratios defined by Apple's

Sound Manager. A minute of high-quality sound takes up about 1.2MB; highly compressed, low-quality sound uses only 200K. Don't toss your portable stereos; for music listening, "high-quality" sound on a PowerBook doesn't come close.

Dictation Software

Dictation requires software with two essential features—long recording times and the ability to take notes or transcribe during recording and playback.

Three products do dictation recording. MicMan 1.1 from Nirvana Research (408/459-9663), Memorizer 2.0.1 from Brains Software Engineering (in Austria, 43 2231 28973; U.S. representative at 910/722-5999), and Useful Voice Processor 1.1 from Useful Software Corporation (508/774-8233, 800/666-9828). MicMan and Memorizer (each \$99) can record and play back in the background. During playback you can switch to any word processor while the playback continues uninterrupted. At any point you can stop or "rewind" the recording with keyboard commands. Of the two, MicMan is more robust. The prerelease version I tested was able to record and play back smoothly during almost any normal disk activity, even while launching programs and saving files. If you type during recording, don't use the built-in microphone with these programs; it will pick up the typing, producing loud clacks in the recording.

Memorizer 2.0.1 pauses when you open large files and has trouble recording with the built-in microphone under battery power. That's because Apple sets the hard drive to shut down whenever you use battery power to record with the built-in mike. Every time Memorizer saves some sound, it turns the drive back on; as a result, the drive cycles on and off every two

continues



Four Different Faces Interfaces vary wildly among sound programs. Useful Voice Processor looks like a tape recorder, while Audioshop resembles gaudy hi-fi equipment. SoundEdit Pro has a functional interface for editing; MicMan shows just the essentials.

seconds. MicMan overrides Apple's setting and simply keeps the drive spinning.

The \$179.95 Useful Voice Processor runs only in the foreground. You can use its simple built-in text editor during recording and playback; both stop if you switch to another program. When you begin recording, Useful sets aside a user-specified block of the hard disk (up to the capacity of the disk) rather than allocating space dynamically like MicMan and Memorizer. You can be certain that you have sufficient disk space for a recording, but the process is less convenient. Like MicMan, Useful keeps the drive spinning when recording under battery power.

None of the dictation products permit marking a spot in a recording; you have to note the time and go back to it manually. With MicMan and Memorizer you can get to a specific time easily by dragging a pointer; with Useful you have to select Fast Forward or Rewind, watch the time indicator, and try to click on the stop button at the correct time. Useful is the only one that suppresses recording during silence so it can save disk space; consequently, its sound processing tends to degrade the recording quality, particularly at high compression settings. Furthermore, since Useful needs to allocate disk space before recording, you always allocate more space than you actually use.

Network Software

On The Air from Digital Eclipse Software (510/547-6101, 800/289-3374) essentially turns a Mac network into an intercom system. On the network, you select a com-

puter you want to talk through and begin talking. After a few seconds' delay, On The Air sends the recording to the receiving Mac for playback. Stilted conversations are possible but hardly worthwhile, since a telephone probably sits next to each computer. The process can work by modem via Apple Remote Access, but the digitized sounds take a long time to transmit. On The Air makes the most sense in an office setting, where a receptionist can use it to announce calls or visitors. Prices start at \$79.99 for two users.

Annotation Software

Read My Lips version 3.0, \$75 from Praxitel (510/846-9380), lets you attach a sound recording to a document created in any of 16 major application programs (Microsoft Word, FileMaker Pro, Page-

Maker, and so on). A small icon marks the attachment. In a budget analysis, for example, you can simply talk about an entry instead of typing out a memo. A Read My Lips player, supplied with the program, can be distributed without charge, so anyone can hear the voice annotations.

Voice Record 2.0, \$69 from Articulate Systems (617/935-5656, 800/443-7077), can also do annotations, but it isn't compatible with Apple's current Sound Manager, version 3.0.

Sound-Editing Software

SoundEdit Pro 1.0.5, \$295 from Macromedia (415/252-2000, 800/945-4061), offers many features of a semiprofessional sound-editing system; it can assemble multiple tracks and mix them into a new *continues*

AUDIO CONNECTOR PROBLEMS

The sound-input and -output jacks on a PowerBook look as though they should work with standard audio equipment using 3.5mm (.125-inch) stereo plugs, but the jacks aren't really standard. They differ from common jacks in both wiring and mechanical design. The input jack is for low-level microphone signals. Most dynamic and electret condenser microphones will work, provided you can find suitable cabling. The input jack looks like a stereo plug, but it's actually wired for monaural sound, with the signal at the tip (left channel in stereo wiring), 8 volts for the mike at the ring (right channel in stereo wiring), and ground at the sleeve. Most mono microphones will simply short the 8V supply to ground. This is a little inelegant but won't damage the PowerBook, since the current drain is limited to a milliamp. There is also a mechanical problem. On most PowerBooks and the Duo MiniDock, the sound-input and -output jacks are recessed, so many plugs won't seat properly. One workaround is a Radio Shack plug adapter (catalog number 274-375, \$3.99), which adapts two mono 3.5mm plugs to a stereo plug; shave off the plug's shoulder with a knife for a better fit. Connect your microphone to the left channel (the silver jack) and leave the right channel (the black jack) empty; this method neatly avoids shorting the 8V supply as well.

If you need to record a line-level signal from a stereo system, you'll need to attenuate the signal to microphone levels. Apple no longer supplies an attenuator with its microphone. You can look for the Apple attenuator (part number 590-0618-A, no longer available) or use Radio Shack #274-300 (\$2.99). The Apple attenuator mixes stereo signals to mono; to mix stereo to mono for the Radio Shack attenuator, add #274-303 (\$1.99) for phono plugs or #274-287 (\$2.49) for 3.5mm stereo plug input. The Radio Shack attenuator cuts the sound by 40 decibels rather than Apple's 54 dB, but it works satisfactorily. You should try to use a variable signal source, since PowerBooks do not offer any way to control the input level. Software that seems to offer an input-level control actually constricts the dynamic range. The PowerBook does have a signal limiter to guard against overload; the limiter can be switched on or off by software.

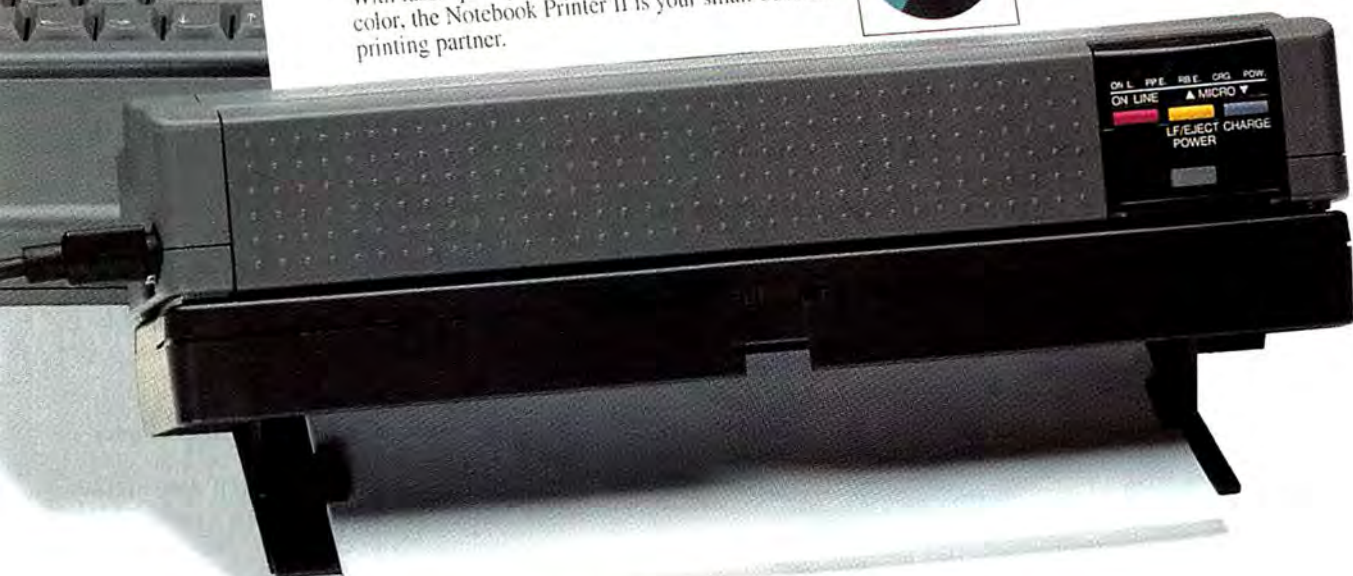
The sound-output jack doesn't have as many quirks; it uses a stereo connector, but both left and right channels carry the same monaural sound. Apple's audio jacks, especially in the PowerBook 160, 165, and 180, are trouble prone. The barrels of many common plugs are too wide to mate well. I haven't found a source for plugs that work as well as the ones that come with the Apple and Jabra microphones. Take care; if you damage a jack, you will have to replace the motherboard.

One final note about plugs: the Duos' AC power adapter uses a connector that resembles a phono plug common to stereo equipment. Make sure you don't confuse the two; connecting 24V DC from the power adapter to an audio jack will damage many kinds of equipment, including the audio connectors of the E-Machines Presenter dock.



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track. It's the only editing program that can work with disk-based files, but as a result operations are often very slow. The much less expensive Audioshop 1.05 (\$89.95) from Opcode Systems (415/856-3333) works far more quickly but only on sound it can load completely into RAM; give it lots of memory. Audioshop's cluttered user interface resembles a hi-fi store, complete with spurious "compact disc" labels; none of these products come anywhere near CD-quality sound. The Mac's 8-bit sound has at best a 48-decibel signal-to-noise ratio; CDs have a 96 dB ratio.

For true CD-quality editing, you need something like the external SoftSplice audio-storage system from Digital Expressions (206/389-9895, 800/868-3434). It connects to a PowerBook via a SCSI cable and takes its input from a DAT audio recorder. The SoftSplice stores sound on its own internal hard drive; a 240MB drive holds half an hour of stereo. At about \$3000, SoftSplice is geared toward recording professionals.

Music Software

MIDI (Musical Instrument Digital Interface) is the standard protocol for electronic instruments. A MIDI data stream codes for notes and timing rather than sound; it's an electronic version of sheet music. A full discussion of MIDI is out of place here; for more information, see *The Incredible Sound Machine*, by Mark Andrews (Addison-Wesley, 1993).

PowerBooks can manage MIDI instruments, run MIDI software, and send/receive MIDI files—with one significant limitation. When receiving long MIDI files, a 100-series PowerBook may drop information because of serial-port limitations imposed by the power manager. According to Apple, this problem was fixed in the Duos.

Opcode Systems (415/856-3333) has developed OMS (Open Music System; originally Opcode MIDI System), a software fix for the PowerBooks' MIDI problem, which works for all models except the 100. OMS is licensed without charge to music software developers. Make sure the MIDI software you buy includes OMS; not all MIDI programs do.

Finally, Andromeda Computer Systems (403/949-2030) has a nifty product called Master Tuner (\$69.95). It turns a PowerBook into a tuning device; play a note and the program graphs the pitch over time. Master Tuner supports 14 temperaments and plays reference tones. **m**

CARY LU is a *Macworld* contributing editor who covers mobile- and remote-computing issues in this monthly column. His books include *The Apple Macintosh Book* (Microsoft Press, 1992).

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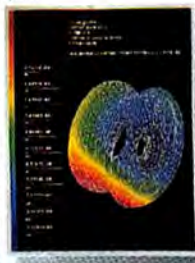
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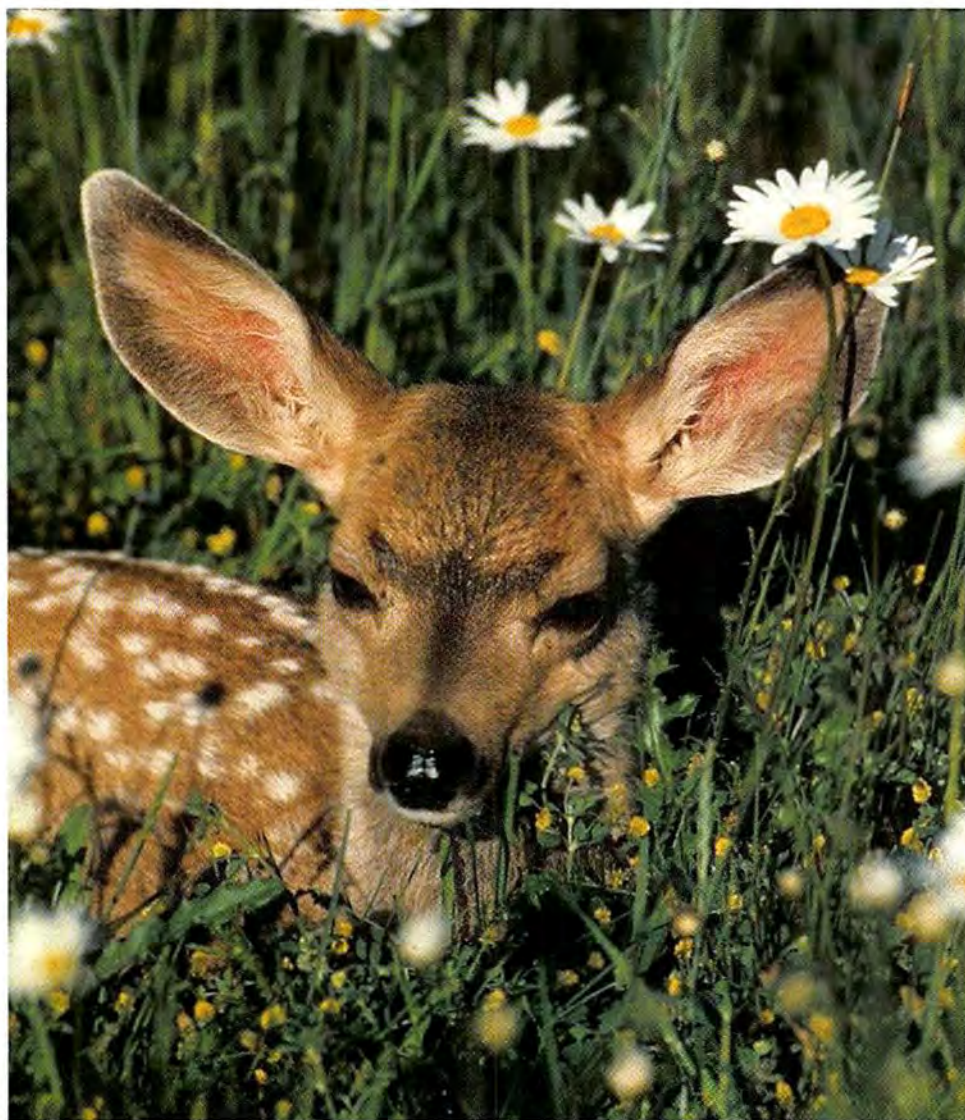
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INIT Picking

Selecting an extension-selecting extension

THE NIGHTMARE BEGAN INNOCENTLY enough. It was 1985. I put a screen saver into my Mac. It automatically blacked out the screen after a few minutes of inactivity.

But the screen saver did something else, too: it violated the virgin gray of the "Welcome to Macintosh" screen with its own icon. I loved it.

A year later, I had four or five icons filing across the start-up screen. My friends gave me funny looks. They said I was heading for disaster. But I laughed. I informed them that I could quit anytime I wanted.

Today, I've got 193 of these extensions and control panels. (About half of them came with the Mac.) For example, WackyLights blinks the little lights on my keyboard in patterns. MoonIt displays the current phase of the moon. And I think Belch probably best goes undescribed.

Now, with so many extensions coating the arteries of my Mac, you probably suspect that I spend my life enduring system crashes caused by conflicts among them. But incredibly, even with 193 extensions, I have absolutely no problems.

Until I turn on the Mac.

What I need, obviously, is an *extension manager*. Such a program lets me choose which of my 193 extensions (INITs) I'd like to load each morning. An extension manager also makes troubleshooting infinitely easier, eliminating the tedious business of dragging extension icons out of my System Folder and restarting.

I know that extension management doesn't make as thrilling a column as, say, hang-gliding simulators or thought-recognition software. But anyone with more than a row of start-up icons will need one of these things sooner or later.

INITPicker 3.02

This control panel has the cleverest name by far (Inline Software, \$79.95, 203/435-4995). As the first commercial INIT manager, its design became the model for all that followed (see "Your Order, Please").

INITPicker also pioneered the use of *sets*. If the mood strikes you, you can cre-

ate different ready-made groups of selected extensions (such as Bare Minimum or The Whole Enchilada). And INITPicker, like most programs of its type, does something helpful if the Mac crashes while starting up. It automatically identifies (and disables) the extension that was loading at the time, on the assumption that that extension was probably responsible.

I have only three nits to pick with INITPicker. First, the price is steep for such a one-trick pony. Second, INITPicker, in its sweet simplicity, lacks some of the features that are standard in its rivals. A few of those options, such as letting you create *links* (I'll explain later), are

you couldn't change them back to their original identities!

Most modern INIT managers turn off extensions by moving them, usually into a folder called Extensions (Disabled), Control Panels (Disabled), and so on. This way, even without the INIT manager, you can restore an extension simply by dragging it back to its regular folder.

INITPicker uses neither method. Instead, it simply denies certain files permission to load. Neat freaks, who'd rather not live with those extra "(Disabled)" folders, probably dig it. Ultimately, though, this system is confusing. If you open your Control Panels folder, you see all your icons in their usual places, smiling innocently. But if you try to open one that INITPicker prevented from loading, you get a nasty error message, and you may not even know why.

Startup Manager

This potent piece of powerware is part of Now Utilities 4.0.1 (Now Software, 503/274-2800, \$129). It's not as pretty as INITPicker, but it uses the easier-to-understand "(Disabled)"-folder scheme and is rich with additional features.

The most important of these is *links*, which saves you effort in switching myriad related extensions on and off individually—for example, the software suite you need for Apple CD-ROM players (ISO 9660, High Sierra, and other obtusely named doodads). With all 6485 of these CD-ROM extensions tied together into a link, you switch them all on or off with one fell click.

Startup Manager is terrific, but you won't think you've gone to heaven quite yet. It would be nice if, in viewing the list of start-up items, you could tell at a glance which are extensions and which are control panels. It would be nice if, when you move a control panel manually to the Control Panels (Disabled) folder, Startup Manager wouldn't stubbornly put it right back next time you start up. And it would also be nice if Startup Manager weren't the slowest extension manager available, adding a full ten seconds to the loading time of your Mac (well, mine, anyway).

continues



absolutely vital in today's madcap, extension-crazed world.

One more wordy-but-interesting point. Early INIT managers worked like this: if you turned an extension off, the INIT manager changed its secret, invisible Type code from *init* to *xnit* (or from *cdev* to *xdev* for control panels). Naturally, the Mac then refused to load these files at start-up—it didn't recognize them. But woe betide you if you were ever caught without your INIT manager. All your *xnits* and *xdevs* were worthless, because

On Startup

See above. What I mean is, On Startup is almost exactly like Startup Manager. Same fundamental features (sans links, however). Same minor problems (won't let you move files around manually, doesn't identify control panels versus extensions). Same kind of package deal (it's one among a set of utilities—in this case, On Cue II 2.0.1, from Viacom New Media, 708/520-4440, \$99.95). On Cue II, the package, has its charms. But in today's INIT manager—eat—INIT manager world, On Startup brings up the rear.

Extension Kit 1.1

Extension Kit (Richard Harvey; "what-it's-worth-ware") takes the concept of sets and blows it either into proportion or out of it, depending on how much you like the concept. Using a stand-alone program, you construct up to ten different sets of INITs. Then, as the Mac starts up, you press a number key to load the corresponding set. (You can also press the spacebar for a free choice, as in the other programs.) You can't assign a nice mnemonic letter key to a set (*M* for *Minimal*, *C* for *CD-ROM*) as you can in the other programs—but at least you can print your sets' list of ingredients for reference.

Alas, this program's antifaturitis bent bends a tad too far; Extension Kit doesn't even let you change your loading order, let alone create links or identify unruly start-up crashers. Still, EK's attractive design fairly sparkles. And it gets credit for daring to differ, interfacially speaking. (It's on America Online, or send a disk and prepaid mailer to P.O. Box 118332, Carrollton, TX 75011.)

Extensions Manager 2.01

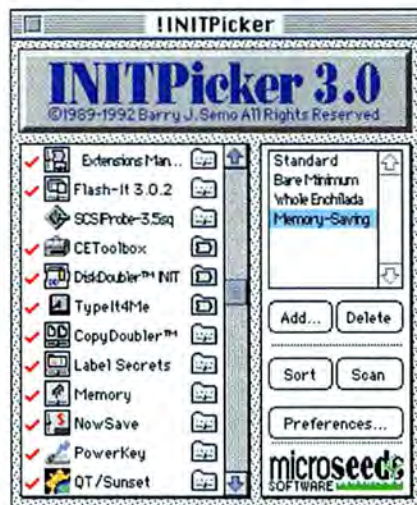
Ricardo Batista doesn't want *anything* for his sophisticated yet bare-bones program: no \$10, no postcard, nada. Bare-bones, because there's almost nothing to it: a plain, small, unresizable white window, and a boring list. You can create sets but not links. No reordering. No crash-hunting. Very little glitz. (You get it from America Online or a user group.)

Yet where the other programs give you control over only bona fide, red-blooded, card-carrying INITs, EM acknowledges the ever-increasing ranks of pseudo-INITs, like Hardware System Update, Network, or EtherTalk. It spots them all, along with practically everything else: printer drivers; start-up items; Apple Modem Tool modules; debuggers; aliases; desk accessories; even fonts, for heaven's sakes. Yes, you can actually switch individual typefaces on or off each morning.

EM also does something considerate for PowerBook users: it figures out when you're connected to a network. (Even I don't always know that.) If you're not, EM starts up the PowerBook without Apple's several dozen network extensions, saving you time, battery power, and memory.

Conflict Catcher II 2.0.1

I think it's safe—very safe—to say that Conflict Catcher II has every feature that's ever been found in an INIT manager (Casady & Greene, \$79.95, 408/484-9228). It recognizes pseudo-INITs, start-up items, fonts, and aliases thereof. It tells you each file's category (control panel or INIT). It calculates how much the national debt increased while your Mac started up (for real). It turns old xnits and



Your Order, Please Rearrange the order your extensions load in by dragging their names up or down in INITPicker's window. Prevent one from loading at all by clicking so the check mark disappears.

xdevs back into functioning members of society. It does links. It does sets. I'm pretty sure it books plane reservations and makes pasta.

Of course, CC's standout feature is its conflict catching. Normally, figuring out which extensions are causing your Mac's inexplicable crashes is some tedious mathematical process. You turn off half your extensions, restart, restore half the remaining half, or something.

Conflict Catcher does the figuring out for you. All you have to do is restart the Mac repeatedly until, triumphantly, CC emblazons the name of the nasty little culprit on your screen. It's a remarkable feat.

CC's interface is more complicated than, say, INITPicker's. This—and, of course, the price—is the price you pay for all them smarts. But if there's even one tiny recessive power-user gene in your body, Conflict Catcher is the extension manager of your dreams.

The Upshot

I'm big on Extensions Manager. Hey, you know my motto: if it's free, it's worth every penny.

Then again, Conflict Catcher, unquestionably the prime minister of start-up managers, can be a godsend. I had the darnedest problem with this one keyboard shortcut in Microsoft Word. With CC on the job, inside of ten minutes I figured out which extension was giving me trouble.

Next week I'll let it loose on the 192 left in my System Folder. **m**

DAVID POGUE, contributing editor and author of the number one Macintosh bestseller *Macs for Dummies*, lives in New York City, where freezes, crashes, and conflicts are a way of life.

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1. Crazy as it sounds, put the System file inside some other folder, like Preferences.

2. Rename your System Folder.

3. Then use your white system disks to reinstall the system.

When it's over, I say: Throw away the old System Folder. That's right—don't blithely copy your fonts and extensions from it into your new one. If something was corrupted, you'll simply be reinstating your problem. Instead, reinstall them from their original floppies. Update your copies of ATM, After Dark, and Suitcase, of which only the latest versions run with the latest Macs.

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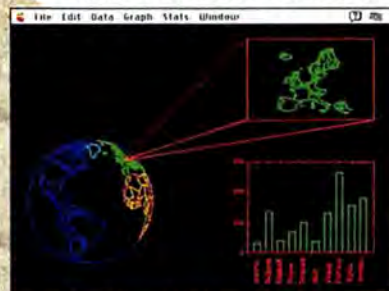
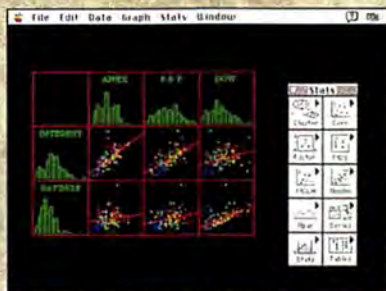
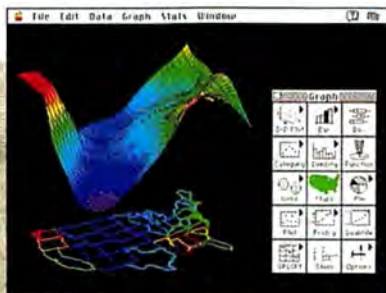
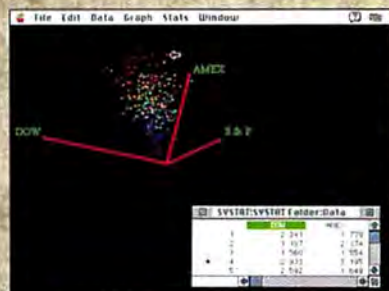
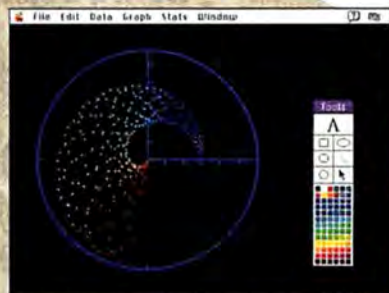
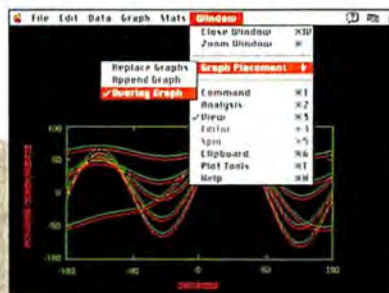
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07. ☐ Corporate/General Management
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SIZE OF YOUR ORGANIZATION

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36. ☐ 500-999
37. ☐ 1,000 & over

WHICH PERSONAL COMPUTER(S) DO YOU OWN/USE?

Choose all appropriate

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40. ☐ Mac LC Series
41. ☐ Mac PowerBook Series, Duo-Series
42. ☐ IBM PC (or compatible)
43. ☐ None
44. ☐ Other _____

AT WHICH HOTEL ARE YOU STAYING?

45. ☐ _____

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May 10-12, 1994, Washington, DC

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- 2**
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- 3**
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- 4**
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- 5**
T R A C K H
THE POWERPC. Leading experts will discuss what new things you'll be able to accomplish with the dramatic performance boost available with the first RISC-based Macintoshes. • What PowerPC Delivers • PowerPC Performance Issues • How Competitive is PowerPC? • PowerPC as the Ultimate Computer Platform
- 6**
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- 7**
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- 8**
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- 9**
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- 10**
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- 11**
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HOTEL ACCOMMODATIONS

Special hotel rates have been negotiated for MACWORLD Expo Summit participants at select Washington, D.C. hotels. Call your choice of hotel directly by April 8th to make reservations and for the best selection. A limited number of rooms have been reserved at preferred rates. Be sure to mention MACWORLD Expo Summit to qualify for these rates.

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InfoFAX

Please see page 189 for instructions.





Net Gains

Apple can ride the data highway to heaven

DEAR MICHAEL SPINDLER: Lately it has come to my attention that you wield some measure of influence at Apple Computer. As you know, there has been some criticism of Apple's strategies of late. Whereas Apple once was perceived as demonstrably superior not only in verve but also in the quality of its technology, that perception is now clouded by recent advances on the part of your competition.

As Apple's chairman and CEO, it is up to you to restore the company to its past glory. No offense intended, but while those following your career have cited your ability to organize, focus, and implement, they cite a shortfall in the vision department. I have no idea whether this is so, but if even you are temporarily in need of a visionary concept, look no farther. I have seen the future—maybe even Apple's future—and its name is Internet.

Certainly the term is familiar to you. You'd have to be a Martian, a particularly dull one, not to have been affected by the sudden media blitz that has celebrated the transformation of a once relatively obscure government packet-switching network to Ground Zero of the digital explosion, the highway to information heaven. As a result, everybody who is anybody—Bill Clinton to Billy Idol—has an Internet address. But while everybody wants to get Internet, only a devoted subset of 10 million or so have actually taken the plunge. Of these, an even smaller portion have figured out how to get to the good stuff. Meanwhile, millions of Internet wannabes are frozen out of the action.

Internet is just too damn hard to use.

Getting Wired

I came to this realization recently, after deciding to become a fully wired Internetter. I had been gradually immersing myself in the Net for a couple of years, first by using a gateway to send mail from various services—The WELL, CompuServe, Echo—into the data cloud of the thousands of computers hooked to the Net. Then, as some of the services I sub-

scribed to got what was called “full Internet” (this is like full-contact karate), I began to experiment with a few features of the Net, like Telnet, Usenet groups, mailing lists, and FTP.

I found the Net to be an eye-popping adventure, full of bizarre diversions, occasionally useful factoids, and more than a few bad jokes. Its most memorable characteristic is its population: a huge, gregarious, and welcoming community with a distinct and charming culture. Yet the culture has its dark side: an exclusivity that limits the Internet to those who can vault its arcane and ultimately idiotic electronic hurdles. All of these obstacles, I'm sure, exist for some technical reason or other. But collectively, they amount to a cruel and unreasonable system.

Spoiled by the relatively heavenly

(which is, as are many Internet tools, widely distributed in the public domain) and double-clicking. No. As if I were the unwilling participant in a high-tech scavenger hunt, I first had to locate and install certain enabling devices and utilities. And then I had to begin a grueling dialogue with my Internet provider to make sure that everything was hooked properly.

I won't bother you with the gory details. But one day, when you are looking over your Cupertino domain and have a spare few hours to talk techie, call in one of your resident wireheads and ask him or her the meaning of some of these terms: TCP. SLIP connection. UUCP. Macintosh Communications Toolbox. PPP. All of these somehow became involved in my quest to run Eudora. Finally I hooked up with a master hacker. Despite ten hours of

work over two sessions, he was unable to get my SLIP connection, my provider, and my software all running smoothly. This should be a routine task, not a Holy Grail. But this is the Internet today.

I Can See Clearly Now

Why am I telling you this? Because I think relief is in sight for this pounding headache. And it could be Apple that provides the analgesic. Ten years ago personal computer users labored under the yoke of the command-line interface, and Macintosh not only liberated us but threw open

the gates for millions of new users. Today the Net provides the same opportunity.

My suggestion is simple: use the talents at Apple—still formidable even after all those pink slips you distributed last year—to make Internet as easy to use as a standard Mac program. Your people should immediately create the ultimate Internet software. Then do two things. First, get it to everyone who has a Mac (bundle it in new units, distribute it through user groups, and sell it at cost to

continues



Mac interface, I found using the Net to be a bittersweet experience. The more I got into things, the richer I found the treasures to be. Yet I found myself sinking into a sea of acronyms, abbreviations, protocols, and abominable artifacts from the sick minds of Unix programmers. The prime example was a result of my determination to use a Macintosh-friendly program called Eudora to sort out my Internet mail, which had come to average around 100 items a day. It was not a matter of simply procuring the program

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all existing users). Then, in every major city, set up Internet portals that match the protocols of your new front end, and allow people to connect to the portals for no more money than it cost Apple for the phone and gateway charges.

Can it be done? Why not? Surely Apple can figure out how to devise the whizziest possible software, an Internet surfboard that not only matches commercial terminal software in features but also allows use of Internet goodies like anonymous FTP, Archie, and Gopher. The software should also allow for quick and easy navigation of Usenet groups. It's kind of obvious what the software *should* do—all that's really required is the willingness to tackle the task. And if the designers apply that good old Apple inventiveness, the program will do the job with panache. For the first time, the *mechanics* of using the Internet will be as much fun as the Internet itself.

What's more, by giving away the software to millions of people, Apple will automatically set into place a series of standard protocols that will transform the Internet itself. Providers of Internet services like knowbots, real-time radio and video, and MUDs (the incredibly popular games known as Multi User Dungeons) will be able to write graphics and sound routines into their products with confidence, knowing that a large number of users can utilize these new features.

At first, of course, only Macintosh users will be able to take advantage of this. (And won't *that* be a shame, Mr. Spindler?) The word will filter down that if you want to really use the Internet, you should buy a Mac. Later, other systems will adapt the Apple protocols (which should be openly published). But by then the words *Macintosh* and *Internet* will be linked forever. And you will sell millions of computers for this very reason.

Inside Stuff

When I first thought of this idea I was so excited that I decided to run it by a couple of your employees. Not surprisingly, I discovered that Internet is a very hot topic at Apple. Intriguingly, while there is general agreement that the Internet revolution could be very significant for the company, and various projects are under way to exploit it, Apple's ultimate response seems undecided.

"Apple is very enthusiastic about the Internet and the value we can bring to it," says Peter Friedman, Apple's director of online services. Friedman's real energies, however, are consumed with eWorld, the ambitious new service Apple is about to roll out, an online network designed to obliterate the likes of CompuServe and

Prodigy. Friedman says that there will be Internet gateways on eWorld, as well as on NewtonMail, and that there are plans for deeper Internet links. This is good news, since eWorld's software looks like an advance in telecommunications. I wouldn't be surprised to see menu commands for things like FTP or newsgroups. But Friedman took pains to explain that the impetus to give away an Internet front end would not come from his division. Perhaps understandably, he's more interested in promoting eWorld than in simplifying the Internet. "Our business unit is a commercial software unit—we're seeking commercial opportunities."

On the other hand, Rick LeFaivre, one of your vice presidents at Apple, not only brightened as I explained my idea, but told me that there were people at Apple who were advocating that very solution! "My feeling, as someone who's used [the Net] for over 20 years, is that there's a fundamental change happening with the Internet taking off," he says. "We're seeing kids and grandmothers getting on. The usual perception is that the Net is all Unix machines, but there are millions of Macintoshes on the Internet as clients. Can we do [for Internet novices] what the original Mac did for the poor schmuck PC users?" I believe the answer is yes, but the key lies not in selling a separate solution but in making it part of every Macintosh. "There are people in the company taking that position," LeFaivre says. "Other people are looking at it in different ways: is there money to be made? Peter wants to make money in providing online services. You could imagine the kinds of discussions."

I suspect the ultimate decision, Mr. Spindler, will rest with you. The question is not whether money will be made: no matter which course is taken, the Internet explosion will benefit Apple. A relatively timid approach to the Internet—integrating it into your online services and developing Internet-related software, sold separately for profit—won't lose money. But it will be a wasted opportunity compared with the bold step of devising the ultimate Internet navigator and getting it into the hands of every Macintosh user. You have it in your power to widen the access roads to the information highway—and spiritually annex the road as part of the revolution in which your company has been such a key factor. The time is right, Mr. Spindler, for you to proclaim, "My way is the highway!"

And I will gladly beta-test. **m**

STEVEN LEVY's latest book, *Insanely Great: The Life and Times of Macintosh, the Computer That Changed Everything*, will be published by Viking in January.

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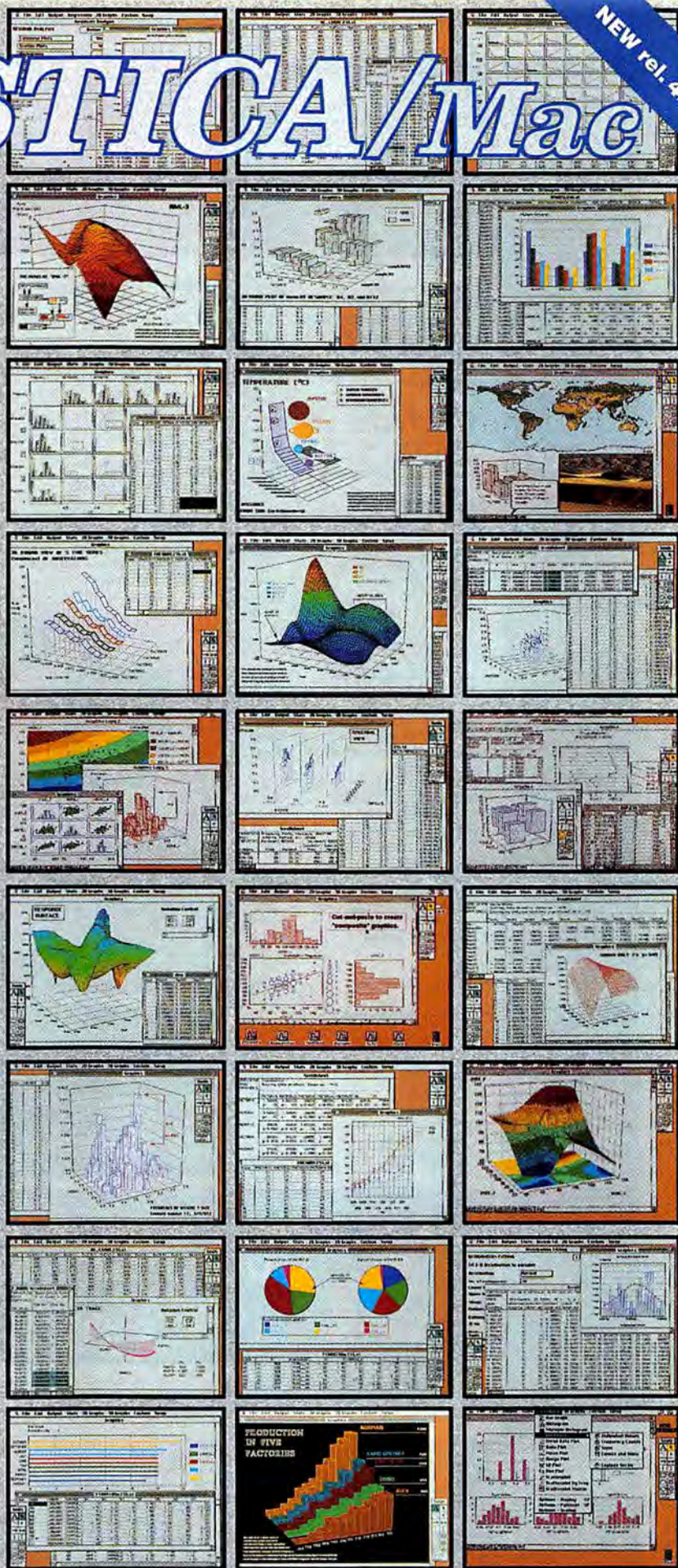
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Technical-Support Trends

Companies limit free support but offer more options overall

EVENTUALLY, UNLIMITED FREE technical support will go the way of the dinosaur, but for years to come users will continue to have access to some type of free support, software company officials and industry analysts say.

"[The] big shift to paid support is probably more of a myth than a reality [for] the average user," says Jeffrey Tarter, editor and publisher of the industry newsletter *Softletter*. "For most products, most of the calls come in during the warranty period [of 90 days]. No vendor can really afford to eliminate that kind of call because users will simply send the product back."

Still, there is a shift away from costly toll-free phone lines staffed by technicians and toward low-cost, high-volume support vehicles such as online services and so-called fax-back systems.

The latest example is Adobe Systems, which is replacing unlimited support for its graphics applications with a program of Adobe Support Credits, or ASCs. Beginning in February, Adobe will issue each purchaser of an Adobe program one ASC, good for one request for technical support—up to 15 minutes of telephone help. (Users will not be charged the credit if the problem is related to a program bug.) Credits are good for three years and are also offered with upgrades.

Adobe isn't abandoning free support. In addition to ASCs, the company has an automated voice-response system, a fax-request line, and a BBS. But credits are a substantial switch from Adobe's earlier program. Why the move? According to Adobe officials, customers simply aren't satisfied with the company's responsiveness. This change, they say, will give users who need direct telephone help faster access to technicians.

John Kunze, Adobe's director of product marketing, says this is an industry trend. "It's very difficult for the software community to face the future, with all of the prices dropping and margins dropping, and maintain our infrastructure. We think this is actually a positive move for the installed base. If customers can get

through to us a lot sooner to get their answer, they will be a lot happier."

At press time, the details were not final, but existing Adobe users were expected to receive one support credit per registered product, up to a total of three credits per user, with no limit on credits for future purchases and upgrades (call 800/872-3623 for details). Adobe also expects to sell ASCs (one for \$25, five for \$100, or ten for \$175) and also offer support via a 900 number at a cost of \$2 per minute.

The Costs of Technical Support

A \$2-per-minute charge may sound expensive, but it doesn't necessarily even pay for the costs of the call, which, according to *Softletter*, average about \$3 per minute (including administrative overhead). These costs lead software compa-

kind of system Archdeacon wants to see—one electronic entry place that will meet many customers' needs but can refer them to a technician if need be.

Support Four Ways

Major software companies generally offer four basic types of technical support.

- Telephone support provided by technicians. Examples include Adobe's one call; Quark's unlimited calls within 90 days of purchase; Claris's unlimited calls within 90 days of the first call; Microsoft's unlimited toll calls for Office, Word, and Excel; and WordPerfect's unlimited toll-free calls.

- Unlimited access to toll-free automated voice-response systems and fax-back systems designed to answer common questions.

- Unlimited access to company BBSs available via a toll call and/or commercial online services such as CompuServe and America Online that require membership fees.

- Paid support plans commonly range from 900 numbers costing \$2 per minute (or a \$25 flat fee) up to corporate support programs costing as much as \$20,000 annually.

Paid support plans are mainly for "intensive support users who don't want to sit on a phone line for 20 minutes and get a junior technician," says *Softletter*'s Tarter. Most plans offer a

package, typically for about \$130 a year, for one user making relatively few calls. Smaller corporate plans run about \$1000. Finally, says Tarter, "there's a full-fledged corporate plan that covers the entire corporation, which usually works through a corporate help desk."

Adventures in Tech Support

The benefits of automated systems and online help aren't always so obvious. To compare experiences, I contacted Micro-



nies to rethink how they provide effective support. Officials at Adobe, Aldus, Claris, Microsoft, and Quark confirm that the industry is headed toward ever more automated systems that let users support themselves.

"Our automated systems ought to be like the ATM over at my bank," says John Archdeacon, director of Aldus's technical services. "I can get stamps, get a bus pass, or make a deposit, but I've got one kind of user interface." A person who needs a loan can still go into the bank. That's the

continues

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soft via its automated voice-response system, its CompuServe forum, and its standard telephone technical support.

Headers and footers often disappear from my Word 5.1 files. So one evening at about 10:40 p.m. I dialed up CompuServe and made my way to the Microsoft Connection area and then the company's knowledge base of technical articles and bug-fixes. My first search, for a Word 5.1 bug list, was unsuccessful. My next search, for a document that discussed headers in Word 5.1 for Macintosh, turned up 41 documents. File number 32, "Word 5.1: Headers and Footers Missing or Changed," answered my question, went on to offer a workaround for fixing the problem, and gave me an 800 number (800/426-9400) for ordering a free patch to correct the problem.

The entire process took roughly ten minutes, in part because I was new to the system and in part because I went searching for more information about the patcher program in the knowledge base. I never did find the reference "MW0711" via the knowledge base and gave up looking for the patch. After all, I had a simple workaround.

I called support the next day at 12:14 p.m., expecting a lunchtime crunch. Instead, a pleasant fellow named Dave answered within a minute. He promptly explained the source of the header problem and what the workaround was, and took my address so I could receive the patch. This took about three minutes.

FastTips, Microsoft's automated and toll-free voice-response system, was a mixed bag. In less than six minutes I located and listened to a series of four questions and answers explaining my Word problem and offering several ways to get hold of the patch. It was great that the recording actually gave me more detailed information than I got from the live technician. But navigating the system isn't as easy as locating information online or dealing with a human being, because the user has so little control. Moreover, a promised faxed copy of the questions and answers never materialized, though the FastTips catalog of documents arrived by fax about six minutes after I requested it. (There was nothing about the patch.)

Brave New World

Automated and online support systems aren't perfect, but they do offer a free or low-cost service around the clock. "You can do the automated stuff 24 hours per day, 7 days per week," says David Aune, director of technical support at Claris. "People say, 'If I can help myself, I can do it quicker and easier.' So that's what we're trying to do."

Software companies like automated systems and online services because they require less time and money to support than does answering individual phone calls, yet give customers 24-hour access to information. Companies often rely on knowledgeable users of online services such as CompuServe to help less savvy people, which frees up technicians to concentrate on more strategic support. That's why some developers encourage customers to start online accounts.

Quark even packed membership offers for AOL and CompuServe into every box of QuarkXPress 3.2. The company has online support technicians dedicated to answering queries in the DTP forum on CompuServe and the Quark forum on America Online.

With the upgrade to 3.2, Quark promised a four-hour response time for online queries during a designated period, but in fact, "we were doing reply posts in two to three hours," says Kevin Dormeyer, Quark's manager of technical support. Though the time period for the prompt-turnaround program has passed, Quark's responses to online queries still average three to five hours, Dormeyer says, and some of his best technicians are working online.

Microsoft fields something like 30,000 contacts per day through its electronic services. "People are moving more and more to electronic services, allowing users to solve the issue on their time schedule," says Steve Wilson, the Microsoft marketing manager involved with these services. "There's an ongoing commitment on our part to make available as much information as possible in as many places as possible."

Aldus's Archdeacon concurs. While electronic tech-support systems are not a universal solution, "if you can solve a problem for 30 percent of your base, it gives you some energy to solve problems for the remaining 70 percent."

Electronic technical support may not be universal yet, but the industry is definitely headed in that direction. Claris's Aune says one problem with such systems is that there's just not enough information out there yet. I agree, but the promise of instant access to technical information makes these systems worth pursuing. And the fact that both large and small companies offer effective online support may be reason enough to invest in a fax modem, if you don't already own one. **m**

Send nominees for sainthood to *Service Heroes*, Macworld, 501 Second St., San Francisco, CA 94107, or via AppleLink (Macworld1) or America Online (Branscum). Conversely, drop *Conspicuous Consumer* a line if a company is ignoring you.

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Circle 37 on reader service card



Editors' Choice

THE BEST PRODUCTS FEATURED IN MACWORLD

Edited by Susan Grant-Marsh

Macworld Editors' Choice is a complete listing of the hardware and software products selected as the best of their year in *Macworld's* comparative articles through the past year. A ♦ next to a product indicates that we chose more than one product in that category.

Hardware

MONITORS

BLACK-AND-WHITE MONITORS, May 93

Portrait monitor: 15-Inch Gray Scale Portrait Display; Mirror Technologies, 612/633-4450; \$399, with video-display board \$549.

Two-page monitor: ♦ L-View MultiMode; Sigma Designs, 510/770-0100; \$1099, with video-display board \$1398. ♦ MD 202 Two Page Display; Mobius Technologies, 510/654-0556; \$699, with video-display board \$798.

COLOR MONITORS, Oct 93

16- and 17-inch: ♦ ErgoView 17; Sigma Designs, 510/770-0100; \$1349.

♦ MultiSync 5FG; NEC Technologies, 708/860-9500; \$1355 (NEC's estimated dealer price).

GRAY-SCALE MONITORS, May 93

Portrait monitor: Pivot Display; Radius, 408/434-1010; \$849, with video-display board \$1148.

Two-page monitor: MultiMode 120, SilverView Pro; Sigma Designs, 510/770-0100; \$1099, with video-display board \$1299.

SMALL COLOR MONITORS, Jan 94

14-inch display: ♦ Sony CPD 1430; Sony Corp. of America, 800/222-7669; \$779.95. ♦ Nanao FlexScan F340iW; Nanao USA, 800/800-5202; \$899.

15-inch display: NEC MultiSync 4FG; NEC Technologies, 708/860-9500; estimated street price \$755.

NETWORK HARDWARE

HARDWARE ROUTERS, Jul 93

Under \$1500: EtherRoute; Compatible Systems, 303/444-9532; base model \$1495 (no TCP/IP support).

Between \$1500 and \$3500: InterRoute/5; Farallon Computing, 510/814-5000; \$3299 to \$3499.

HIGH-SPEED FAX MODEMS, Oct 93

Teleport Gold and Silver with Global Fax; Global Village Communication, 415/390-8200; Gold \$499, Silver \$429.

POWERBOOK TOOLS

DUO DOCKING CONNECTORS, Feb 93

PowerLink DeskNet; E-Machines, 503/646-6699; \$699.

EXTERNAL HARD DRIVES, Feb 93

♦ Companion 120; APS Technologies, 800/874-1428; \$599. ♦ PocketDrive 120MB; La Cie, 503/520-9000; \$699.

INTERNAL FAX MODEMS, Feb 93

♦ PowerModem series; PSI, 408/559-8544; \$195 to \$495. ♦ PowerPort series; Global Village Communication, 415/390-8200; \$229 to \$499.

PRINTERS

COLOR PRINTERS, May 93

Dye-sublimation: ♦ ColorStream/DS; Mitsubishi International, 408/980-1100; \$9950. ♦ Phaser IISD Color Printer; Tektronix, 503/682-7377; \$9995.

Thermal-wax: ♦ ColorScript 210; QMS, 205/633-4300; \$4995. ♦ Personal ColorPoint PSE; Seiko Instruments, 408/922-5800; \$2999.

Low-end liquid-ink: HP DeskWriter 550C; Hewlett-Packard, 800/752-0900; \$1099.

Midrange liquid-ink: HP PaintJet XL300; Hewlett-Packard, 800/752-0900; \$3495.

Solid-ink: Phaser III PXi Color Printer; Tektronix, 503/685-3585; \$9995.

PERSONAL PRINTERS, Sep 93

Ink-jet: StyleWriter II; Apple Computer, 408/996-1010; \$359.

PostScript laser: TI microLaser Series; Texas Instruments, 512/250-6679; \$1199 to \$1599.

QuickDraw laser: LaserWriter Select 300; Apple Computer, 408/996-1010; \$839.

WORKGROUP PRINTERS, Feb 94

High-speed: Hewlett-Packard 45i MX; Hewlett-Packard, 800/752-0900; \$5499.

Best buy: ♦ Apple LaserWriter Pro 630; Apple Computer, 408/996-1010; \$2529. ♦ Hewlett-Packard LaserJet 4M; Hewlett-Packard, 800/752-0900; \$2329.

SCANNERS

LOW-COST COLOR SCANNERS, Nov 93

\$1300 to \$1600: ♦ La Cie Silverscanner II; La Cie, 503/520-9000; \$1599. ♦ Hewlett-Packard ScanJet IIc; Hewlett-Packard, 800/752-0900; \$1599.

Under \$1300: Mirror 800 Plus Color Scanner; Mirror Technologies, 612/633-4550; \$1299.

OCR, Nov 93

OmniPage Professional; Caere Corp., 408/395-7000; \$995.

SYSTEMS/STORAGE

DOUBLE-SPEED CD-ROM DRIVES, Jul 93

Sheer speed: Pioneer DRM-604X; Pioneer, 408/988-1702; \$1795.

Overall value: AppleCD 300; Apple Computer, 408/996-1010; \$599.

Budget choice: NEC MultiSpin 38; NEC Technologies, 708/860-9500; \$465.

HIGH-SPEED HARD DRIVES, Aug 93

2.7GB drives: ♦ Nova XL 2700; Microtech International, 203/468-6223; \$2999. ♦ Vista 3.5GB; Relax Technology, 510/471-6112; \$3499.

SCSI-2 adapter: QuickSCSI; PLI, 800/288-8754; \$499.

MACINTOSH UPGRADES, Jun 93

Classic accelerator (40MHz): TransWarp Classic; Applied Engineering, 214/241-6060; \$798 (with FPU).

SE accelerator (50MHz): Gemini Integra; Total Systems, 503/345-7395; \$1089 (with FPU).

SE accelerator (25MHz): Quik30; Novy Systems, 904/427-2358; \$449 (without FPU).

SE/30 accelerator (50MHz or 33MHz): Universal PowerCache; DayStar Digital, 404/967-2077; 50MHz \$999 (with FPU), 33MHz \$449 (without FPU).

LC and LC II upgrades: Macintosh LC III Logic Board Upgrade; Apple Computer, 408/996-1010; \$599.

Mac II accelerators: ♦ Radius Rocket 25i, Radius Rocket 33; Radius, 408/434-1010; 25i \$1199, 33 \$2499. ♦ Universal PowerCache series; DayStar Digital, 404/967-2077; \$449 to \$999.

Ilfx SCSI accelerator: QuickSCSI; PLI, 800/288-8754; \$499.

Quadra static-RAM cache card: FastCache Quadra; DayStar Digital, 404/967-2077; \$299 for Quadra 700 and 900, \$449 for Quadra 800 and 950.

MIDRANGE HARD DRIVES, Mar 93

Low-capacity drive: La Cie Cirrus 240; La Cie, 503/520-9000; \$769.

Notable technology: DiamondDrive 510; Mass Microsystems, 408/522-1200; \$2089.

Bargain: APS Fujitsu 520; APS Technologies, 800/874-1428; \$1149.

All-around quality: hammer 525FMF; FWB, 415/474-8055; \$2799.

OPTICAL DRIVES, Dec 93

3½-inch: ♦ Epson OMD 5010; ClubMac, 800/258-2622; continues

Editors' Choice

\$959. ♦ 128 MO; APS Technologies, 800/874-1428; \$899.
5¼-inch: ♦ Sharp JY-750; ClubMac, 800/258-2622;
 \$1829. ♦ Infinity MaxOptical 11m; PLI, 800/288-8754;
 \$4113.

VIDEO/DISPLAY

COLOR LCD PROJECTION, Jan 93

Display panel: MediaPro; nView Corp., 804/873-1354;
 \$7995.

Low-end panel: TFT Rainbow HD Model 700; Chisolm,
 408/559-1111; \$5295.

Complete LCD projector: System 6000; In Focus Sys-
 tems, 503/692-4968; \$8495.

VIDEO-CAPTURE BOARD, Jan 93

VideoSpigot; SuperMac Technology, 408/541-6100; \$449
 to \$1399, depending on bundling options.

Software

ACCOUNTING/FINANCE

GROWING A SMALL BUSINESS, Nov 93

Small-business system: M.Y.O.B.; Teleware, 201/586-
 2200; \$199.

Home office/personal finance: MacMoney; Survi-
 vor Software, 310/410-9527; \$119.95.

PERSONAL FINANCE, Jun 93

♦ CheckWriter 4.0; Aatrix Software, 701/746-6801;
 \$79. ♦ Andrew Tobias' Managing Your Money 5.0; MECA
 Software, 203/256-5000; \$79.95.

BUSINESS TOOLS

STATISTICS, Oct 93

Exploratory data analysis: DataDesk 4.1; Data De-
 scription, 607/257-1000; \$595.

Comprehensive package: SYSTAT 5.2.1; SYSTAT, 708/
 864-5670; \$895.

CD-ROM

TOP 10 CD-ROMS, Mar 94

Overall: Seven Days in August; Time Warner Interactive
 Group, 818/955-9999; \$79.99.

COMMUNICATIONS/NETWORKS

HIGH-SPEED FAX MODEM SOFTWARE, Oct 93

FaxStf; Telefocus, 816/886-9800; \$79.

NETWORK CONNECTIVITY, Sep 93

NetWare for Macintosh; Novell, 801/429-7000; \$495
 for 5-user license to \$2295 for 200-user license.

NETWORK DIAGNOSTICS, Feb 93

Ethernet: EtherPeek; AG Group, 510/937-7900;
 \$795.

LocalTalk: LocalPeek; AG Group, 510/937-7900;
 \$495.

NETWORK MANAGEMENT, Feb 93

Network SuperVisor; CSG Technologies, 412/471-7170;
 \$495.

SOFTWARE ROUTER, Jul 93

Apple Internet Router 3.0; Apple Computer, 408/996-1010;
 Basic Connectivity Package \$499.

TERMINAL EMULATOR, Oct 93

VersaTerm; Synergy Software, 215/779-0522; \$149.

GRAPHICS

2-D CAD, Jan 93

Low-end: Blueprint; Graphsoft, 410/461-9488; \$295.

Midrange: PowerDraw; Engineered Software, 919/299-
 4843; \$795.

3-D DESIGN, Aug 93

Price for performance: ♦ Ray Dream Designer 2.0.4;
 Ray Dream, 415/960-0765; \$299. ♦ Alias Sketch 1.5; Alias
 Research, 416/362-9181; \$995.

All-in-one solution: ♦ Infini-D 2.5; Specular Inter-
 national, 413/549-7600; \$995. ♦ StrataVision 3D 2.6.1;
 Strata, 801/628-5218; \$995.

CLIP ART'S GREATEST HITS, Jan 94

Overall collection: ♦ ClickArt Studio Series; T/Maker
 Company, 415/962-0195; \$99.95 per volume. ♦ Elec-
 tronic Clipper subscription service; Dynamic Graphics,
 800/255-8800; \$67.50 per month. ♦ Metro ImageBase
 Electronic Clip Art; Metro ImageBase, 800/525-1552;
 \$74.95 per volume. CD-ROM \$149.95. ♦ Images with
 Impact series; 3G Graphics, 800/456-0234; \$99.95 to
 \$129.95 per volume. CD-ROM \$499. ♦ Typographers'
 Ornaments; Underground Grammarian, 609/589-6477;
 \$25 per volume; ten TIFF albums \$200; EPS volumes
 \$50 each.

DRAW PROGRAMS (LOW-COST), Sep 93

Budget draw: Expert Draw; Expert Software, 305/567-
 9990; \$49.95.

Budget draw/paint: UltraPaint; Deneba Software,
 305/596-5644; \$79.

Beginners' program: Aldus SuperPaint; Aldus Corp.,
 619/558-6000; \$149.95.

Overall: Canvas; Deneba Software, 305/596-5644;
 \$399.

FONT BUYERS' GUIDE, Mar 94

Text-face collection: Type On Call CD-ROM; Adobe
 Systems, 415/961-4400, 800/682-3623; \$99 (includes the
 ability to unlock two families from preselected packages)
 plus \$25 to unlock individual faces or \$69 to \$179 for un-
 locking families.

Display/decorative-face collection: Fontek; Letra-

set, 201/845-6100; \$39.95 per face.

Bargain collection: Monotype ValuePack; Monotype,
 312/855-1440; \$89 for 57 fonts.

IMAGE DATABASES, Oct 93

♦ Aldus Fetch 1.0; Aldus Corp., 206/628-5739; \$295.

♦ Multi-Ad Search 2.0; Multi-Ad Services, 309/692-
 1530; \$249.

PAINT AND IMAGE-EDITING, Sep 93

Budget buy: Expert Color Paint; Expert Software, 305/
 567-9990; \$49.95.

Overall program: Fractal Design Painter; Fractal Design
 Corp., 408/688-8800; \$399.

Image-editing program: Adobe Photoshop 2.5.1;
 Adobe Systems, 415/961-4400; \$895.

INTEGRATED SOFTWARE

INTEGRATED SOFTWARE, Feb 94

ClarisWorks; Claris Corporation, 408/727-8227; \$299.

ORGANIZATION/PRODUCTIVITY

CALENDARS, Jul 93

Alarm system: ♦ First Things First; Visionary Software,
 503/246-6200; \$79.95. ♦ Smart Alarms Plus; JAM Soft-
 ware, 203/630-0055; \$75.

All-around scheduler: Now Up-to-Date; Now Software,
 503/274-2800; \$99.

Meeting scheduler: Meeting Maker; On Technology,
 617/374-1400; five-pack \$495.

SALES-AUTOMATION SOFTWARE, Oct 93

♦ Contact Ease; WestWare, 619/660-0356; one user \$395,
 five users \$1495.

♦ CBS; Colleague Business Software, 512/345-9964;
 \$495.

TEXT-RETRIEVAL SOFTWARE, Dec 93

Small system: On Location; On Technology, 617/374-
 1400; \$129.

Multiuser system: Personal Librarian; Personal Library
 Software, 301/990-1155; \$995.

PRESENTATION TOOLS

MULTIMEDIA AUTHORIZING, Mar 93

Entry-level: ♦ Action; Macromedia, 415/252-2000;
 \$495.

♦ Passport Producer; Passport Designs, 415/726-0280; \$495.

UTILITIES

BRAVE NEW DOCUMENTS, Jan 94

Application-independent document distribution:
 Common Ground; No Hands Software, 800/598-3821;
 \$189.95.

Book-length documents: FrameReader; Frame Tech-
 nology, 800/843-7263; \$84.95.

PRINTING, Sep 93

PC-printer cable packages: PowerPrint; GDT
 Softworks, 604/291-9121; \$149. **m**

Vendors: Please write to Macworld Editors' Choice,
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spending another \$500-\$700. With Relisys, it's free! Now you can scan slides, transparencies—even X-Rays in full color—at no extra cost. Together with a full version of Adobe Photoshop 2.5—also included FREE—the RELI 2400DPI will handle even your most demanding scanning needs.

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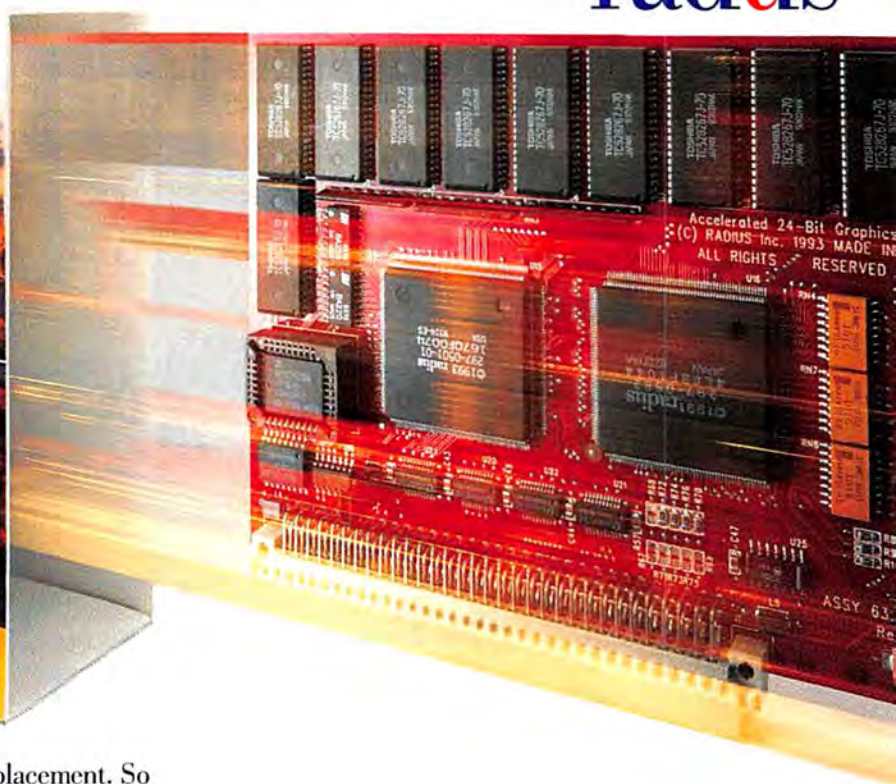
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Software

BUSINESS TOOLS

★★★★ 4D Server 1.0.1 (1.0.5), ACI US, 408/252-4444, \$1495 to \$3495. Database server uses the ingenious multitasking technology built into 4D to make it appear that each client has the full resources of the server. If you use 4D on a network, you need this product. Jun 93

★★★★ 4th Dimension 3.0.1 (3.0.5), ACI US, 408/252-4444, \$895. Multitasking, which greatly improves speed, makes this upgraded relational database delightful for both developers and end users. For a relational database, it's impressively easy to use. Apr 93

★★ AccuZip6 1.5.2 (1.8.5), Software Publishers, 800/233-0555, \$689. Professional-level mail-list-management tool on CD-ROM is the most comprehensive system available, but its inexcusable user-interface violations make our reviewer reluctant to recommend it. May 93

★★★★ Acrobat Exchange, Acrobat Distiller, Adobe Systems, 415/961-4400, \$195 to \$2495. Complete, well-planned paperless office system creates application-independent viewable files that can be readily distributed on a network. Still, it's not yet as inexpensive or as convenient as you might wish. Oct 93

★★★★ @Risk 1.1, Palisade Corp., 607/277-8000, \$395. Statistical simulator for Microsoft Excel financial computations generates complex, statistically valid templates within Excel and is the first choice for analysts who work with probabilistic models every day. It assumes

that the user is an Excel power user. Aug 93

★★★★ ClarisWorks 2.0, Claris Corp., 408/727-8227, \$299. Integrated program provides more features, is easier to use and faster, and has better integration among modules than other available programs. Aug 93

★★★★ Common Ground 1.0, No Hands Software, 415/802-5800, \$189.95. Simple, robust document-interchange system is the clear choice for modest document-distribution jobs. In tests, it worked easily with documents from many different applications. Oct 93

★★ EasyFlow 1.1, HavenTree Software, 613/544-6035, \$229. The rough edges and distinctly un-Mac-like attributes of this flowcharting software reflect its DOS heritage, but on the whole it's easy to use. Sep 93

★★★★ Helix Express 1.0 (2.0), Helix Technologies, 708/465-0242, \$439. This relational database has an iconic programming language that sometimes baffles programmers, but provides an easy route into basic data-handling for nonprogrammers. Jul 93

★★★★ Helix Tracker 1.0, Helix Technologies, 708/465-0242, \$439. Well-designed workgroup-document manager has strong audit and annotation features; imposes just the right amount of administrative discipline. For large documents, however, Ethernet will look mighty attractive. Nov 93

★★★★ ithink 2.2.1, High Performance Systems, 603/643-9636, \$695. Although it requires a real training commitment for effective use, this product is an attractive dynamic business modeling system. It's a good bet for identifying cloudy spots in the crystal ball. May 93

★★ Lotus Notes 3.0, Lotus Development Corp., 617/577-8500, \$495 per client. Well-organized, robust, and flexible business data system demands a full-time administrator, preferably with considerable programming experience, for effective use. Sep 93

★★★★ MacBarcode 2.2.4, ComputaLabel, 508/462-0993, \$349 to \$895. Simple-to-use desk accessory creates bar codes in EPS or Adobe Illustrator 1.1 format. DA cannot automatically create serial codes. Jun 93

★★★★ MacProject Pro 1.0 (1.5), Claris Corp., 408/727-8227, \$599. If you're working on a midsize project and like using PERT charts, this may be the project-management software for you. However, the multistep scheduling process and the limited integration between charts are frustrating if you prefer Gantt charts. May 93

★★★★ MarcoPolo 2.0, Mainstay, 805/484-9400, \$395. Inexpensive, easy-to-use product allows you or your workgroup to archive and retrieve documents, whether in electronic or paper form. Queries are easy to construct and searches are handled quickly. Sep 93

★★★★ Market Master Manager 3.5, Breakthrough Productions, 916/265-0911, \$395 to \$1995. Sales-automation software is designed to keep track of contacts, generate mailings, and make sure that leads

don't fall through the cracks. It includes a remote module, but it has some odd user-interface features. Oct 93

★★ Memorizer 2.0, Brains Software Engineering, 432-231-28973 (Austria), \$100. Software records dictation and you transcribe the dictation in a word processor. You may prefer to stick with a hand-held tape recorder, considering the product's RAM and storage appetite, and its propensity to crash. Aug 93

★★★★ Micro Planner Manager 1.1, Micro Planning International, 303/757-2216, \$695. When you require cross-project resource sharing and leveling for a reasonable price, this project-management software has the edge. It has a generally intuitive interface, though there's a steep learning curve for its advanced features. Nov 93

★★★★ Microsoft Works 3.0 (3.0a), Microsoft, 206/882-8088, \$249. Capable upgrade delivers marginally improved functionality and a welcome face-lift to this integrated program, but there are a number of incompatibilities, odd design choices, and performance flaws. Feb 93

★★★★ Office Tracker 1.1, Milum Corp., 512/327-2255, \$195 to \$995. The efficient user interface of this software sign-out board, in both single-user and networkable versions, makes it easy to learn and use; but it has some minor flaws. Dec 93

★★★★ OrgChart Express 1.0, Kaetron Software, 713/298-1500, \$199. Organization-chart software links a database to standard box-drawing functions. Although the learning curve is steep, the effort may be worth it for people who regularly work with large or complex organization charts. Apr 93

★★★★ Project Scheduler 5, Scitor Corp., 415/570-7700, \$695. For most midrange project-planning, this program's many hits outweigh its few misses. It goes beyond the requisite scheduling options, with inflation factors and unlimited projects in memory, and it conforms to accepted standards, so you get consistent, predictable results. Aug 93

★★ Useful Voice Processor for Macintosh 1.1v7 (1.1v9), Useful Software Corp., 508/774-8233, \$179.95. Dictation software lets you record and transcribe on a Mac. It has some useful features, but you must take uncommon care to avoid crashes. Dec 93

★★★★ Wingz 1.1ae, Informix Software, 913/599-7100, \$399. Low-overhead spreadsheet offers advanced-math functionality, a competent calculating engine, and superior charts; but spreadsheet is missing outlining, real 3-D spreadsheet linking, and the host of third-party add-ons offered for Microsoft Excel. Jul 93

★★★★ WordPerfect Works 1.2, WordPerfect Corp., 801/225-5000, \$249. This program offers seven well-integrated and flexible modules. It has a few shortcomings, including some memory-management problems. *continues*

Star Ratings

tems, but buyers should generally be pleased. Jun 93

COMMUNICATIONS/NETWORKS

★★★ **Delrina FaxPro for Macintosh 1.0, Delrina Corp., 408/363-2345, \$129.** Fast, efficient fax software has an excellent address-book feature but also has some interface quirks and minor bugs. Feb 94

★★★★ **EtherPeek 2.0.3, LocalPeek 2.0.3, TokenPeek 1.0 (2.0.3), AG Group, 510/937-7900, \$495 to \$995.** Priced at a fraction of the cost of dedicated hardware analyzers, these network analyzer tools give you better analysis with a friendlier interface. They're a worthwhile investment. Jan 94

★★★★ **MicroPhone Pro, Software Ventures Corp., 510/644-3232, \$295.** Truly comprehensive telecommunications package now includes send-and-receive fax software. Although the new TCP/IP tools are complicated, the documentation is clear and precise. Apr 93

★★★★ **Network Vital Signs 1.0 (1.1), Dayna Communications, 801/269-7200, \$449.** Fault-monitoring application continually watches selected network devices, monitoring for specific errors. Unfortunately, when monitoring more than ten devices, it noticeably degrades the performance of the monitoring Mac. Mar 93

★★★★ **On The Air 1.0.1 (1.0.2), Digital Eclipse Software, 510/547-6101, \$79.99 to \$639.99.** Intercom system transmits System 7 SND resources, SoundEdit, and AIFF sound files across a network. It's well designed and performs decently, but its usefulness seems limited. Aug 93

★★★★ **On The Road 1.1, Connectix, 415/571-5100, \$99.** Helpful PowerBook utility looks at what's hooked up to your computer and adjusts accordingly—for example, printing when a printer is available and otherwise deferring printing. It only supports some hardware, however, so check before buying. Dec 93

★★★★ **Silver Cloud 1.2, AG Group, 510/937-7900, \$495.** If you are administrating a large network and are drowning in a sea of devices and zones, this network-management software will make your life simpler. Feb 94

★★ **SoftPC with Windows (3.1), Insignia Solutions, 415/694-7600, \$499.** The emulation of a complete and accurate Windows environment on a Mac is an amazing accomplishment, but the product is so slow, even on a Quadra, that it performs in what might best be characterized as a dreamlike languor. Jun 93

★★★★ **Timbuku 5.0.1, Farallon Computing, 510/814-5000, \$199 to \$5500.** By letting one computer (a Mac or a Windows-based PC) control, observe, or exchange data with another computer, this terminal-emulation product allows you to use resources almost anywhere on a network. Mar 93

★★★★ **VersaTerm 5.0, Synergy Software, 215/779-0522, \$195.** The price and feature set of this network terminal-emulation package make it a terrific value, in spite of its complex documentation and limitations. If you're looking for a fast path to Internet connectivity, this is it. Jan 94

DESKTOP PUBLISHING

★ **AboutFace 1.1.1 (1.1.2), Big Rock Software, 716/288-2860, \$69.95.** Type-specimen generator has many serious deficiencies that need to be addressed. Jan 94

★★★★ **Aldus Fetch 1.0, Aldus Corp., 206/622-5500, \$295.** The rich feature set and network sup-

port of this image-cataloging software make it a clear winner. Although cataloging is slow, users have fine control of the depth and compression of thumbnails. Aug 93

★★★★ **Aldus PageMaker 5.0, Aldus Corp., 206/622-5500, \$895.** Desktop publishing software has added the features, both great and small, that it's been lacking, while still retaining the ease-of-use advantages that it's always had. This is a superb upgrade. Nov 93

★★ **Aldus Personal Press 2.0, Aldus Corp., 206/628-2320, \$199.** Basic, inexpensive page-layout program gains strength, but is still missing elements that novice users need, such as automatic kerning. Its software-knows-best approach to copyfitting makes manual fine-tuning difficult and is likely to confuse beginners. Mar 93

★★★★ **Apple Font Pack, Apple Computer, 408/996-1010, \$99.** Apple's first collection of TrueType fonts includes only 12 fonts that haven't been available since the late eighties in the PostScript format. Still, it's not a bad deal, considering that Adobe PostScript fonts cost four times as much. Mar 93

★★★★ **Cumulus 1.1 (1.2), Canto Software, 415/431-6871, \$295 to \$895.** Good network support, plus a feature that creates a protocol file for recording user actions, make this image-cataloging program a good choice for workgroups. It doesn't have an image-preview feature, nor does it offer 32-bit thumbnails. Aug 93

★★★★ **Expanded Book Toolkit 1.0.1 (2.1), The Voyager Company, 310/451-1383, \$295.** Using this hypermedia publishing program, average mortals can create highly functional multimedia books in a fraction of the time it would take to do the job unassisted. Be aware, though, that it's no QuarkXPress. Jun 93

★★★★ **FontMonger 1.5.7, Ares Software Corp., 415/578-9090, \$149.95.** Font-conversion utility provides cross-platform, cross-font conversion and makes it easy to create composite, subscript, superscript, and rotated characters. Sep 93

★★ **ImageAccess 1.0, Nikon, 516/547-4355, \$495.** This expensive image-cataloging program has an unusual interface and cannot be used over a network. A plug-in module provides direct support for Nikon's LS-3510AF film scanner. Aug 93

★★★★ **Kodak ColorSense 1.0, Eastman Kodak, 716/253-0740, \$499.** Color-management system gives average users access to a reasonable level of color consistency at a reasonable price. It does not make color separations. Oct 93

★★ **Kudo Image Browser 1.0 (1.1), Imspace Systems Corp., 619/272-2600, \$195.** This image-cataloging software cannot control thumbnail depth or compression and doesn't have a keyword feature or allow multiple users to access the catalog simultaneously. The unique Riffle feature lets you quickly scan images. Aug 93

★★★★ **Lazy Dog Foundry Personal Font, Lazy Dog Foundry, 612/291-0306, \$199.99 to \$499.99.** Type 1 font made from your handwriting has clean, even lines—whether or not your writing does. Apr 93

★★★★ **Publish It Easy 3.0 (3.02), Timeworks, 708/559-1300, \$199.95.** Desktop-publishing program offers writing, editing, formatting, page-layout, drawing, and painting tools with well-thought-out interface innovations, plus an excellent database manager. Unfortunately, the program is unstable and crash-prone. Mar 93

★★★★ **QuarkXPress 3.2, Quark, 303/894-8888, \$895.** This upgrade adds the EfiColor XTension to ensure the greatest possible fidelity of color images and is a must-have for professional color publishers who use Quark. For others, the enhancements are welcome but minor enough that they provide little incentive to upgrade. Nov 93

★★★★ **SuperATM, Adobe Systems, 415/961-4400, \$149.** This upgrade to Adobe Type Manager lets you view Adobe-brand PostScript fonts on screen and output them at high resolutions, even when the corresponding printer fonts are unavailable. Although it has limitations, this is an outstanding advance in font technology and a tremendous value. May 93

★★★★ **Tableworks Plus 1.05, Npath, 206/392-7745, \$299.** Publishing utility adds a full table-editor to QuarkXPress and is a must-have for anyone doing even mildly complex tables. Jan 94

EDUCATION

★★★★ **Algebra 1.0, Broderbund Software, 415/382-4400, \$69.95.** Interactive, imaginative math tutorial is keyed to the standard textbook order of topics, but offers much more. It is particularly strong on word problems and graphing. May 93

★★ **Comprehensive Review in Biology, Queue, 203/335-0908, \$295.** There isn't a textbook publisher in North America with the nerve to publish a black-and-white biology book with nothing more than text and basic line drawings, much less charge several hundred dollars for it, but that, in effect, is what this CD-ROM is. May 93

★★★★ **Compton's Multimedia Encyclopedia 1.00M, Compton's New Media, 619/929-2626, \$795.** The down-to-earth writing style and numerous bells and whistles of this multimedia encyclopedia on CD-ROM appeal to younger readers, but the high cost and sluggish performance may be prohibitive. Apr 93

★★★★ **Decimal & Fraction Maze 1.2 (1.2.3), Great Wave Software, 408/438-1990, \$69.95 to \$89.95.** Education software weaves the threads of eight math curricula—from third grade to eighth, along with two levels of adult education—into an interesting and visually stimulating game. Jul 93

★★ **Dvorak on Typing 1.0, MacPlay, 714/553-3530, \$49.95.** Typing tutor offers solid lessons, but the small annoyances, such as never being able to take intermediate or advanced lessons without first passing a test, add up. Jun 93

★★★★ **How Computers Work, Time Warner Interactive Group, 818/955-9999, \$79.99.** Graceful, well-integrated CD-ROM tutorial guides the curious through brief but helpful explanations of basic computer technologies. Jan 94

★★★★ **HyperStudio, Roger Wagner Publishing, 619/442-0522, \$179.95.** Hypermedia authoring tool supports color and many multimedia functions through easy-to-use dialog boxes, but the interface doesn't always follow Apple guidelines. Dec 93

★★★★ **MacGlobe 1.3.0 (1.5), Broderbund Software, 415/382-4400, \$39.95.** Besides maps and bits of fun, such as national anthems, this geography software offers an impressive quantity of demographic and economic information. Its data export could use some work. Feb 93

★★★★ **Mavis Beacon Teaches Typing 2.0, The Software Toolworks, 415/883-3000, \$49.95.** If being entertained while learning to type interests you, this typing tutor provides varied environments, interesting lessons, and good games. Jun 93

★★★★ **Millie's Math House 1.0 (1.1), Edmark Corp., 206/556-8400, \$49.95.** Math-education software provides ways for preschoolers to experiment with numbers and counting. It's engaging, but more advanced levels would keep children challenged longer. Jul 93

★★★★ **The New Grolier Multimedia Encyclopedia, Grolier Electronic Publishing, 203/**

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797-3530, \$395. The scholarly text of this encyclopedia on CD-ROM is suitable for sophisticated readers, while its speed, ease of use, and value are impressive. **Apr 93**

★★★★ **The Rosetta Stone, Fairfield Language Technologies, 703/432-6166, \$395.** Foreign-language instruction on CD-ROM is a valuable educational tool and fun to use. The lessons are well paced, and the content is generally excellent and diverse. **Jan 94**

★★★ **The Secret Codes of C.Y.P.H.E.R. 1.0 (1.1.1), Tanager Software Productions, 510/430-0900, \$59.95.** Intriguing facts about mammals and a variety of alphabets provide the interest in this educational game, but the inescapable, repetitive animations are a major detraction. **Apr 93**

★★★★ **The Secret Island of Dr. Quandary 1.0, MECC, 612/569-1500, \$49.95.** Clever package of gorgeous landscapes, catchy sounds, and tempting arcade-game puzzles uses math, logic, and reading skills. Although slow, it's fun for parents and kids. **Jun 93**

★★★★ **Stickybear's Reading Room 2.2a, Optimum Resource, 803/785-7441, \$59.95.** Educational game with four activities takes a sedate but direct path to building primary-level reading skills. **Jun 93**

★★★★ **Where in America's Past Is Carmen Sandiego? 1.0, Broderbund Software, 415/382-4400, \$34.95.** Travel in time and the U.S. chasing those V.I.L.E. crooks in this clever educational history/geography game that's challenging for all ages. **Mar 93**

ENTERTAINMENT

★★★★ **A-Train, Maxis, 510/254-9700, \$69.95.** Charming railroad simulation offers astonishing, and often witty detail, but the learning curve is high and the interface isn't completely Mac-like. **Apr 93**

★★ **America Alive, MediaAlive/CD Technology, 408/752-8500, \$99.** QuickTime movies, photographs, maps, text, and audio mingle in this multimedia CD-ROM guide to the United States. It is a promising concept, but it does not yield much useful information. **Mar 93**

★★★★ **Arthur's Teacher Trouble 1.0, Broderbund Software, 415/382-4400, \$39.95.** Every page of this delightful animated book is dense with surprises that arouse and satisfy a child's curiosity. In the words of six-year-old Alex, "It's like chocolate ice cream. You can have it more than once and it's still good." **Apr 93**

★★★★ **Battle Enhanced Chess CD ROM (Rev 7), Interplay Productions, 714/553-6678, \$64.95.** Elaborately detailed cartoon characters act out little dramas of strategy and capture, complete with sound effects, in this chess game that will drive nine-year-olds mad with glee but may annoy experienced chess players. **Mar 93**

★★★★ **BlackJack Trainer, ConJelCo, 412/492-9210, \$75.** Learn the strategies you need to win at blackjack with this program. There are a number of trivial bugs, but they won't get in the way. **Oct 93**

★★★★ **Cogito 1.0 (1.04), Inline Software, 203/435-4995, \$59.95.** Rubik's Cube fans will like this challenging game where the goal is to replicate a pattern by moving rows and columns of tiles. It gets more and more complex as you progress through the 120 levels. **Apr 93**

★★★★ **Daily Sports Quiz 1.0, DreamTime, 619/236-1341, \$49.95.** If you think you know a lot about sports and love to play trivia games, then this entertaining and informative game is for you. **Oct 93**

★★★★ **Falcon MC 1.0, Spectrum HoloByte, 510/522-1164, \$69.95.** Whether you're an armchair jet jockey or an experienced fighter pilot, you're bound to

be impressed by the 4-bit color, enhanced graphics, and sophistication of this latest incarnation of the original Macintosh combat flight simulator. **Dec 93**

★★★★ **Hell Cab 1.0.1, Time Warner Interactive Group, 818/955-9999, \$99.99.** Take a diabolical New York cabbie with a penchant for time travel, toss in the Empire State Building, add a few brainteasers, and you've got this engaging game on CD-ROM. It's slow and the arcade sections are hard to control, but overall it succeeds. **Jan 94**

★★★★ **Hellcats Over the Pacific 1.0.3, Graphic Simulations, 214/699-7400, \$69.95.** Fly a WWII-era Navy fighter, the Grumman F6F Hellcat, against enemy planes in the South Pacific with this flight simulator that offers smooth graphics, good special effects, and great documentation. **Apr 93**

★★★★ **Indiana Jones and the Fate of Atlantis, LucasArts Games, 415/721-3394, \$59.95.** In this game, the whip-wielding archaeologist goes looking for Atlantis and finds it armed to the gills with magical technology and Nazi stooges. If you're not bothered by the story's astonishing sexism, you'll find it diverting. **Oct 93**

★★★★ **Insanity 1.0, Luxembourg Publishers, 203/236-1993, \$39.95.** Shoot your Mac with this cool control panel device that offers a choice of nine weapons, ranging from an Uzi to a pigeon. It has first-rate sound effects and detailed animation, but the novelty wears off. **Feb 93**

★★★★ **Jewelbox 1.5 (2.0), Varcon Systems, 619/563-6700, \$49.95.** This gem of a game is strongly reminiscent of Tetris. The jewels fall into rows that disappear when you place three jewels of a kind together. **Jun 93**

★★★★ **The Journeyman Project 1.0 (1.2), Presto Studios, 619/689-4895, \$79.95.** Interactive science-fiction epic on CD-ROM is a work of art. The scenes are rich with painstakingly detailed graphics, elaborate models, and subtle textures, but the sluggish pace may leave you impatient and bored. **Sep 93**

★★★★ **Maelstrom 1.03, Ambrosia, P.O. Box 23140, Rochester, NY 14692-3140, \$15 plus \$5 shipping and handling.** Fast-paced arcade game is loosely modeled after Asteroids, the Atari classic. Maelstrom features superb animation, hilarious sound effects, exciting action—and best of all, it's shareware. **Jun 93**

★★★★ **Monkey Island 2: LeChuck's Revenge, LucasArts Games, 415/721-3394, \$59.95.** This whimsical Twilight Zone of life on the sea is the adventure-game equivalent of *Mad* magazine, filled with splendid gross-out jokes, heapings of self-parody, and enough hilarious detail to keep you amused for days. **May 93**

★★★★ **Mozart: The "Dissonant" Quartet, The Voyager Company, 310/451-1383, \$59.95.** CD-ROM includes an unusual essay on stringed instruments, discussions of general musical concepts, an analytical overview of the quartet, and a taped minilecture on Mozart; but the music is limited almost entirely to the title piece. **Apr 93**

★★ **The Orchestra: The Instruments Revealed, Time Warner Interactive Group, 818/955-9999, \$79.99.** The many-branched, interwoven, hypertext style of this music-education CD-ROM makes it hard to navigate and digest, despite its richness. For the price, other music-education CD-ROMs present better values. **Apr 93**

★★★★ **Poetry in Motion, The Voyager Company, 310/451-1383, \$29.95.** Intriguing CD-ROM juxtaposes performance videos of contemporary poets with the texts of their poems and taped interviews, combining the excitement of the stage with the reflective appeal of the page. **Feb 93**

★★★★ **Richard Strauss: Three Tone Poems,**

The Voyager Company, 310/451-1383, \$59.95. *Don Juan, Till Eulenspiegel, and Death and Transfiguration* are included in this CD-ROM. The musical analysis is satisfying, and the lush orchestral music will appeal to both novice and experienced classical music listeners. **Apr 93**

★★★★ **Rodney's Wonder Window, The Voyager Company, 310/461-1383, \$39.95.** Collection of 23 colorful, wacky graphics and animations by Rodney Alan Greenblatt is charming but uneven. While some modules are elaborate and sophisticated, others are simple and not particularly interesting. **Mar 93**

★★★★ **Schubert: The "Trout" Quintet, The Voyager Company, 310/451-1383, \$59.95.** Alan Rich, classical music commentator for NPR, conveys his enthusiasm for this appealing music in this CD-ROM's lively text. The discussion is relatively unchallenging, and the musical performance is not at the top of most reviewers' lists. **Apr 93**

★★★★ **Seven Days in August, Time Warner Interactive Group, 818/955-9999, \$59.99.** Compelling, interactive documentary on CD-ROM cuts a slice from history and offers August 10 through August 16, 1961, (the building of the Berlin Wall) to viewers in a way that truly evokes the period. **Oct 93**

★★★★ **Sherlock Holmes, Consulting Detective, Volume II, Viacom New Media (formerly Icom Simulations), 708/520-4440, \$69.95.** Match wits with the legendary detective by solving three difficult mysteries in this CD-ROM game. **May 93**

★★★★ **SimLife, Maxis, 510/254-9700, \$49.95.** A megalomaniac's dream come true, this amazingly intricate simulation allows players to create and control ecosystems. It's not easy, but it offers the reward of an increased understanding of the complex interrelationships of life. **Feb 93**

★★★★ **So I've Heard, Volume 1: Bach and Before, The Voyager Company, 310/451-1383, \$24.95.** Engaging text describes nearly two millennia of Western music (up to the mid-eighteenth century) in this CD-ROM. It offers a unique opportunity to sample 50 or so performances, styles, and compositions. **Feb 93**

★★★★ **Space Quest 1: Roger Wilco in the Sarien Encounter, Sierra Online, 209/683-8989, \$19.95.** As Roger Wilco, starship janitor, you must defeat the evil Sariens in this adventure game where your head is more important than your hands. For most players the game will be easy to complete. **Apr 93**

★★★★ **Spectre Supreme, Velocity Development, 415/274-8840, \$69.95 to \$89.95.** The pleasure of this game comes not in high scores, but in the almost addictive sense of control you get from moving your tank around the screen. It's so much fun that it's even fun when you lose. **Dec 93**

★★★★ **Super Mines 1.0, Callisto Corp., 508/655-0707, \$49.95.** You use logic to search a minefield without setting off mines in this fast-paced game that's easy to learn, but offers 84 levels for long playability. **Apr 93**

★★★★ **V for Victory: Utah Beach, Three-Sixty Pacific, 408/879-9144, ext. 23, \$69.95.** The post-D-Day conquest of Normandy is re-created in this game; its strength is the way it blends easy play with complicated strategy. Some bugs exist. **Oct 93**

★★★★ **Who Killed Sam Rupert, Creative Multimedia Corp., 503/241-4351, \$39.99.** You're a police detective trying to solve the murder of a popular restaurateur in this interactive CD-ROM that exploits the full range of multimedia options and provides a wealth of clues and surprises to hold your interest. **May 93**

continues

Star Ratings

FINANCE/ACCOUNTING

★★ **Andrew Tobias' TaxCut for Macintosh**, MECA Software, 203/256-5000, \$79.95. The occasionally awkward interface of this personal tax-preparation software doesn't follow every Mac standard, but the help system is very good. State versions are available for California and New York. May 93

★★★★ **BestBooks 1.0**, Teleware, 201/586-2200, \$99. In a straightforward, unimposing manner, this small-business accounting program integrates the standard bookkeeping functions of accounts receivable, accounts payable, and general ledger. Jul 93

★★ **Business Sense 1.6 (2.2b2)**, Software Developers Consortium, 801/288-1222, \$399. Competent, single-user, all-in-one bookkeeping package will adequately help you keep the books for a small company, but it's not as easy to use as its competition. Feb 93

★★★★ **MacIntax 1992 (1993)**, ChipSoft, 619/453-8722, \$39.95. It's difficult to correct your errors when using this personal tax-preparation software, but it's easier than doing your taxes by hand. The display is attractive and the program supports electronic filing. May 93

★★★★ **Quicken 4**, Intuit, 415/898-6095, \$69.95. Personal-finance software is powerful and easy to learn, even for a financial neophyte. Although slower than previous versions, 4.0 lives up to its promise of making financial chores easier and better organized. Nov 93

★★★ **WealthBuilder 2.0**, Reality Technologies, 800/346-2024, \$79.99. Financial-planning software forces you to think about your money and helps you develop an investment plan. It's a good program for beginning investors, but more-sophisticated investors will want more-advanced features. May 93

GRAPHICS

★★★★ **addDepth 1.0.2**, Ray Dream, 415/960-0768, \$179. The purpose of this graphics program is to enhance the creation of 2-D images with 3-D effects. It's versatile, accommodating, and affordable, but working on complex images gets tedious because of the automatic application of styles. Aug 93

★★★★ **Adobe Dimensions**, Adobe Systems, 415/961-4400, \$199. This three-dimensional-effects utility may seem very limited, with white-only light and no surface texturing, but it's a ground-breaking product. It performs its 3-D illusions within the object-oriented, resolution-independent world of PostScript. Apr 93

★★★★ **Adobe Illustrator 5.0**, Adobe Systems, 415/961-4400, \$595. The Mac's most dependable draw program has added enough new features to boggle the mind. It still can't import TIFF images, but it catches up with, and in some areas surpasses, the competition. Nov 93

★★★★ **Adobe Photoshop 2.5 (2.51)**, Adobe Systems, 415/961-4400, \$895. No graphics program is as universally loved as this one, but while this upgrade builds on the program's capabilities, it ignores some minor weaknesses that have begun to peek through the product's armor. It's still great but perhaps not perfect. Jun 93

★★★★ **Alias Sketch 1.5**, Alias Research, 415/362-9181, \$995. The enhanced modeling and revamped rendering capabilities of this 3-D illustration program contribute to a tremendous and reliable upgrade, a heartening example of a company listening to its users. Jul 93

★★ **ArtBeat Professional 1.0**, Pie Practical Solutions, 201/902-9500, \$249. Despite a smattering of unique capabilities, this inexpensive draw/paint program lacks features of equivalent programs. Apr 93

★★★ **artWorks 1.0 (1.01)**, Deneba Software,

305/596-5644, \$149. If you're expecting a graphics dynamo, this combination paint and draw program will leave you a little cold. Despite its flaws, it ranks as one of the best graphics programs available under \$200. Jun 93

★★★★ **Blueprint 4**, Graphsoft, 410/290-5114, \$295. Entry-level 2-D drafting program is a wonderful antidote to the complicated CAD system blues. Don't be misled by the low price; this full-fledged drafting package is powerful enough to serve professionals who appreciate the value of simplicity. Jul 93

★★ **BrushStrokes 1.0**, Claris Clear Choice, 408/727-8227, \$139. If you have absolutely no experience with computer graphics, the simplified interface of this 24-bit paint program might warrant its price. Otherwise, you can find better programs for less. Oct 93

★★★★ **CA-Cricket Draw III 2.0 (2.01)**, Computer Associates International, 516/342-5224, \$249. This draw program is not going to inspire experienced Mac artists to jump up and down, but its features are abundant, the interface is straightforward, and the price is right. Oct 93

★★★★ **Canvas 3.5**, Deneba Software, 305/596-5644, \$399. Draw program offers two to three times as many features as any competing program, but our reviewer would prefer an interface that you can navigate without scrambling for the manual. Jan 94

★★★★ **Color It 2.0.1**, MicroFrontier, 800/388-8109, \$299.95. Overpriced color paint program has a full range of painting and image-retouching capabilities, including 15 levels of undo and an impressive magic-wand tool, but its naming conventions are bewildering. Apr 93

★★ **ColorUp 1.0**, Pantone, 201/935-5500, \$99.95. Professional graphic designers don't need the advice of this color tutorial and series of palettes. Although nonprofessionals might benefit from the information on color theory, it may not be worth the money. Nov 93

★★ **CPM Graphic Tutor 1 & 2**, Caseys' Page Mill, 303/220-1463, \$489 per volume. Although some neophytes may find these CD-ROM tutorials on Adobe Illustrator and Adobe Photoshop helpful, the programs' distracting interfaces, inconsistent execution, lack of polish, and high price weigh strongly against them. May 93

★★★★ **DeBabelizer 1.5 (1.5.5)**, Equilibrium Technologies, 415/332-4343, \$299. Bitmapped-graphics-conversion software supports a huge number of file formats and can work wonders. If you spend any significant time dealing with file conversion, you should have this program. Nov 93

★ **Easy Color Paint 3.0**, MECC, 612/569-1500, \$59.95. For a program that purports simplicity, this color paint program is anything but. Possibly the weakest, least intuitive paint program for the Mac, it's unnecessarily complex and frustrating. Jul 93

★★★★ **Electric Image Animation System 1.5.1 (1.6)**, Electric Image, 818/577-1627, \$7495. The most powerful animation program for the Mac improves its documentation and rendering, and adds an intuitive project window. Unfortunately, it still retails for the price of a European vacation for two. Feb 93

★★★ **Expert Draw 1.0**, Expert Software, 305/567-9990, \$49.95. Inexpensive draw program is not really for experts, but it offers a decent, no-frills set of basic drawing tools and commands for beginning illustrators, office use, or anyone on a budget. Aug 93

★★★★ **Folio 1 Media Kit-Print Pro**, D'Pix, 614/299-7192, \$499.95. Each image in this texture collection on three CD-ROMs provides a dynamic range of colors, highlights, and shadows; is free of artifacts; and is crisply focused. Aug 93

★★★★ **Fractal Design Painter 2.0**, Fractal

Design Corp., 408/688-8800, \$399. If you can put up with a few inconveniences, this color paint software provides the tools required by professional artists, and many of its functions—natural-media brush tools, the color-sensitive magic wand—are entirely without peer. Jul 93

★★★★ **Generic CADD 2.0**, Autodesk, 206/487-2233, \$495. Competent, midlevel 2-D drafting program has a well-executed Mac interface, a good complement of tools, and a sprinkling of high-end features, such as floating-point precision. Aug 93

★★ **Image Assistant 1.0**, Caere Corp., 408/395-7000, \$195. Besides unsatisfactorily addressing Adobe Photoshop's small list of liabilities, this image-editing software's problems include an unforgivable lack of antialiased text, no selective revert function, and an incorrectly implemented smudge tool. Apr 93

★★★★ **Infini-D 2.5.1**, Specular International, 413/253-3100, \$995. Serviceable 3-D graphics program has a wide range of modeling, rendering, and animation options with a straightforward interface and quick operating speed. If it weren't for the bloated price, it would be the ideal entry-level program. Feb 94

★★★★ **Kai's Power Tools Volume 1 1.0 (2.0)**, HSC Software, 310/392-8441, \$149. Although at times monstrously complicated, this collection of Photoshop plug-ins represents a virtually infinite supply of visual resources. It's an amazing tool that no regular Photoshop user should be without. May 93

★★★★ **MiniCAD+ 4**, Graphsoft, 410/290-5114, \$795. Professionals will appreciate this highly competent CAD package's evolution into 3-D. It has maintained its features-champion status and is easier to use. Mar 93

★★★ **Ofoto 2.0 (2.02)**, Light Source Computer Images, 415/461-8000, \$395. Many new features—notably color support—have been added to the already impressive toolbox of this scanning software. It often produces good results, but it rarely produces the best scan possible for a given image and output method. Jul 93

★★★★ **Paint It 1.0**, MicroFrontier, 800/388-8109, \$59.95. Straightforward color paint program lacks image-editing tools but has a versatile cast of selection and painting tools—and it's priced to sell. Apr 93

★★★★ **PosterWorks 3.0**, S. H. Pierce & Co., 617/338-2222, \$395. This large-format graphics production tool is for people who think big, up to 10,000 square feet big. It fills the need for user-defined, full-color, large-format output robustly and elegantly. Aug 93

★★★★ **PowerDraw 4.0 (5.0)**, Engineered Software, 910/299-4843, \$795. The best new feature of this polished 2-D drafting program is an open architecture that supports modules that let you customize the program with application-specific tools, floating palettes, and menu commands. Sep 93

★★★★ **Sketcher 1.0**, Fractal Design Corp., 408/688-8800, \$79. A variety of effects reproduce techniques of traditional drawing tools with this wonderful gray-scale paint and image processing program. Feb 93

★★ **StrataType 3d 1.0 (2.0)**, Strata, 801/628-5218, \$199. The rulers, texture palette, custom bevels, and canned positioning schemes of this 3-D type-effects software are nice, but they can't compare with the animation skills, lighting capabilities, and superb rendering of other available programs. Mar 93

★★★★ **StrataVision 3d 2.6.3**, Strata, 801/628-5218, \$995. 3-D program includes animation and is a superior rendering tool and versatile modeler. It's a challenge to learn, however, as the interface is overly dense

continues

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Star Ratings

and sometimes sluggish. Feb 94

★★★ **Transverter Pro 1.0 (1.51), TechPool, 216/291-1922, \$395.** Remarkable graphics-conversion software can read PostScript files and convert them to a variety of formats. As you might expect of a program attempting to fill such a tall order, its conversions are not always flawless, but it can be a lifesaver nonetheless. Nov 93

★★★ **Tree, Onyx Computing, 617/876-3876, \$295.** Single-purpose program generates lifelike color drawings of trees from a number of easily controlled parameters. Although visually appealing, it's an expensive way to draw a tree. May 93

★★★ **upFront 2.0, Alias Research, 416/362-9181, \$299.** Capable modeler is something of an acquired taste. However, take the time to learn it and you'll find useful, if unconventional and demanding, tools that are well suited for architectural modeling. Jan 94

★★★ **Virtus WalkThrough 1.1, Virtus Corp., 919/467-9700, \$195.** Interactive 3-D modeling tool provides instantaneous access to rendered 3-D scenes, allowing you to travel through models at will. While it has some problems (such as occasionally just quitting), it's an excellent value. Jul 93

★★★ **Wraptures One, Wraptures Two, Form and Function, 619/536-9999, \$95 each.** The images in these texture collections on CD-ROM are generally acceptable, although some are muddy and others are difficult to decipher at low resolutions. If you need images for repeating patterns, however, these repeat seamlessly and are a good value. Aug 93

MATH/SCIENCE

★★★ **Alchemy III, Tripos Associates, 314/647-1099, \$950.** Molecular-modeling software can model decapeptides and DNA fragments, in addition to the expected small molecules, with refreshing alacrity on a Mac IIci or better. Sep 93

★★★ **Amazing Universe 2.1 (2.1a), Hopkins Technology, 612/931-9376, \$79.95.** Space-image exploration package on CD-ROM offers an amazing variety of astronomical images with a very competent program (ProVision II) for modifying and inspecting those images. It assumes that users won't be fazed by such things as writing their own image-convolution matrices. Aug 93

★★★★ **CircuitMaker 3.0, MicroCode Engineering, 801/226-4470, \$199.95.** Much of the tedium of diagramming circuits and constructing prototypes is relieved by this digital circuit simulator that provides a powerful set of basic tools for a very reasonable price. Aug 93

★★★★ **CSC ChemOffice 2.0, Cambridge Scientific Computing, 617/491-6862, \$995 to \$1595.** Comprehensive chemistry software is the Mac equivalent of software that seven years ago would have cost \$200,000 and required an equally costly minicomputer. It's a winner. Feb 94

★★★★ **Data Desk 4.0 (4.1), Data Description, 607/257-1000, \$595.** For finding patterns in data, this statistical-analysis program has no peer. Years of refinement have made it a uniquely valuable tool, despite its lack of some tests found in larger programs. May 93

★★★★ **Expressionist 3.0 (3.1), Prescience Corp., 415/543-2252, \$159.** If you work regularly on similar topics, you can customize this equation-writing software to produce equations with exactly the appearance you want, letting you work at amazing speed. Mar 93

★★★ **f(z) 6, Lascaux Graphics, 602/299-0661, \$115.** The main problem this math software attacks is four-dimensional visualization. It costs slightly more than a textbook, making it a great educational bargain. Sep 93

★★★★ **FASTAT 2.0, SYSTAT, 708/864-5670, \$495.** Statistical business-analysis software makes sense as a day-to-day statistics tool. It provides the right tests for most requirements, and its graph types provide plenty of information, although they lack glamour. Jun 93

★★★★ **InStat 2.01, GraphPad Software, 619/457-3909, \$95.** For scientists with limited statistics backgrounds, the chatty clarity of this lab-oriented statistics software's help screens will be invaluable, while the limited variables and minimal graphics won't be a problem. Nov 93

★★★★ **MacPhase 1.2, Otter Solutions, 315/768-3956, \$159.** Low-cost, scientific-data-visualization software with a large assortment of mathematical tools is an authentic bargain. A principal strength is a well-planned color lookup table editor that's delightfully easy to use. May 93

★★★★ **MathCAD 3.1, MathSoft, 617/577-1017, \$495.** Numerical and symbolic computation software is easy to learn and use, and is much more powerful than earlier versions. It doesn't compete in scope with the largest math programs, but for most science and engineering tasks, it's a fast way to get problems solved. Jun 93

★★★★ **Mathematica 2.2, Wolfram Research, 217/398-0700, \$595.** The one essential program in science and mathematics adds a function browser that makes the program as easy to use as it should be, as well as improvements to computational routines. Sep 93

★★★★ **MathType 3.0, Design Science, 310/433-0685, \$199.** This equation-writing software makes automatic typographical decisions, which is helpful if you produce documents on a wide range of subjects. Its smooth integration with Microsoft Word is also convenient. Mar 93

★★★★ **QC Tools 1.0, Abacus Concepts, 510/540-1949, \$245.** Quality-control tool kit for StatView appears to introduce a slight slowdown in program response, but is generally well designed, well documented, and suitable for quality-control neophytes as well as professionals. Jan 94

★★★★ **Spyglass Dicer 2.0, Spyglass, 217/355-6000, \$695.** Scientific 3-D visualization tool displays a two-dimensional slice through a three-dimensional object (which is represented in the computer by a data table). While Dicer pushes the limits of the Mac hardware, for its function this product is really the only game in town. Jul 93

★★★★ **Spyglass Transform 3.0 (3.01), Spyglass, 217/355-6000, \$595.** Scientific-visualization software can access data stored in every common format, offers some useful presentation-graphics features, and includes a programming language with a large range of built-in, high-level scientific functions. Sep 93

★★★★ **StatView 4.01 (4.02), Abacus Concepts, 510/540-1949, \$595.** If your work uses statistics for decision support rather than abstract analysis, and you regularly have to present your results to non-statisticians, this is the statistics package for you. Oct 93

★★★★ **Sum Total 1.01, Concurrent Engineering Tools, 602/464-8208, \$99.95.** Exceptional calculator utility is packed with advanced features, including a mode that lets you sample colors and use the numerical color values in calculations. The convenient palette approach causes a distinct time-lag in menu operations. Oct 93

★★★★ **Theorist 1.5, Prescience Corp., 415/543-2252, \$289.95.** Symbolic-math program that you can figure out by yourself adds a useful table feature, more special functions of physics, and better graphics. It's still the only program to use real notation directly. May 93

★★★★ **Turing's World 3.0, CSLI Publications, 312/568-1550, \$19.95.** Computer-science educational software lets you investigate some fundamentals in computing at an almost unbelievable bargain price. Feb 94

★★★★ **Visualization of Natural Phenomena, Telos/Springer Verlag, 408/249-9314, \$59.95.** CD-ROM introduction to applying all aspects of computer graphics to scientific imaging; covers all disciplines and offers definitive analysis of methods. No other source covers this much material, at this level of clarity. Jan 94

★★★★ **Voyager II 1.0 (1.01), Carina Software, 510/352-7328, \$159.95.** If a brilliantly lit, star-filled sky holds more than a moment's fascination for you, you need to know about this astronomy program. In a firmament of mostly faint and forgettable astronomy software, it's a supernova. Jul 93

ORGANIZATION/PRODUCTIVITY

★★★★ **Achieving Your Career 1.02 (1.04), Up Software, 415/921-4691, \$69.** HyperCard-based job-search software succeeds by compactly organizing. It provides a structure for identifying letters to write, phone calls to make, and interviews to follow up. Aug 93

★★ **ACT 1.0 (1.01), Contact Software International, 214/919-9500, \$395.** While this contact manager has several laudable features, such as customizable contact views and an integrated word processor, learning how to use it is a frustrating experience. Feb 93

★★★★ **CalendarMaker 4.0, CE Software, 515/224-1995, \$59.95.** Polished, intuitive calendar-making program is straightforward, with a variety of options for customizing your calendar. Some features can be cumbersome. Oct 93

★★ **ClieTrac 1.7.1 (1.7.2), Whiskey Hill Software, 415/851-8702, \$135.** Easy-to-use, HyperCard-based contact-management software performs as billed, but fails to inspire much enthusiasm. Aug 93

★★★★ **Contact Ease 2.0.1 (2.0.2), WestWare, 619/274-5053, \$395 to \$1495.** Contact-management and sales-automation software helps salespeople keep in touch with contacts, makes it easy to generate letters, and maintains detailed records of activities. It has a few quirks but is overall a good program. Aug 93

★★★★ **DateBook and TouchBase Pro Bundle, Aldus Corp. Consumer Division, 619/558-6000, \$149.95.** Calendar and contact manager offer a superior combination of integration, usefulness, and features. If you want to get organized, make sure you look at this dynamic duo. Feb 94

★★★★ **DayMaker 2.0 (2.03), Pastel Development Corp., 212/941-7500, \$129.95.** If you need to organize lots of disparate information, follow up on meetings with many people, create an archive of completed work, and print out lists of to-do items, this free-form personal information manager is a great choice. May 93

★★★★ **Dynodex 3.0 (3.0.1), Portfolio Software, 802/865-2700, \$59.95.** The speed and printing options of this field-based address-book manager are its strengths, but this upgrade adds welcome improvements to the interface, including automatic formatting of phone numbers. Apr 93

★★★★ **In Control 2.0, Attain Corp., 617/776-1110, \$89.95.** The best features of an outlining program are combined with those of a database, making it easy to sort, search, organize, and print your to-do list. Aug 93

★★★★ **Inspiration 4.0, Inspiration Software, 503/245-9011, \$295.** Watch your ideas evolve in a dynamic diagram mode and a text-based outline mode with this brainstorming tool. Feb 93

★★★★ **InTouch 2.0.4 (2.0.8), Advanced Software, 408/733-0745, \$99.95.** Free-form database is a fast and easy way to manage contact information. *Al-continues*

HOW TO USE PC DATA WITHOUT LOSING YOUR COOL



You asked them to give you the file on a disk. But the floppy they handed you was formatted for an IBM PC.

Worse yet, the file was created by a program you don't have.

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Unlike other packages that only provide disk compatibility, AccessPC also includes dozens of translators.

So when you try to open a file ↗

your Macintosh doesn't recognize, AccessPC opens it anyway — and asks you which Mac format to convert it to. ⚡

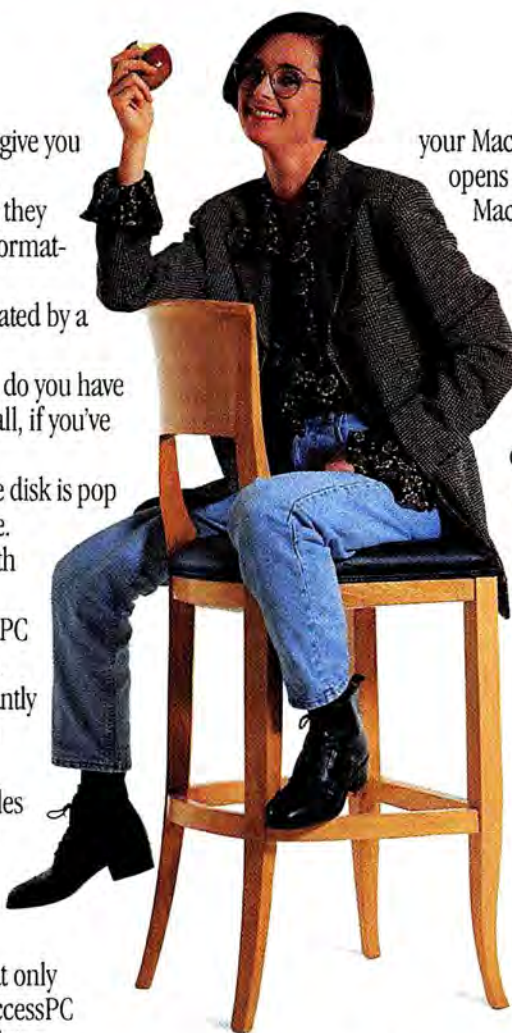
And when you go to write a Mac file to a PC disk, AccessPC lets you choose which PC format you want.

Speaking of choices, AccessPC works with all kinds of PC media — from floppies and flopticals, to Bernoullis, SyQuests and mageto-opticals. It lets you format and partition them, too.

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And discover the words that best describe AccessPC.

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Insignia

Star Ratings

though this version adds a handy reminder system, it falls short as a calendar planner. Feb 93

★★★ **LapTrack For the Mac 1.0b (1.0g), Timeslips Corp., 508/768-6100, \$79.95.** Time- and expense-tracking program offers the right features for the on-the-go professional, but the interface is overcomplicated and the documentation is sloppy. Still, in spite of its flaws, it does an excellent job. May 93

★★★★ **Now Up-to-Date 2.0, Now Software, 503/274-2800, \$69.95 to \$599.** Calendar utility combines flexibility, ease-of-use, and streamlined operations in an almost irresistible package. The Reminder control panel, while a great new feature, has had minor conflicts. Jun 93

★★★★ **Power Team 1.0, ProVue Development Corp., 714/892-8199, \$149.95.** Personal information manager consists of seven modules: Phone Book, Calendar, Correspondence, Checkbook, Calculator, Expense Report, and Mailing List. It has some bugs, but the data entry features are excellent. Oct 93

★★ **Rae Assist 1.0.2, Rae Technology, 408/725-2850, \$199.** Although this personal-information manager offers some fresh ideas, including automatic linking of company and contact information, it's too big and too slow. Jan 94

★★★★ **Spiral 1.0 (1.02), Technology Works, 512/794-8533, \$129.** Designed specifically for taking and organizing notes, this product has an excellent feature set, but it's marred by some errors in the editing and import/export processes. Mar 93

★★ **TimeVision 1.0, Powercore, 815/468-3737, \$99.** New scheduler with notepad and card-file functions lacked on has some worthwhile features, but in general doesn't match up to the competition. May 93

PRESENTATION TOOLS

★★★★ **Action 1.0 (1.0.2), Macromedia, 415/252-2000, \$495.** Entry-level multimedia integration program offers, for its price, a rich selection of features, including a variety of transitions as well as gradient and patterned backgrounds. Feb 93

★★★★ **Adobe Premiere 3.0, Adobe Systems, 415/961-4400, \$695.** Solid and dependable QuickTime video-editing software offers a structured, responsive, and flexible interface with enhancements that range from the mundane to the dramatic. It can now mix 99 tracks. Jan 94

★★★★ **Astound 1.0, Gold Disk, 408/982-0200, \$399.** Presentation software lets you include sound, text, and graphics animation with no more effort than pasting in a chart in other products. It's a good value. Nov 93

★★★★ **Authorware Professional 2.0.1, Macromedia, 415/252-2000, \$4995.** Multimedia-scripting and -presentation software lets you develop complex presentations with amazing speed. Although expensive, it's wonderfully done and will pay for itself in time saved. Feb 94

★★★ **Avid VideoShop 2.0, Avid Technology, 508/640-6789, \$499.** QuickTime video-editing program shines in its intuitive, easy-to-use interface, although it may fall short on features for hard-core video professionals. Feb 94

★★ **Comet CG 1.0.3 (2.2), MSI, 317/842-5097, \$995.** Program for generating antialiased text over live video is reasonably priced compared with dedicated graphics systems, but you're likely to be as astonished by its limitations as you are impressed by its capabilities. May 93

★★★★ **CoSA After Effects 1.1, CoSA, 401/831-2672, \$1295.** QuickTime movie editor blurs the boundaries between animation and traditional video-editing. It produces results that simply can't be created in other

packages. Oct 93

★★★ **Elastic Reality 1.0, ASDG, 608/273-6585, \$349.** Exciting morphing tool can create professional-caliber results—if you can figure out how to use it. The needlessly convoluted interface, poor documentation, and inadequate tech support make that a difficult task. Feb 94

★★★★ **Hi Rez Audio Volume 1.0, Presto Studios, 619/689-4895, \$149.95.** The enjoyable, high-quality music on this CD-ROM adds a nice touch to presentations. The software for browsing the music is quirky, and the product could use some documentation. Jul 93

★★★★ **Interactive Training for Director 1.1, Media In Motion, 415/621-0707, \$199.** This somewhat expensive program teaches basic Macromedia Director skills and provides a foundation for exploring Director's other features. It has a clear, often lighthearted approach, but navigating the lessons can be frustrating. Jun 93

★★★★ **Macromedia Director 3.1 (3.1.3), Macromedia, 415/252-2000, \$1195.** Versatile multimedia authoring tool adds 23 scripting commands, QuickTime, and a utility that compiles movies into a faster playback format—along with a whopping \$149 addition to the price. Feb 93

★★★★ **Media-Pedia Video Clips, Media-Pedia, 617/235-5617, \$195 to \$495.** Fifty-seven minutes of stock footage for use in QuickTime movies includes over 150 different segments, ranging from unremarkable to dramatic to genuinely funny. Apr 93

★★★★ **Microsoft PowerPoint 3.0 (3.0b), Microsoft, 206/882-8080, \$495.** This presentation program is ahead of the pack in terms of convenience and ease of use. Although the ready-made template collection is pretty paltry, the extensive system of master layers, reliable cross-platform compatibility, and strong on-screen presentation capabilities more than compensate. Feb 93

★★★ **MovieWorks 1.1, Interactive Solutions, 415/377-0136, \$395.** Over 100 bugs were fixed in version 1.1 of this multimedia authoring software that takes an all-in-one approach to creating presentations, but problems remain. It's a good idea, poorly executed. Jun 93

★★★★ **QuickFlix 1.0, VideoFusion, 419/891-1090, \$149.** Approachable QuickTime moviemaking software lacks the high-end features of other programs but costs a whole lot less. Feb 94

★★★ **Special Delivery 1.0 (1.1), Interactive Media Corp., 415/948-0745, \$399.** While this entry-level multimedia package has all the tools you need to assemble interactive screen presentations that burst with motion and sound, it has a disorienting interface and lacks the polish and power of other programs. Mar 93

★★★★ **VideoFusion 1.0.1 (1.5), VideoFusion, 419/891-1090, \$649.** Collection of special effects for QuickTime movies may not be for the casual user, but if you have the equipment and you can't live without spinning logos, then go ahead and indulge. Jul 93

★★★★ **Working Model 1.0, Knowledge Revolution, 415/553-8153, \$995.** Animators and engineers will love this terrific motion simulator that mimics real motion by applying physical laws to objects. It's easy to learn and use, but you'll need some understanding of math and physics. Oct 93

PROGRAMMING

★★★★ **CLimate 1.0, Orchard Software, 617/876-4608, \$59.95.** With a little more documentation and a few more sample programs, this utility that provides a subset of Unix-like commands for the Mac environment could be an irresistible package. Oct 93

★★★★ **EISToolKit 2.0 (2.11), MicroStrategy,**

302/427-8800, \$1995. Reliable, field-tested developer's environment for creating executive information systems provides automatic access to information in spreadsheets and databases across a distributed system. May 93

★★★★ **FutureBASIC 1.0 (1.02), Zedcor, 602/881-8101, \$299.95.** Complete, easy-to-learn, real-world programming tool has full Toolbox, System 7, and assembler support. It's a wonderful tool that's rapidly becoming a favorite among commercial developers. Jul 93

★★★★ **Macintosh Common Lisp 2.0 (2.0.1), APDA, 716/871-6555, \$495.** Anyone who likes programming in LISP will be pleased with the environment provided by this version of the standard dialect and its extensive debugging and interface-building facilities. Oct 93

★★★★ **MetaDesign for the Macintosh 3.0, Meta Software Corp., 617/576-6920, \$250.** This diagramming tool for structured systems analysis offers easy ways to group and ungroup symbols in diagrams and to show relationships between symbols. It excels at austere, classic flowcharts but could use some flashier features, such as shaded backgrounds, for presentations. Mar 93

★★★★ **Object Logo Student Edition, Paradigm Software, 617/576-7675, \$49.95.** This book-plus-disk package offers a wide-ranging introduction to programming concepts. It's aimed roughly at the high-school educational level and lets you see something happen for every few lines of code you type. Jul 93

★★★★ **PG:Pro 1.5 (2.1), Staz Software, 601/255-7085, \$169.** For part-time or novice programmers, the combination of these BASIC programming tools and FutureBASIC is a fast path to a working program. Jul 93

★★★★ **PowerPacks 2.0, NDG Phoenix, 301/718-8880, \$225.** Programmers' tool kit for 4th Dimension provides 280 external procedures to improve custom applications and exploit System 7 features. Don't expect any quick fixes for 4D's less-than-blistering performance in most areas, though. Oct 93

★★★★ **Smalltalk/V for Macintosh 2.0, Digitalk, 714/513-3000, \$495.** Object-oriented development system is now even more viable for commercial projects, while Digitalk's customer support and documentation set a standard other vendors should emulate. Feb 94

★★★ **SoftPolish 1.1, Language Systems Corp., 703/478-0181, \$295.** Program-quality-assurance utility systematically checks the resources in a program's interface against a huge laundry list of errors. It's a programming tool for anyone who hopes to produce a commercial Mac application. Sep 93

★★★★ **SourceSafe 2.1, One Tree Software, 919/821-2300, \$295 to \$1195.** Solid, relatively easy-to-use product handles program-development administrative tasks, including version control, for multipatform programs being created by groups. Sep 93

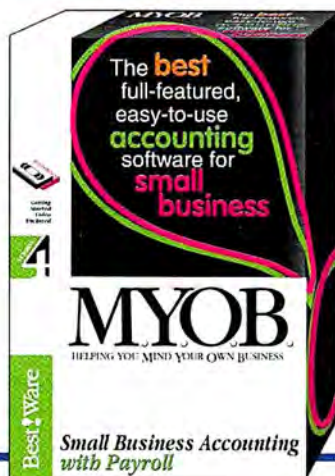
★★★★ **Symantec C++ for Macintosh 6.0, Symantec Corp., 408/253-9600, \$499.** If you like Think C, you'll like this software-development system, too. For the Mac, it's an excellent opportunity to catch a new wave in programming. Nov 93

UTILITIES

★★★★ **7th Heaven 2.5 (2.5.1), Logical Solutions, 612/659-2495, \$99.95.** Our reviewer found the seven enhancements to System 7 fun and elegantly done, but not all of them were useful. Jul 93

★★★★ **Alki Seek 2.1, Alki Software Corp., 206/286-2600, \$39.95.** Competent file-finding utility scans by file name or content and lets you combine multiple search

continues



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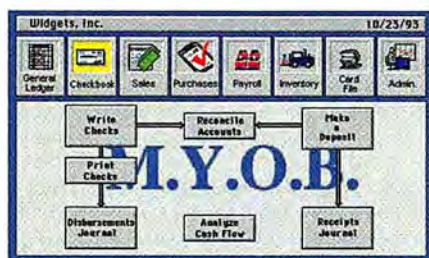
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criteria. It cannot search in the background or find text in compressed files. Jul 93

★★★★ **At Ease 1.0 (1.1), Apple Computer, 408/996-1010, \$59.** Sweet, simple, secure substitute for the Finder displays a clean, attractive page full of over-size icons where a single click launches a program or document. To delete, rename, or move files, you have to return to the Finder. Mar 93

★★★★ **Billy Steinberg's PBTools 1.0.1, Inline Software, 203/435-4995, \$99.55.** If you want basic PowerBook management without added frills or complex menu bar displays, this collection of four utilities may be just your cup of tea. Jul 93

★★★★ **Chameleon 2.0.3 (2.1), Logical Solutions, 612/659-2495, \$59.95.** Sleek desktop-pattern editor comes with an ample supply of rich, textured color images and a set of limited but functional editing tools. Sep 93

★★★★ **ClickChange 2.0, Dubl-Click Software, 818/888-2068, \$89.95.** Interface-customizing package has nothing you need but is filled with everything you want, including tools that let you alter major elements of the Mac's look-and-feel. Aug 93

★★★★ **Connectix Desktop Utilities 1.0 (1.0.1), Connectix Corp., 415/571-5100, \$99.** Although some of the 16 utilities offered in this package are more at home on a PowerBook, this collection offers one-stop shopping at a low price. It's worth it for the file-synchronization, Keyboard Power and Hot Keys features alone. Nov 93

★★★★ **CopyDoubler 2.0 (2.0.1), Symantec/Fifth Generation Systems, 504/291-7221, \$59.** This utility speeds up copying, lets you queue jobs for background copying, and offers a variety of other useful, copying-oriented features—all at a very reasonable price. Nov 93

★★★★ **Copyright Pro 1.0.3, CSG Technologies, 412/471-7170, \$79.** Utility takes over the Finder's copying function, copies in the background, and allows you to regularly schedule copying. It doesn't speed up copying, however. Nov 93

★★★★ **CPU 2.0 (2.0.1), Connectix Corp., 415/571-5100, \$99.** Reasonably priced collection of utilities for the PowerBook adds new features, including file synchronization, that easily justify the upgrade price. Sep 93

★★★★ **CryptoMatic 1.0.1, Kent Marsh, 713/522-5625, \$99.** Security software offers fast Finder-level encryption and decryption with effective file removal. Although its simplest encryption algorithm isn't quite hacker-proof, it's worth considering. Feb 94

★★★★ **DiskFit Direct 1.0, Dantz Development Corp., 510/849-0293, \$49.95.** Basic but efficient backup system is simple and painless enough to foster better backup habits in anyone who uses it. It doesn't back up to hard drives or tape drives. May 93

★★★★ **DiskLock PB 1.0, Symantec/Fifth Generation Systems, 504/291-7221, \$59.** PowerBook security software balances robust security with simplicity and ease of use. It's much harder to crack than most PowerBook utility collections' security features, and will keep out all but the most determined. Jan 94

★★★★ **DriveShare 1.03, Casa Blanca Works, 415/461-2227, \$129.95.** This utility allows users to share a removable drive over a network. It's most useful if your network consists of both System 6 and System 7 users, as its advantages over System 7 file sharing are slight. Nov 93

★ **DriveTech 1.0, MicroMat Computer Systems, 415/898-6227, \$59.95.** Without decent documentation or clearer error messages, this floppy-drive cleaning and diagnostic program is essentially a \$60 floppy-drive cleaning kit. Since you can buy a cleaning kit without software for \$10, that makes it a bad deal. Jan 94

★★★★ **DupLocator 1.03, Midnight Software, 303/933-1013, \$99.** For new Macintosh users who don't have a general file utility, this software that locates duplicate files, as well as performs basic file commands such as moving and renaming files, may be useful. Jan 94

★★ **DynoPage 2.0, Portfolio Software, 802/865-2700, \$59.95.** While this utility simplifies the printing of booklets and double-sided pages, it doesn't support PostScript graphics, is incompatible with some popular applications, and has a buggy drag-and-drop feature. Jul 93

★ **eDisk 1.0 (1.2), Alysia Software Corp., 415/566-2263, \$149.95.** Driver-level compression software has little to recommend it over file-level, idle-time compression programs. The biggest drawback is the strong potential for disk or file corruption. Oct 93

★★★★ **Icon 7, Inline Software, 203/435-4995, \$79.95.** Simple, straightforward utility has a streamlined and intuitive library feature for storing and retrieving icons, plus tools for icon editing. Its icon collection, however, is pretty paltry. Sep 93

★★★★ **Icon-It Pro 3.0.6, Olduvai Corp., 305/670-1112, \$129.** Utility allows you to attach custom tool bars to almost any application, including the Finder. The interface is quirky, but you get used to it. Dec 93

★★★★ **ILike Icon 1.0, Baseline Publishing, 901/682-9676, \$59.95.** Glibby utility has tools for icon editing, has a nice library of icons, and can create animated icons. Some basic features, such as a text tool, are missing, and the animated icons are fun but impractical. Sep 93

★★★★ **INITPicker 3.0 (3.02), Inline Software, 203/435-4995, \$79.95.** This INIT manager's ability to load aliased INITs over a network will interest network managers. While it disables problem INITs at start-up, it doesn't help you identify the cause of INIT conflicts that don't cause the Mac to crash at start-up. Mar 93

★★★★ **Inline Sync 1.0 (1.01), Inline Software, 203/435-4995, \$129.95.** Keep the latest version of your work on your portable machine and your desktop Mac with this file-sync software. It's easy to install, easy to use, easy on the wallet, and does the job well. Mar 93

★★★★ **KidDesk 1.0 (1.1), Edmark Corp., 206/556-8484, \$39.95.** If you have young children who love to experiment with your Mac, this desktop environment provides easily navigable play while protecting your files from the havoc that little fingers can wreak. Jun 93

★★★★ **MacPak 1.0, Symantec/Fifth Generation Systems, 504/291-7221, \$149.** The quality of this utility collection is uneven—some modules are unpolished—but if you don't already own AutoDoubler, CopyDoubler, and a good file-management program, it's worth the price. Jan 94

★★ **Magic Typist 2.0, Olduvai Corp., 305/670-1112, \$129.** If you want to speed up typing of repetitive phrases or if you don't have full use of your hands, this utility, which automates typing of repetitive phrases, may be useful, but some functions work erratically or not at all in Microsoft Word. Sep 93

★★★★ **Magnet 1.0 (1.01), No Hands Software, 415/802-5800, \$129.95.** Automation aids file-management with this software. It creates "magnets" that trigger in response to user-specified events and automatically look for files to copy, move, or alias. Feb 93

★★★★ **Mr. File 2.0, Softways, 408/978-9167, \$99.** The well-designed background capabilities of this Finder utility make it a handy tool for copying, finding, moving, launching, and renaming files, although it has a few interface quirks. Dec 93

★★★★ **Norton Essentials for PowerBook 1.0, Symantec Corp., 310/453-4600, \$129.** Uneven collection of PowerBook utilities ranges from the useful In-

stant Access module, which automatically turns AppleTalk on and off, to the relatively inaccurate Battery Gauge feature, which tries to tell you your battery's status. Apr 93

★★★★ **Now Compress 1.0 (1.0.1), Now Software, 503/274-2800, \$99.** Compression utility holds its own in a crowded market; it's easy to use, it's complete, and it compresses as well as or better than other options. Dec 93

★★★★ **Now Fun, Now Software, 503/274-2800, \$69.** Five control panels let you liven up your Mac by customizing everything from menu colors to system sounds. The included screen-saver modules and desktop patterns and pictures are fairly limited, though. Dec 93

★★★★ **Now Utilities 4.0.1 (4.0.1p), Now Software, 503/274-2800, \$129.** Many thoughtful improvements have been added to this collection of utilities, which is now better integrated, more logically designed, and still an excellent deal for your dollar. The new scrapbook feature, however, is awkward and inconvenient. Aug 93

★★★★ **Peace of Mind 1.2.2, Polybus Systems Corp., 716/871-6533, \$149.** Hardware diagnostic tool performs exhaustive tests on major Mac hardware components; does an excellent job of diagnosing simple simulated hardware errors. The program has minor bugs and lacks a comparative test-history feature. Jun 93

★★★★ **PicturePress 2.5, Storm Technology, 415/691-6600, \$199.** This image-compression software supports every useful storage mode, has new calculation features for improved image fidelity, and is twice as fast as version 2.0. Mar 93

★★★★ **PowerMerge 1.0.2 (1.0.3), Leader Technologies, 714/757-1787, \$129.** File-synchronization utility has a potentially confusing interface but is a handy means of updating selected files so that different Macs end up with identical versions of the selected documents. Apr 93

★★★★ **Power To Go 2.0, Claris Corp., 408/727-8227, \$99.** PowerBook utility collection has a few unique slants—including a floating palette that can display battery-life estimates—that keep it above the also-rans. It does lack features of similar products. Dec 93

★★★★ **Public Utilities for the Macintosh 1.0, Symantec/Fifth Generation Systems, 504/291-7221, \$149.** Utility program sticks to the basics of disk diagnosis, disk repair, and file optimization. It does a good, and in some cases unique, job, although disk optimization is slow. Jun 93

★★★★ **RapidTrak 1.0.1 (2.0), Insignia Solutions, 415/694-7600, \$99.95.** If you've got RAM to spare, this hard drive formatter offers driver-level RAM caching to store frequently used data and improve performance, especially on slower-speed drives. May 93

★★★★ **Redux Deluxe 2.0.2, Inline Software, 203/435-4995, \$79.95.** Easy to learn and relatively simple to use, this backup program has some powerful features, such as scripting, but it doesn't have a compression option. Jan 94

★★★★ **Retrospect 2.0, Dantz Development Corp., 510/849-0293, \$249.** Powerful backup and archiving software has an improved interface and scripting capabilities, and works well for all levels of users. Sep 93

★★★★ **Retrospect Remote 2.0, Dantz Development Corp., 510/849-0293, \$449.** Utility allows fast, automatic backup of networked Macs to a central Mac with a backup device. It worked flawlessly in our reviewer's tests. Sep 93

★★★★ **Safe and Sound, Central Point Software, 503/690-8090, \$49.95.** Limited but useful disk-protection and -salvage utility has a clean, simple interface and is an efficient emergency recovery tool. Jun 93

★★ **SafeDeposit 1.2, Dayna Communications,**

801/269-7200, \$189. Automated backup program is easy to set up but slow. Also, unattended backups must be restarted from scratch if disk space runs short and a new disk isn't inserted. Sep 93

★★ **Safe or Sorry 1.0, Olduvai Corp., 305/670-1112, \$59.** Unobtrusive control panel periodically saves all of your keystrokes, but requires System 7.1 and offers no clear-cut advantages when compared with other text-recovery programs. Oct 93

★★★★ **Screenscapes 1.0.1, Kiwi Software, 805/685-4031, \$44.95.** With more than 600 desktop patterns—and a suite of well-designed modules to transform those patterns—this fun and frivolous utility lifts desktop-pattern design to new heights of elegance. Nov 93

★★★★ **Square One 1.5.2, Binary Software, 310/582-8293, \$74.** Flexible, attractive icon-based file launcher provides infinitely customizable palettes, including one that displays active applications. The application will consume 400K of your system memory. Aug 93

★★ **Stacker for the Macintosh 1.0.1, Stac, the Data Compression Company, 619/431-7474, \$149.** As long as you pay attention to the capacity of your hard drive, this driver-level compression product performs reasonably well, except for its slow hard drive read quotient. Oct 93

★★★★ **Star Trek: The Screen Saver, Berkeley Systems, 510/540-5535, \$49.95.** Go where no Mac has gone before with this screen saver based on the original "Star Trek." May 93

★★★★ **Star Wars Visual Clips, Sound Source Unlimited, 805/494-9996, \$89.95.** Control panel lets you play QuickTime movie clips from Star Wars at system events. If you have the money, the hard drive space, and the RAM, this is the kind of totally cool toy that will make you remember why you love your Mac. Sep 93

★★★★ **Super 7 Utilities, Atticus Software, 203/324-1142, \$99.95.** Collection of seven control panels/extensions adds some ease of use to System 7, although none of its functions are essential. Modules perform tricks such as turning any menu into a tear-off palette, and randomizing the sounds that play in response to errors. Apr 93

★★ **TimesTwo 1.0.1 (2.0), Golden Triangle Computers, 619/279-2100, \$149.** Automatic disk-compression utility operates at the disk-driver level. A number of quirks, such as its ungraceful handling of full disks, are problems. May 93

★★★★ **Toner Tuner 1.0.3, Working Software, 408/423-5696, \$24.95.** Inexpensive, incredibly useful extension adds a sliding bar to print dialog boxes allowing you to adjust the amount of toner applied to each print job. If you can't save trees, you can at least save toner. Dec 93

★★★★ **ultraShield 1.252 (1.3), usrEZ Software, 714/756-5140, \$149.** Sophisticated security product combines practically every feature you might need into an integrated package, including a lightning-fast version of the U.S. government data-encryption standard. Dec 93

★★★★ **Virtual 3.0.1, Connectix Corp., 415/571-5100, \$99.** If you need to eke out as much virtual memory speed as possible, this utility may be a useful tool. For System 6 users who want virtual memory, it's the only game in town. Sep 93

★★★★ **Working Watermarker 1.02, Working Software, 408/423-5696, \$49.95.** This simple, useful system extension allows you to print or fax text and/or graphics "watermarks" in the background of virtually any document. Although the program has imperfections, it has earned a permanent spot in our reviewer's System Folder. Jan 94

VERTICAL MARKETS

★★★ **Compare-A-Loan 4.0.2 (4.1), Softflair, 612/894-3357, \$79.95.** Although geared to professionals, this product for home-loan evaluation provides thorough documentation and is structured so that anyone can use it. Apr 93

★★★ **Expert Home Design 1.0 (1.0.3), Expert Software, 305/567-9990, \$49.95.** Quickly and easily create home- or office-interior layouts that are precise, but not as detailed as blueprints, with this interior design software. May 93

★★ **Expert Landscape Design 1.0 (1.0.2), Expert Software, 305/567-9990, \$49.95.** Bare-bones drawing environment for experimenting with landscape design is inexpensive, but its usefulness is severely limited because of awkward color and pattern tools. Feb 93

★★★★ **Finale 3.0.1, Coda Music Technology, 800/843-2066, \$749.** Upgraded music-notation software is now infinitely more pleasant to use. Its comprehensive feature set makes it the standard against which all other music-notation products must be judged. Dec 93

★★★★ **LoanLease Library 3.0.3 (3.05), Softflair, 612/894-3357, \$99.95.** If you are generating a loan or a lease and need to keep track of payments, this well-documented program for loan evaluation is a worthwhile investment, despite its minor eccentricities. Apr 93

★★★★ **MacGrade 1.5.5, CalEd Software, 408/625-6667, \$85 to \$245.** Grade-book program has a straightforward, simple interface and clear documentation. Although there's room for improvement, it's easy to use and flexible. Feb 94

★★ **MacInteriors, Microspot, 408/253-2000, \$129.** Correctly placing objects is unduly cumbersome in this interior-design software, but once you catch on to the program's quirks, it's useful. Feb 94

★★★★ **Musichop 1.0, Opcode Systems, 415/856-3333, \$149.95.** MIDI sequencer is an excellent choice as a first sequencer. It's powerful enough to satisfy the needs of most MIDI users. Oct 93

★★★★ **Roll Call 2.0 (2.5.6 or 3.0), By the Numbers, 603/927-4508, \$495 to \$595.** 4th Dimension database application for church management helps track donations, attendance, church-group membership, and visitation. While not a complete church-management system, it's an acceptable complement to a general accounting program. Aug 93

★★★★ **Sailing Master 1.1, Starboard Software, 313/662-4393, \$64.99.** Though the slow speed and jerky motion point to less-than-polished programming, this sailboat-racing simulation offers good tactical play and is fun—well worth the price for sailing competitors. Nov 93

WRITING TOOLS

★★★★ **Final Draft 2.0.3 (2.0.4), MacToolkit, 310/395-4242, \$349.** Script writing gets simpler with this well-conceived software that automates formatting of different elements in a script. Customization is easy, and macros automate typing of common phrases. Apr 93

★★★★ **Just Joking 1.0, WordStar International, 415/382-8000, \$49.** HyperCard stack of around 2800 humorous quotations offers a serviceable selection of sayings from a diverse group of humorists, comedians, philosophers, and writers, among others. Apr 93

★★★★ **MacWrite Pro, Claris Corp., 408/987-7000, \$249.** Many of the new features of this upgrade are very well executed, including the easy-to-use table feature, simple but elegant palettes, and an almost pain-free

continues


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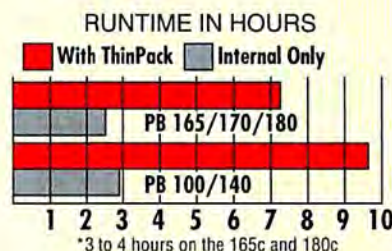


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mail merge feature. Jul 93

★★ **MasterWord 5.1, Alki Software Corp., 206/286-2600, \$99.95.** The centerpiece of this package of add-on Microsoft Word commands is a set of customizable tool bars. Unfortunately, rough edges remain, including inaccuracies in the documentation and some features that don't work as advertised. Aug 93

★★★★ **Microsoft Word 5.1 (5.1a), Microsoft, 206/882-8080, \$495.** Small, solid upgrade fine-tunes some plug-in modules and adds new modules including an icon tool bar and text annotation. It's worth the upgrade price, but it won't give Word 5.0 users goosebumps. Mar 93

★★★ **RightWriter for the Mac 5.0, Que Software, 317/573-2500, \$99.95.** Grammar checker looks at writing style, word usage, punctuation, and capitalization, as well as grammar. Customizable filters and multiple approaches to analysis are nice, but—as with all grammar checkers—not all the advice is great. May 93

★★★ **ShowScape 4.1, Lake Compuframes, 914/941-1998, \$429 to \$679.** This script-writing software formats scripts in either screenplay format or dual-column format (for audio and video) and allows you to choose the number of shots displayed per page, but it requires you to own and work in WordPerfect. Apr 93

★★★ **Spelling Coach Professional 4.0.1, Deneba Software, 305/596-5644, \$195.** If you're considering investing in reference software, this spelling checker, dictionary, and thesaurus is a relatively capable, if expensive, alternative. Oct 93

★★★★ **Thunder 7 1.5.3, Baseline Publishing, 901/682-9676, \$99.95.** Stand-alone spelling checker and thesaurus interactively monitors your keystrokes and alerts you to potential errors as they are entered. It quickly and transparently prevents you from making embarrassing typos. Nov 93

★★★★ **TypeReader 1.0, ExperVision, 408/428-9988, \$695.** Speed and accuracy combine with a straightforward operating style in this high-end OCR software that doesn't do everything its competition does, but is a major contender nonetheless. Feb 93

★★★★ **VersionMaster 1.5, AStar Technologies, 508/486-8532, \$199.95 to \$1199.95.** Document-management utility helps you archive and track versions of a file by maintaining a database of altered documents. It's recommended only for workgroups that routinely follow check-out procedures. Apr 93

★★★★ **A Zillion Kajillion Rhymes 1.0, Eccentric Software, 206/628-2687, \$49.95.** Rhyming dictionary is quick, small, simple, and self-contained; but it only rhymes with the roots of search words (and ignores -ed, -s, and -ing endings). Nov 93

Hardware

MISCELLANEOUS HARDWARE

★★ **ACS100, Altec Lansing Consumer Products, 717/296-2818, \$180.** Lightweight powered speakers don't sound as good as they should. There's too much emphasis on the high end at the expense of the midrange, and they hiss noticeably. Dec 93

★★ **ACS150, Altec Lansing Consumer Products, 717/296-2818, \$150.** Subwoofer rounds out the sharp tones of the ACS100, but the bass response is neither punchy enough nor loud enough, and the unit is about the size and weight of a concrete block. Dec 93

★★ **Address Express, CoStar Corp., 203/661-9700, \$499.** Flaky performance and system crashes plagued this envelope-and-label printer in our tests, but the

print quality was good. Oct 93

★★ **Apple Adjustable Keyboard, Apple Computer, 408/996-1010, \$219.** Keyboard is only a slight improvement on the flat slab keyboard. Theoretically, it corrects ulnar deviation, but many sufferers of repetitive stress injuries want a keyboard that adjusts vertically. Jul 93

★★★★ **AppleCD 300, Apple Computer, 408/996-1010, \$599.** Double-speed CD-ROM drive spins its discs at twice the speed of earlier drives, providing faster access to large files. Jun 93

★★★★ **Apple Color OneScanner, Apple Computer, 408/996-1010, \$1349.** Tests of this color scanner demonstrate unpolluted colors and sharp image details, perhaps due to color filters and lenses that Apple claims were designed and tuned for the scanner. Jul 93

★★★ **AppleDesign Powered Speakers, Apple Computer, 408/996-1010, \$179.** Tall and curvy powered speaker set looks and sounds good and can produce uncomfortably high volumes without noticeable distortion, but the bare-wire-and-terminal connections aren't user-friendly. Dec 93

★★★★ **Apple Newton MessagePad, Apple Computer, 408/996-1010, \$699.** Although Apple released this personal digital assistant too early and marketing hype led to mistaken expectations, this is a very intelligent piece of work with an impressive variety of serious business uses. Dec 93

★★★ **Apple PowerCD, Apple Computer, 408/996-1010, \$400.** This extremely versatile and beautifully designed portable CD-ROM drive offers impressive audio and Photo CD features, but if you're a serious CD-ROM user, it's too slow to satisfy. Jan 94

★★★★ **ArtZ ADB Tablet, Wacom Technology Corp., 206/750-8882, \$449.** Combining pressure-sensitive operation, manageable size, and a new pencil-thin stylus, this affordable digitizing tablet is perfect for artists looking for traditional-style control of their graphics programs. Aug 93

★★★ **Computer Crayon, Appoint, 510/463-3003, \$49.** The kid contingent's verdict was a definite thumbs-up on this brightly colored input device that's shaped like a thick pencil. The buttons can be hard for smaller children to press, and serious computer artists should still opt for a drawing tablet. Oct 93

★★★★ **Coolscan LS-10e, Nikon Electronic Imaging, 516/547-4200, \$2600.** Compact desktop scanner for digitizing images from 35mm transparencies is slow, but delivers images good enough for newsprint publications and some catalogs. Dec 93

★★★ **EMBARC, Embarc Communications Services, 407/364-2000, \$395 plus fees.** If you're a PowerBook user who is frequently in places with no telephone and you need timely delivery of electronic news and E-mail, this portable wireless message service may prove useful, but the cost may be prohibitive to others. Sep 93

★★★★ **Epson ES-800C, Epson America, 310/782-0770, \$1499; Macintosh interface kit \$399.** Flexible 400-dpi scanner offers a range of options, including one- or three-pass scanning, plus a full-featured, easy-to-use software package. Aug 93

★★ **Gulliver, Appoint, 510/463-3003, \$119.** This diminutive mouse is hard to hold comfortably for an extended period, but it works well on almost any surface and is an acceptable option for PowerBook users. Oct 93

★★★★ **Hello Music, Yamaha Corp. of America, 714/522-9240, \$449.** MIDI starter kit includes an impressive tone generator that's compatible with General MIDI Level 1 and Roland MT-32, but the included software is functional at best. Dec 93

★★★ **LightningScan Portable, Thunderware,**

510/254-6581, \$459. PowerBook owners will find this hand scanner's modem- or serial-port connection, lightweight interface, and total portability well worth the cost, although the scanner is incompatible with some desktop Macs. Dec 93

★★★★ **Media Control Station 1.0 (1.04), JLCopier Electronics, 310/306-4131, \$269.95.** Versatile tool connects to the Mac through an ADB port and offers an easy and intuitive way to cue and edit QuickTime movies, MIDI files, and other dynamic data. Feb 93

★★★★ **Mirror 800 Plus Color Scanner, Mirror Technologies, 612/633-4450, \$1299.** Add the optional NuBus JPEG board (\$300) and the easy-to-use 35mm transparency scanning module (\$599) and this is a nifty—if slow—desktop scanning package for a reasonable price. Jan 94

★★★★ **PhonePro 1.0.3 (1.2), Cypress Research Corp., 408/752-2700, \$950.** Application makes it relatively easy, especially for those with programming backgrounds, to develop a multiple-choice voice-mail system using your Mac. Feb 93

★★★ **PowerLink Presentor, E-Machines, 503/646-6699, \$499.** Simple, compact Duo dock wobbles a bit when plugged in but provides fine support for a variety of displays, plus ports for ADB, floppy drive, and sound output. Nov 93

★★★ **ScanMaker 35t, Microtek, 213/321-2121, \$1999.** Speedy 35mm film scanner accommodates loose film and delivers a good image, but the included software is weak. Dec 93

★★★ **ScanPlus Color 6000 for Mac, PlusTek USA, 408/980-1234, \$749.** Small, inexpensive sheetfed color scanner is not appropriate if exact color matching is critical, but it is otherwise a good, economical option. Sep 93

★★★ **TrakMate, Key Tronic Corp., 509/928-8000, \$149.** Input device integrates a trackball into a wrist pad. While the design is interesting, it's not for everyone. Feb 94

★★★ **The UnMouse, MicroTouch Systems, 508/659-9000, \$199.** Input device is a cursor-control device, programmable keypad, and small graphics tablet in one, and can be programmed with 60 macros (although only 16 can be selected by sight). It's ergonomically better than a mouse, but not as good as a trackball. May 93

★★★★ **Yamaha TG100, Yamaha Corp. of America, 714/522-9011, \$449.** Compact, keyboardless, multitimbral MIDI synthesizer adheres to the General MIDI standard patch arrangement. Although it won't convince you that you're hearing a live orchestra, the sound is about as realistic as low-cost MIDI gets. Apr 93

MODEMS/NETWORK HARDWARE

★★★★ **AsantéHub 1012, Asanté Technologies, 408/435-8388, \$1299.** This 12-port, 10BaseT Ethernet hub works right out of the box and is a premium device at a bargain price. Dec 93

★★★ **DataLink PB; Axcell Cellular Interface, Applied Engineering, 214/241-6060, \$824.** If you need a full-blown office on the beach, this PowerBook cellular-modem package with automatic answering machine is a well-executed solution. Each recorded second requires 25K of disk space. Nov 93

★★★ **PerFit Port-A-Com, PerFit, 303/530-7333, \$349.** Compact, ADB-powered, high-speed fax/data modem is difficult to configure, due to its Spartan and poorly organized documentation, but is still a solid product at a reasonable price. Nov 93

★★★★ **Sportster 14,400 Fax/Data Modem,**

U.S. Robotics, 708/982-5001, \$329. Several nice features, including an easily accessible power button and a front-mounted volume-control dial, make this 14,400-bps fax/data modem better than average. Feb 93

★★★★ **SupraFaxModem 144PB, Supra Corp., 503/967-2400, \$349.95.** If you're looking for a high-speed internal modem for your PowerBook, and you want to save a few bucks, this modem is worth considering. Disabling its fax software solved occasional transfer problems. Nov 93

PRINTERS

★★★★ **Apple Color Printer, Apple Computer, 408/996-1010, \$2349.** If you need large-format color output, but not precision color-matching, this well-built printer is a reasonable choice, although it doesn't support PostScript. Aug 93

★★★★ **Apple Portable StyleWriter, Apple Computer, 408/996-1010, \$439.** Sleek, portable ink-jet printer weighs 4½ pounds and is a pleasure to use. It uses standard StyleWriter cartridges. Jan 94

★★★★ **DEClaser 1152, Digital Equipment Corp., 508/493-5111, \$999.** Four-pages-per-minute, 300-dpi, PostScript Level 2 printer offers simultaneous support for Macs and PCs, plus excellent image quality, for a ground-breaking price. May 93

★★★★ **HP LaserJet 4M, Hewlett-Packard, 800/752-0900, \$2479.** An Intel i8960 RISC processor makes printing complex images faster than ever with this 600-dpi printer. Feb 93

★★★★ **LaserWriter Pro 600 and 630, Apple Computer, 408/996-1010, \$2099 to \$2529.** From their paper handling to their print quality, these laser printers are Apple's best. Unfortunately, they don't support emulation-sensing, and thus may be less desirable for mixed-platform offices than other possibilities. Jun 93

★★★★ **LaserWriter Select 300, Apple Computer, 408/996-1010, \$839.** Inexpensive, low-capacity printer is networkable, and an excellent buy, despite a few weaknesses. Add a 4MB SIMM to take advantage of the amazing PhotoGrade capabilities, which allow the printer to generate 91 shades of gray. Aug 93

★★ **LaserWriter Select 310, Apple Computer, 408/996-1010, \$1099.** This big, slow printer is a true Adobe PostScript printer with both Mac and DOS ports, but it's not networkable or compatible with the Communications Toolbox, it can't automatically switch ports, and it doesn't have adjustable paper guides. Aug 93

★★★★ **MobileWriterPS, Mannesmann Tally Corp., 206/251-5524, \$999.** Fast, portable printer is currently the only PostScript portable available. While the print quality is quite good on glossy laser paper, it's mediocre on inexpensive bond. Dec 93

★★★★ **Phaser 200i Color Printer, Tektronix, 503/682-7377, \$5995.** This thermal-wax color printer is fast and compact, with versatile paper-handling features. TekColor image-enhancement technologies provide excellent output quality that is, however, poor on letterhead and inexpensive photocopy bond. Aug 93

★★ **PrintPartner 10W, Fujitsu Computer Products, 408/432-6333, \$2450.** While this multipatform printer is fast and prints clearly, many Mac users will find it frustrating as it can't print some TrueType fonts. Jul 93

★★★★ **StyleWriter II, Apple Computer, 408/996-1010, \$359.** Apple's ink-jet printer retains the best features of its predecessor, but costs less. New features, such as gray-scale printing and the ability to share the printer over a network, make it even more versatile. Jun 93

★★★★ **WideWriter, GCC Technologies, 617/**

275-5800, \$1699. Large-format output is reasonably priced with this ink-jet printer that can automatically feed sheets as large as 14 by 91 inches, and manually feed sheets 17 inches wide with an unlimited length. Feb 93

★★★★ **WriteMove II, GCC Technologies, 617/275-5800, \$599.** Portable printer for the PowerBook measures 11½ by 2 by 3½ inches and weighs 2½ pounds. It's no speed demon, but it's fine for short jobs. May 93

SYSTEMS/STORAGE

★★★★ **Centris 610, Apple Computer, 408/996-1010, 4/80 \$1859.** Slim-design Mac uses a 20MHz 68LC040 processor at a price-to-performance ratio that comes close to competing with Windows PCs; however, its expandability is severely limited. Jun 93

★★★★ **Centris 650, Apple Computer, 408/996-1010, 4/80 68LC040 \$2699.** Moderately priced but fast 040 system offers three expansion slots and one drive bay, and (except for the base model) has built-in Ethernet, video circuitry, and a math coprocessor. Jun 93

★★★★ **DataPak 105, Mass Microsystems, 408/522-1200, \$949 to \$1049.** Well-built 105MB SyQuest drive comes with a decent, no-frills cartridge-formatting package and a copy of 7th Heaven. The preformatted cartridges have a lifetime warranty. Sep 93

★★★★ **Duo Dock, Apple Computer, 408/996-1010, \$1079.** Clever housing for Duos provides back-panel connectors, a SuperDrive, support for external monitors, and two expansion slots. Some details, such as the difficulty of installing NuBus boards, belie Apple's usual attention to detail. Mar 93

★★★★ **Expert Pad PI-7000, Sharp Electronics Corp., 800/993-9737, \$899.** Personal digital assistant features the advantages of the Newton, in a better industrial design and at a comparative price. If the battery lasted longer and the message network were implemented, the PDA revolution could begin. Feb 94

★★★★ **FastCache Quadra, Daystar Digital, 404/967-2077, \$279 to \$399.** PDS board provides 128K of secondary cache for a Quadra. The average real-world speed improvement is 15 percent, but some operations benefit more from the cache card than others. May 93

★★ **HP Optical Disk Library 10LC, Hewlett-Packard, 800/752-0900, \$9495.** Optical jukebox may fill the need for 10 gigabytes of online storage, but its performance is poor, and the software lacks the features needed for adequate management. Jan 94

★★★★ **Infinity 105 Turbo, Peripheral Land, 510/657-2211, \$795 to \$894.** Small, light, quiet, inexpensive 105MB SyQuest drive is ingeniously packaged and ideal for both desktop and PowerBook use. Sep 93

★★★★ **Infinity Optical 3.5, Peripheral Land, 510/657-2211, \$1999.** If you need the extra measure of permanence that magneto-optical storage provides—or a compact alternative to bulky cartridges—this drive, based on a Sony mechanism and using 3½-inch disks that store 120MB of data, deserves a look. Jun 93

★★★★ **LC III, Apple Computer, 408/996-1010, 4/80 \$1349.** Base system comes equipped with a 25MHz 68030 processor and 512K of VRAM. This is a machine that fits the bill and the pocketbook of most home users and small-business owners. Jul 93

★★★★ **MicroMac Plus Upgrade System, Micro-Mac, 714/362-1000, \$499.** This 68030 accelerator for the Mac Plus requires disassembling a Plus and using the Plus system board to assemble the MicroMac system. It speeds up the Plus dramatically, and supports an included external full-page monochrome monitor. Jun 93

continues

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★★★★ **MultiDisk 150, Iomega, 801/778-1000, \$699.** Durable cartridges are one of the strongest reasons to choose this Bernoulli removable drive. Although it's slightly more expensive than a SyQuest drive, it's fast and reliable, and the disks are competitively priced. **Jun 93**

★ **NuTek Duet, NuTek USA Corp., 408/973-8799, \$2996.** Mac workalike is both a PC and a Mac in a single box, but because of many incompatibilities and problems, the Duet is not a computer anyone should consider using for serious work. **Feb 94**

★★★ **OrangePC, Orange Micro, 714/779-2772, \$1799.** NuBus board has a DOS processor, letting you have your Mac and a PC, too. It's fairly well executed, though there are some minor problems. **Oct 93**

★★★★ **PowerBook 140 F/25 Upgrade, Digital Eclipse Software, 510/547-6101, \$399.** By changing the oscillators and adding an FPU, Digital Eclipse changes PowerBook 140s into 170s, minus the active matrix screen. While the upgrade seems expensive, it's the only way to extend the viability of a 140. **Dec 93**

★★★ **PowerBook 145, Apple Computer, 408/996-1010, 4/40 \$2149.** Adequate but essentially outdated notebook computer is an upgraded PowerBook 140 with a faster 25MHz 68030 CPU. **Feb 93**

★★★★ **PowerBook 160, Apple Computer, 408/996-1010, 4/40 \$2429.** A built-in video port and gray-scale capability are the new features Apple offers with this notebook computer. While it offers good processing speed and power, the passive matrix display doesn't cut it for all-day use. **Feb 93**

★★ **PowerBook165c, Apple Computer, 408/996-1010, 4/80 \$3399.** The passive matrix screen of this color notebook computer is dull and has noticeable afterimages, but if your expectations are reasonable, the speedy processor provides a pleasant environment in which to work. **Jul 93**

★★★★ **PowerBook 180, Apple Computer, 408/996-1010, 4/80 \$4109.** An active matrix screen and math coprocessor are the only differences between this computer and the PowerBook 160, but the beautiful display is worth the extra \$1000. **Feb 93**

★★ **PowerBook 180c, Apple Computer, 408/996-1010, 4/80 \$4169.** The active matrix screen of this color notebook computer is beautiful but so small that its usefulness is very limited. **Sep 93**

★★★★ **PowerBook Duo 210 and 230, Apple Computer, 408/996-1010, 210 (4/80) \$1839, 230 (4/80) \$2299.** Apple's smallest computers have the pleasing heft of hardbound books but pack the horsepower of 030 chips. Although the screen, keyboard, and trackball feel small, these computers virtually cry out to be picked up and used. **Mar 93**

★★★★ **PowerBook Duo 270c, Apple Computer, 408/996-1010, 4/240 \$3099.** Notebook computer meets all the demands of power users; it weighs less than 5 pounds, features a color active matrix display, and offers longer battery life. The lack of a floppy drive can be inconvenient, though. **Feb 94**

★★★★ **Quadra 800, Apple Computer, 408/996-1010, 8/230 \$4679.** Squat, yet curvy and attractive, this minitower system has fewer expansion opportunities than the Quadra 950, but just as much power. It's fast, slick, and moderately priced. **Aug 93**

★★★★ **Quadra 840AV, Apple Computer, 408/996-1010, 8/230 \$4069.** Technological tour de force uses a 40MHz 68040 and an AT&T 3210 digital signal processor, and is brimming with sophisticated speech-recognition and audiovisual technology. Beware of some hardware and software incompatibilities. **Dec 93**

★★★ **SmartStack, Envisio, 612/628-6288, SmartSource \$119; SmartModules \$289 to**

\$1379. The SmartStack line of modular storage peripherals may be neatly stacked on top of a common power supply to reduce desktop clutter and cabling problems. **Sep 93**

★★★ **Turbo 040, DayStar Digital, 404/967-2077, \$1899.** This accelerator card is equipped with the fastest 68040 chip available, and is as fast as or faster than any Macintosh in processor-intensive tasks. For the price, however, it may make more sense to trade up to a faster computer. **Dec 93**

VIDEO/DISPLAY

★★★ **AudioVision 14 Display, Apple Computer, 408/996-1010, \$769.** Monitor integrates audio and video with built-in speakers that produce surprisingly rich, full-bodied sound. The display, while nice, is small for multimedia work. **Dec 93**

★★★ **BookView Imperial, Computer Care, 612/371-0061, \$1399 (includes 6MB of RAM).** This notebook-display adapter supports all common sizes of monitors. It is expensive, however, and uses 2MB of system memory for video processing. **Feb 93**

★★★ **Dycam Model 3, Dycam, 818/998-8008, \$895.** Low-end, digital still camera is easy to use, and is a solid product if Instamatic grade gray-scale meets your image-quality requirements. **Sep 93**

★★★ **Editing Aces Suite, RasterOps, 801/785-5750, \$3899.** Video professionals can record and play back full-screen movies in 24-bit color with 16-bit CD-quality sound with these products. Despite flaws, this package represents a step forward in QuickTime technology. **Nov 93**

★★★ **Lightning Effects II, Spectral Innovations, 408/955-0366, \$1295.** Digital-signal-processor chips dramatically speed up some Photoshop operations with this expensive Photoshop-acceleration board. It had problems acquiring some JPEG files. **May 93**

★★★ **L-TV, Lapis Technologies, 510/748-1600, \$349.** Interface board allows a Mac LC, LC II, or Performa to use a TV as a display. Unfortunately, a TV is a poor substitute for a monitor, so while the L-TV does its job, the setup is unsuitable for many applications. **May 93**

★★★★ **MovieMovie, Sigma Designs, 510/770-0100, \$349.** This 7-inch NuBus video-capture board may be what you've been waiting for. The price is right, and the addition of on-board audio input is a plus, even if it is only mono. **Dec 93**

★★★ **PaintBoard Turbo, RasterOps, 408/562-4200, \$1499.** Midrange video board supports 24-bit color on monitors up to 17 inches and resolutions as high as 1024 by 768 pixels. If you can live without changing resolutions on the fly, it's a reasonably good deal. **Oct 93**

★★★ **Power Portrait, Sigma Designs, 510/770-0100, \$749.** Hook your Classic or PowerBook to this 15-inch portrait-style monochrome display. Built-in QuickDraw acceleration speeds up the slow SCSI connection on the one hand, and results in a few software incompatibilities on the other. **Feb 93**

★★★★ **PowerVision, Mirror Technologies, 612/633-4450, \$499 to \$999.** Separate VRAM means you don't lose system memory with this nicely priced notebook-display adapter. **Feb 93**

★★★★ **ThunderStorm, SuperMac Technology, 408/541-6100, \$699.** Photoshop-acceleration board uses digital-signal-processor chips to speed up some Photoshop operations. It's fast, with good JPEG compatibility and a great manual. **May 93**

★★★ **VideoToolkit 2.0.1, Abbate Video, 508/376-3712, \$279.** Despite a few rough edges, this is an attractive, inexpensive solution for those who need to catalog and edit videotapes on a budget. **Sep 93** **m**

Streetwise Shopper

SPECIAL HARDWARE AND SOFTWARE BUYING OPPORTUNITIES

Selected and edited by Charles Barrett

These special product promotions are being sponsored by Macintosh vendors and resellers for a limited time only. When ordering a product, please be sure to tell the vendor or reseller that you saw the promotional offer in *Macworld*. Should any problems arise, please inform the *Streetwise Shopper* editor by fax (415/442-0766), phone (415/978-3241), or mail (*Macworld*, 501 Second St., San Francisco, CA 94107).

Listings indicate the star rating awarded in *Macworld's* Reviews (products rated ★★ or lower are not eligible to be listed), if the product has been chosen as an *Editors' Choice*, and if it has won a *World-Class* award. In some cases, the editorial evaluation quoted is for an earlier product version.

Vendors and resellers desiring to have products and services considered for inclusion in this section are encouraged to mail or fax press releases, or to call the *Streetwise Shopper* editor with particulars (contact information shown above).

BUNDLES

First Things First Proactive + First Things First 3.0

Visionary Software is including its \$79.95 First Things First event-reminder utility (Apr 92 ★★★★★ for version 2.0) free with the purchase of a new \$149 First Things First Proactive time-management system that fully integrates outlining with scheduling and provides shared calendars, shared reminders that can launch files of any type, automatic scheduling of cyclical projects, and delegation of time-lined items. Bundle is available direct or through resellers for \$99. Call 800/877-1832 for purchase information. *Offer expires 3/15/94.*

InTouch 2.0 + DateView 1.0 The Mac Zone is offering a bundle from Advanced Software consisting of InTouch, the \$99.95 address book and reminder desk accessory (Feb 93 ★★★★★—"flexible output options"; 1993 *World-Class*) plus DateView, a new \$99.95 calendaring and to-do-list management program that integrates seamlessly with InTouch. Available through The Mac Zone (800/248-0800) for \$54.96. *Offer expires 4/31/94.*

PowerTools + free Macintosh Quadra 605 Iconix Software Engineering is giving away a Quadra 605 with 4MB of RAM and an 80MB hard drive (Mar 94 ★★★★★—"pummels the former champ, the Mac IIci"), complete with keyboard and 13-inch color monitor, with the purchase of a \$599.95 bundle of six environment-specific software modules (plus a one-year service contract); Iconix offers ten PowerTool modules designed for object-oriented development, information-systems control, structured development, real-time-systems control, and Ada development. Call 310/458-0092 for further information. *Offer expires 2/15/94.*

QuickMail AOCE + PowerTalk Gateway StarNine's \$99 MailLink PowerTalk personal gateway is included free when you purchase any 10, 25, 50, or 100 User Pak of CE Software's QuickMail AOCE for System 7 Pro. Purchase a 1 User Pak and receive a full working copy of this gateway

for use through 5/31/94. Call CE Software at 800/523-7638 for further details.

SCSI DOC + PowerMerge LE APS Technologies is including a fully operational, limited-edition version of Leader Technologies' \$129 PowerMerge 1.0 file-synchronization software (Apr 93 ★★★★★) free of charge with the \$39 APS SCSI DOC 25-to-30-pin PowerBook SCSI adapter and docking cable with termination power indicator. Available direct (800/723-2080). *Offer expires 3/31/94.*

Thunder 7 1.5.3 + DayMaker 3.0 + CPU 2.0 + Magnet 1.0 Baseline Publishing is bundling its \$99.95 Thunder 7 spelling checker and thesaurus (Nov 93 ★★★★★—"sports an improved interface and a host of new writing aids") with Pastel Development's \$129.95 DayMaker time-management software (May 93 ★★★★★—"flexible printing options," "easy to customize" for version 2.0), Connectix Corp.'s \$99 CPU PowerBook utility (Sep 93 ★★★★★—"indispensable and reasonably priced"), and No Hands Software's \$129.95 intelligent-agent-based utility for automating file management (Feb 93 ★★★★★—"anyone who routinely works with multiple disks will find Magnet invaluable"). Available through Mac's Place (800/814-0009) for \$78. *Offer expires 2/28/94.*

SIDEGRADES/UPGRADES

FoxPro for Macintosh Professional Edition

Microsoft is offering this \$695 list-priced relational database for \$295 (regularly \$595) to current licensees of both FoxBase+ for Macintosh and the FoxBase+ run-time version. The professional version allows developers to distribute stand-alone applications royalty-free and to write libraries in C or C++ that are callable from FoxPro. It also enables development of client-server applications via Open Database Connectivity (ODBC). Call 800/426-9400 for further information. *Offer expires 4/30/94.*

MoviePak2 RasterOps is allowing \$850 off the \$1849 retail price of this video board to customers who purchase it after 1/31/94 and turn in their old MoviePak board. MoviePak2 supports displays up to 26 inches in diameter and offers full-motion 60-fields-per-second video, real-time 30-frames-per-second video digitizing, and full-screen 640-by-480-pixel playback. Once buyers pay \$999, they don't have to turn in an old board until the new one arrives. Call 800/729-2656 for purchase instructions. *Offer expires 4/30/94.*

VideoPaint 1.1 Olduvai Corp. is offering this \$495 color painting and retouching software (see Nov 90 review for version 1.0) direct (305/670-1112, 800/548-5151) to users of any other paint program for \$99. *Offer expires 6/30/94.*

DISCOUNTS/REBATES/FREE OFFERS

Common Ground 1.0 No Hands Software is offering a special \$99.95 introductory price on this \$189.95 electronic-

document-distribution program (Oct 93 ★★★★★—"admirably cost-effective and easy-to-use"). Available through Egghead Software (800/344-4323), CompUSA (800/451-7638), MacConnection (800/800-2222), and MacWarehouse (800/255-6227). *Offer expires 6/30/94.*

FoxPro for Macintosh 2.5 Microsoft is offering a special \$99 introductory price on this new \$495 relational database, which is a major upgrade from FoxBase+ for Macintosh 2.01, that provides extensive support for System 7 capabilities as well as cross-platform compatibility. Call 800/426-9400 for further information. *Offer expires 6/30/94.*

HyperCard 2.2 Apple Computer is offering a special introductory price on this \$249 software tool that enables users to easily create customized software solutions. Version 2.2 integrates AppleScript for automating repetitive tasks by launching, controlling, and exchanging data with existing applications; ColorTools for seamlessly adding color to stacks; and WorldScript for creating multilingual solutions. It also bundles Motion Works International's \$149.95 Addmotion II for creating and editing animation. With a suggested list price reduced to \$139, it is available through authorized resellers and APDA (800/282-2732), Apple's source for developer tools. To locate a reseller, call 800/538-9696. *Offer expires 6/30/94.*

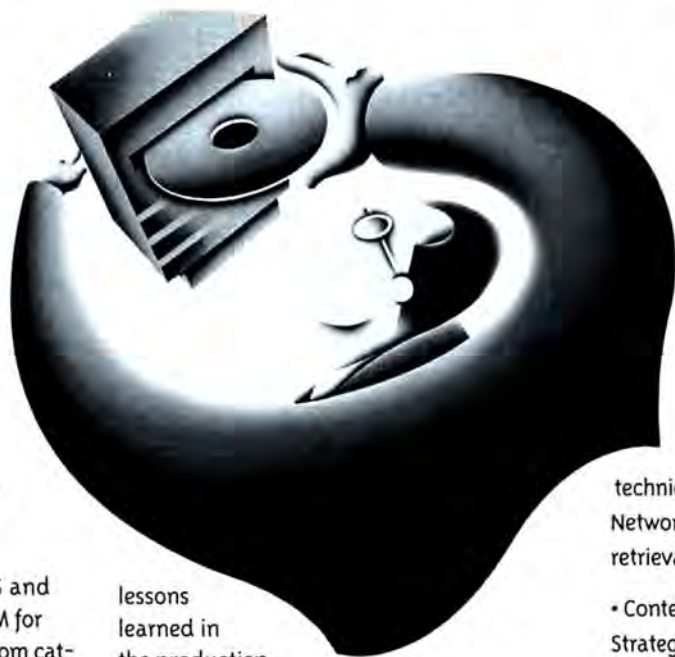
MacHandwriter Communication Intelligence is offering this complete \$399 input system at the special introductory price of \$199. Software includes CIC Handwriting Recognition System and PenMac system extensions; hardware consists of a cordless pen and an ultrathin tablet with a 10-foot cable. MacHandwriter can be attached to your system in addition to, or instead of, a keyboard, mouse, or trackball. Available direct (800/888-9242). *Offer expires 2/28/94.*

MacWrite Pro 1.5 Claris is offering this \$249 word processor (Jul 93 ★★★★★ for version 1.0) for \$99 (an upgrade from version 1.0 to 1.5 is available for \$29). Call 800/325-2747 to locate the Claris authorized reseller nearest you. *Offer expires 5/31/94.*

PicturePress 2.5 Storm Technology has reduced the price of PicturePress image-compression software (Mar 93 ★★★★★—"if you work with images professionally, [it's] the clear choice") from \$199 to \$99. PicturePress features include the ability to locate images quickly and compress them to manageable sizes. It also facilitates automating image processing tasks and is further accelerated with DSP-based cards from both DayStar Digital and SuperMac Technology. For further information, or to order, call 800/275-5734.

Quicken 4.0 Intuit is offering a Trial Edition of this \$69.95 personal-finance package (Nov 93 ★★★★★—"easy to learn and powerful to use") for an \$8 shipping and handling fee. The trial version will set up eight accounts and enter 50 transactions per account. An \$8 rebate coupon is included, which can be activated when the complete program is purchased through a reseller (around \$39.95). The Trial Edition is available direct (800/624-5071). **■**

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- A. Including yourself, approximately how many people are employed at your entire work-site (i.e., employees in your office, building, or cluster of buildings)? (Check one.)
- 01 ☐ 1000+
02 ☐ 999 - 100
03 ☐ 99 - 25
04 ☐ Under 25
- B. Which of the following computers are installed at this entire work-site? (Check all that apply.)
- 05 ☐ Apple Workgroup Servers/Mac Quadra-series
06 ☐ Mac Centris-series/II-series/LC III/Performa 600/450/SE 30
07 ☐ Mac LC/LC II/Performa 430/405/400/200/Classic-series/SE Plus/512K/128K/Portable
08 ☐ Mac PowerBook-series/Duo-series
- C. What is the total number of Macs installed at this entire work-site? (Check one.)
- D. For how many Macintosh computers within this entire work-site do you have purchase involvement for products and/or services? (Check one.)
- E. In which ways are you ever involved in purchase decisions for Macintosh products at this entire work-site? (Check all that apply.)
- F. Over the next 12 months, how much will this entire work-site spend on Macintosh products and/or services? (Check one.)
- G. Considering the entire work-site, which of the following Macintosh hardware and software products are currently installed? (Check all that apply.)
- H. What is your primary job function? (Check one.)

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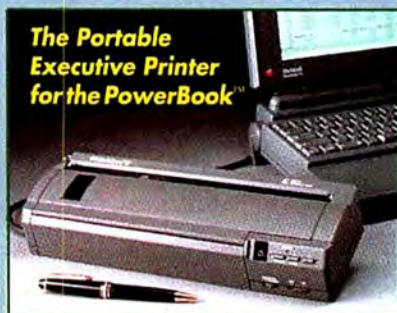
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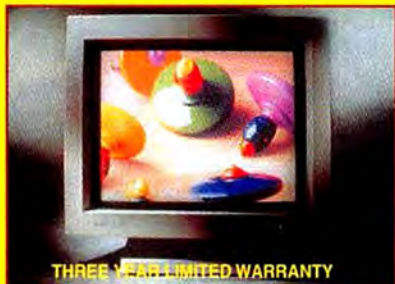
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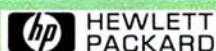
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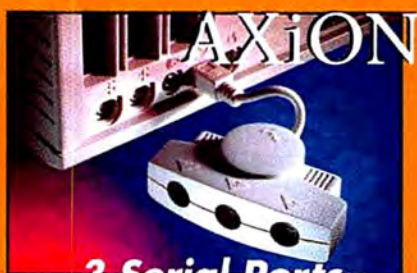


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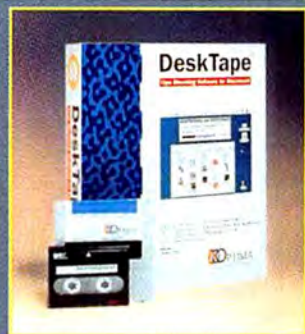
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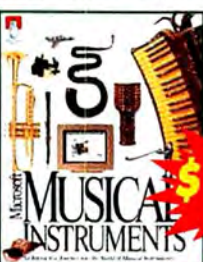
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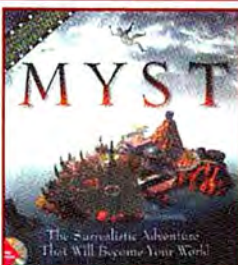
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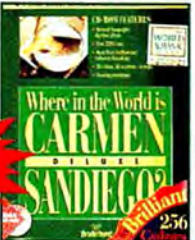


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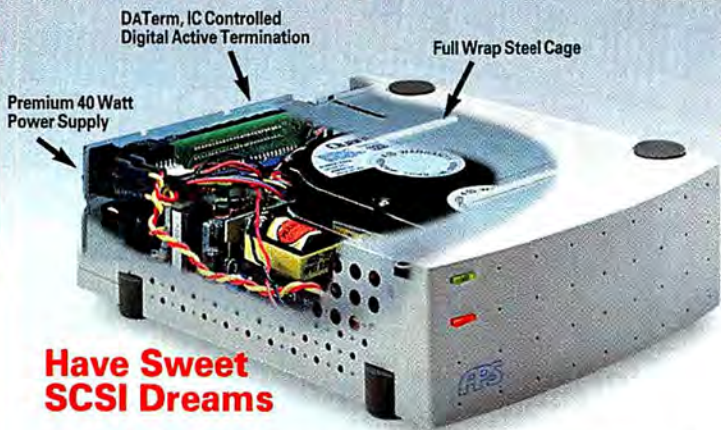
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Model	Capacity	Internal	SR2000
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APS Q 127 ²	122MB	\$189	\$279
Quantum 127 mechanism			
APS 170 ²	163MB	199	289
170 mechanism			
APS MX 240 ²	234MB	259	349
Maxtor 7245 mechanism			
APS Q 270 ²	257MB	269	359
Quantum LPS270 mechanism			
APS 340 ²	327MB	329	419
340 mechanism			
APS MX 345 ²	324MB	379	469
Maxtor 7345 mechanism			
APS Q 540 ²	516MB	749	839
Quantum 540 mechanism			
APS MX 540 ^{2*}	521MB	749	839
Maxtor MXT540 mechanism			
APS Q 1080 ⁵	1029MB	999	1089
Quantum 1080S mechanism			
APS MS 4110 ⁵	1002MB	999	1089
Micropolis 4110 mechanism			

APS Technologies 6131 Deramus
Kansas City, MO 64120

Model	Capacity	Internal	SR2000
-------	----------	----------	--------

1.2G - 3.0G

APS MS 1.2 ⁵	1001MB	\$999	\$1089
Micropolis 2210 mechanism			
APS MS 1.2AV ⁵	965MB	1099	1189
Micropolis 2210AV mechanism			
APS MX 1240 ³	1183MB	1249	1339
Maxtor MXT1240S mechanism			
APS ST 1.6 ⁵	1611MB	1599	1689
Seagate ST 11950N mechanism			
APS MS 1.7 ⁵	1682MB	1349	1439
Micropolis 2217 mechanism			
APS MS 1.7AV ⁵	1682MB	1449	1539
Micropolis 2217AV mechanism			
APS ST 2.0 ⁵	2040MB	1929	2019
Seagate ST 12550N mechanism			
APS MS 2.4G ⁵	2000MB	1999	2099†
Micropolis 1926 mechanism			
APS MS 3.0G ⁵	2845MB	2349	2449†
Micropolis 1936 mechanism			

Drive Capacity Listed is Formatted
* While Supplies Last
† Only Available in Full Height Case

POWERBOOK DRIVES

Model	Capacity	LW 630	Internal	SR 1000
APS PB 85 ¹	80MB	\$249	—	—
APS PB 170 ¹	160MB	349	\$299	\$439
APS T213 ¹	202MB	449	399	539
APS PB 250 ¹	240MB	429	379	519
APS T340 ¹	324MB	709	659	799

SR 1000 AC Power Only Available.

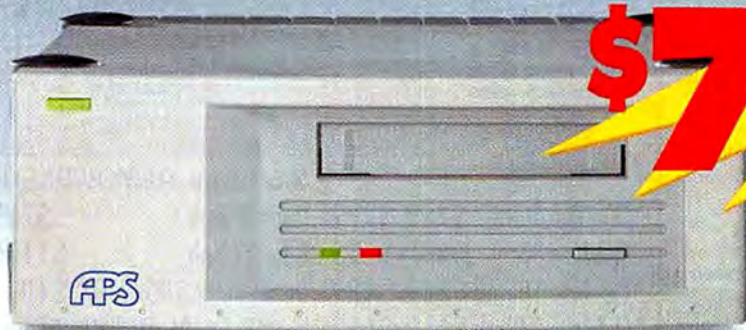
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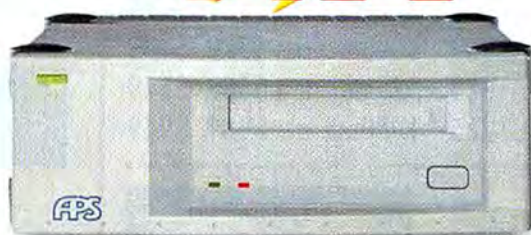
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Capacity	Access	Internal	External
85mb	17ms	\$209	\$309
127mb	17ms	\$249	\$349
170mb	17ms	\$279	\$379
256mb	17ms	\$389	\$489

External Go•Drives come in battery powered case as shown.

ELS SERIES

3.5" LOW PROFILE, LOW POWER

Capacity	Access	Internal	External
127mb	17ms	\$192	\$252
170mb	17ms	\$195	\$255

LPS SERIES

3.5" LOW PROFILE

Capacity	Access	Internal	External
240mb	11ms	\$239	\$299
270mb	11ms	\$279	\$339
340mb	11ms	\$329	\$389
525mb	10ms	\$589	\$649
1080mb	11ms	\$889	\$949

PRODRIVE SERIES

3.5" HALF HEIGHT

Capacity	Access	Internal	External
700mb	10ms	\$779	\$839
1225mb	10ms	\$1029	\$1089
1800mb	10ms	\$1225	\$1285

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FIVE YEAR
WARRANTY**

Unformatted Capacity	Model	Description	Access Time	Actual MAC Capacity	Internal	External
230mb	M2637	2.5" Low Profile	15ms	220mb	\$369	\$469
520mb	M2624	3.5" Half Height	9ms	496mb	\$589	\$649
1.2GIG	M2694	3.5" Half Height	8.5ms	995mb	\$929	\$1019
2.4GIG	M2654	5.25" Full Height	11.5ms	2000mb	\$1629	\$1729



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Unformatted Capacity	Model	Description	Access Time	Actual MAC Capacity	Internal	External
3.5" HALF HEIGHT						
1.2GIG	ST11200N		10.5ms	1000mb	\$939	\$999
2.4GIG	ST12400N		9ms	2000mb	\$1649	\$1709
1.9GIG	ST11950N	Barracuda 1	8ms	1350mb	\$1579	\$1639
2.4GIG	ST12550N	Barracuda 2	8ms	2050mb	\$1949	\$2009
5.25" FULL HEIGHT						
1.6GIG	ST41651N	Wren-8	15ms	1350mb	\$1129	\$1229
2.1GIG	ST42100N	Wren-9	12.9ms	1900mb	\$1439	\$1539
2.4GIG	ST42400N	Elite-2	11ms	2050mb	\$1799	\$1899
3.4GIG	ST43400N	Elite-3	11ms	2750mb	\$2199	\$2299

FEATURING



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ClubMac 44mb	\$259	\$299	Dual 105mb \$729
ClubMac 88c	\$405	\$455	Dual 270mb \$1179
ClubMac 105mb	\$389	\$429	Dual Combo 105/270* \$1029
ClubMac 270mb	\$619	\$659	5.25" DUAL REMOVABLES
CARTRIDGES			Dual 44mb \$549
44mb/105mb		\$59	Dual 88c \$649
88mb		\$89	Dual Combo 44/88c* \$729
270mb		\$99	

All SyQuest drives include a TWO Year Warranty, SCSI Director formatting software, and necessary cables for "plug-and-play". All SyQuest cartridges include a ONE Year Warranty.

CLUBMAC TAPE BACKUP SYSTEMS



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Capacity	Model	Media	Internal	External
DAT TAPE BACKUP SYSTEMS				
2.0GIG	Hewlett Packard 35470A	DDS	\$1009	\$1029
3-5GIG	Hewlett Packard 35480A	DDS-DC	\$1089	\$1109
4-8GIG	Hewlett Packard C1533A	DDS-2	\$1629	\$1649
2.0GIG	Sony SDT-2000	DDS	\$879	\$899
3-5GIG	Sony SDT-4000	DDS-DC	\$1039	\$1059
4-8GIG	Sony SDT-5000	DDS-2	\$1359	\$1379

8MM TAPE BACKUP SYSTEMS

Capacity	Model	Media	Internal	External
2-5GIG	Exabyte 8205	8mm	\$1569	\$1589
5-10GIG	Exabyte 8505	8mm	\$2409	\$2429

ClubMac Tape Backup Systems include Retrospect v.2.0 Backup Software, ONE Tape and ONE Year Warranty.

CLUBMAC OPTICAL DRIVES



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-Macworld Editor's Choice December 1993



"Without question the best bargain among 5.25" drives."
-Macworld Editor's Choice December 1993

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Fujitsu 3.5" Dynamo		\$869
ClubMac 3.5" 128MB Epson Optical	\$759	\$789
ClubMac 5.25" 650MB Sharp Optical	\$1669	\$1699
Hewlett-Packard 5.25" 1.3GIG Optical External		\$2699

All ClubMac Opticals include ONE cartridge and ONE Year Warranty.



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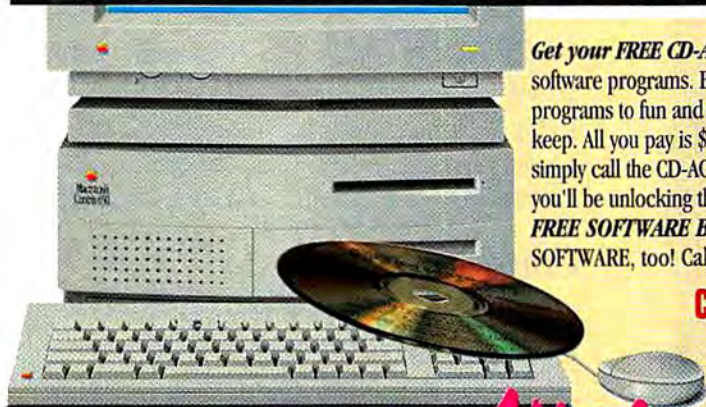
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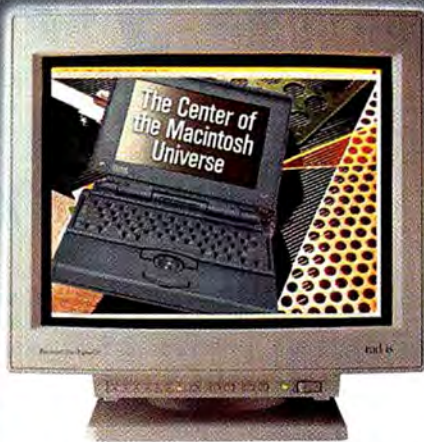
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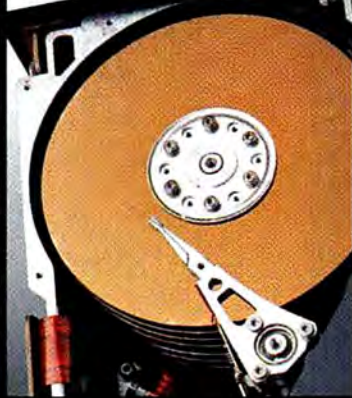
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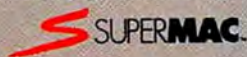
We carry only top-notch products from the industry's best manufacturers. No garbage. You demand quality and so do we. What's more, our strict criteria for selecting products means we always get the lowest price – directly from the manufacturer. So **nobody can give you a better value** than Express Direct.

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b 2439
a 2339

SuperMac Thunder 24 (a), "the fastest 24-bit card" & the award winning 20-TXL 20" Trinitron display (b)

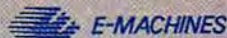


For color publishing & pre-press, nobody delivers more power and performance than SuperMac. SuperMac's 24-bit graphic accelerators constantly sweep MacWorld magazine's top 3 ratings for the fastest cards on the market. SuperMac's large screen displays are tailored to the demands of the graphics professional.



a Call
b 299

Performance and Value: E-Machines razor-sharp T16R (a) & the affordable accelerated 24-bit color interface, Futura SX (b)



E-Machines is unquestionably the best value in color. Offering an unmatched combination of performance and price, E-Machines video cards give you all the features and speed – at half the price. Plus E-Machines displays have set the industry standard for quality. Now you can have the performance you demand at a price you can afford.



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240MB*	2.5"	14MS	\$ 375	\$ 435
330MB*	3.5"	9MS	\$ 325	\$ 385
520MB	3.5"	9MS	\$ 575	\$ 635
1.2GIG	3.5"	8.5MS	\$ 850	\$ 910
2.4GIG	5.25"	11.5MS	\$ 1550	\$ 1610

Seagate

5 YEAR WARRANTY

CAPACITY	SIZE	ACCESS	INTERNAL	EXTERNAL
600MB*	3.5"	10.5MS	\$ 839	\$ 889
1.2GIG	3.5"	9MS	\$ 899	\$ 949
1.6GIG*	5.25"	15MS	\$ 1149	\$ 1249
2.2GIG	5.25"	12MS	\$ 1429	\$ 1529
2.4GIG	5.25"	11MS	\$ 1729	\$ 1829
2.4GIG	3.5"	9MS	\$ 1695	\$ 1755
2.5GIG	3.5"	8MS	\$ 1949	\$ 1999
3.4GIG	5.25"	10MS	\$ 2169	\$ 2269

HITACHI

5 YEAR WARRANTY

CAPACITY	SIZE	ACCESS	INTERNAL	EXTERNAL
1.2GB	3.5"	11.8 MS	\$ 899	\$ 959
1.6GB	3.5"	11.8 MS	\$ 1239	\$ 1299
3.7GIG	5.25"	12.8 MS	\$ 2295	\$ 2395

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128MB	Ricoh	30MS	\$ 839
128MB	Fujitsu	30MS	\$ 855
650MB	Ricoh Hyperspace	28MS	\$ 1799
1.0GIG	Panasonic	90MS	\$ 1999
1.3GIG	Sony	19MS	\$ 2299
1.3GIG	Tahiti 3	19MS	\$ 2799

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CAPACITY	MODEL	MEDIA	INTERNAL	EXTERNAL
250MB	Sankyo CP-150	DC6250	\$ 415	\$ 475
500MB	Sankyo CP-525	DC6250	\$ 565	\$ 625
750MB	Exabyte 2501	DC2750	\$ 626	\$ 686
1.3-2GIG	Archive 4320*	4MM	\$ 939	\$ 999
1.3-8GIG	Archive Turbo*	4MM	\$ 1139	\$ 1199
1.3-2GIG	Exabyte 4200*	4MM	\$ 939	\$ 999
1.3-5GIG	Exabyte 8205	8MM	\$ 1539	\$ 1599
1.3-10GIG	Exabyte 8505	8MM	\$ 2179	\$ 2279
4.0-8GIG	Sony 4000	4MM	\$ 1089	\$ 1149
4.0-8GIG	Sony 5000 DDS-2	4MM	\$ 1189	\$ 1249

CD ROMS

1 YEAR WARRANTY

Toshiba 3401	Unparalleled speed and reliability. Fully integrated audio, double speed drives. MPC compliant, and supports Multi-session photo CD.	\$ 439
Sony CDU-561	Multi-session photo CD, double speed, Fully integrated audio.	\$ 385

With one of our drives, you can pick and choose your title or bundle from our large selection. All our CD titles are only \$23.95 when you buy 2 or more.

Ricoh Playwright 1000	Recordable CD Make your own! 1 MB data buffer, 1 mb/sec data transfer rate, supports multi-session recording and is compatible with many platforms.	\$ 3899
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650 8/230-CD .. \$2487	Duo 250/270C ... Call	Laser Select 360 \$1447	NEC 4FGE \$ 717
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660 8/230-CD .. \$2377	SPECIALS	Super Mac 177 .. \$1057	Super Mac 207XL \$2397
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840 40/1.70GIG \$5397	LC III 4/160 \$ 777	Newton Call	
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Delta Graph 3

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Minimum requirements: Mac SE/30, 2MB RAM, System 6.0.2, a hard drive.

Delta Point

◆ 6949 Delta Graph 3



EtherPeek 2.0.3

EtherPeek is a packet-level Ethernet network analysis package which makes the complex tasks of network monitoring and debugging easy, graphic, and customizable. EtherPeek localizes network problems, performs sophisticated diagnostic tests, monitors network loads and events, tests hardware and software, and provides information for the management and planning of network configurations.

Minimum requirements: Mac SE/30, System 6.0.5; color monitor recommended.

AG Group

7442 EtherPeek 2.0.3

\$95.



Abacus Mac Keypad

Try the Abacus on-line keypad with your PowerBook or any Mac. This keypad features its own LCD display and separate keys for switching to calculator mode or accessing secondary functions. It handles all the standard memory functions, calculator functions, and 15 F-key functions. Quick Cursors give you easy access to cursor keys in a familiar inverted "T" layout, and a Send Key lets you paste calculation results directly into your text or spreadsheet. The Abacus keypad delivers world-class Key Tronic quality, performance, and warranty protection, and it's built in the U.S.A.

Key Tronic

◆ 6270 Abacus Mac



\$145.

Retrospect Remote 2.0

Don't bet on individuals in your office to back up their work. To ensure all important data is secure, you need to automate backup with Retrospect Remote. It's the premier network backup software for the Mac. Easily back up your Mac plus 10 others on your network to the same storage device. Just drop a Remote INIT into the system folder of the 10 other machines and protect them with remote control - transparently, automatically, and overnight. It's fast - 20 to 100 percent faster than other backup software. Create any number of scripts to customize your backups.

Then, schedule the scripts so backups can run automatically any day and at any time.

Minimum requirements: Mac Plus, 2MB RAM, System 6.0.5, a hard disk, 4MB RAM under System 7.

Dantz

◆ 6050 Retrospect Remote 2.0



\$52.



ClickChange 2.0

Customize the Mac with your color schemes. Wildly refreshing patterns brighten your desktop and scroll bars. Choose 3D scroll bar, button, and window styles. Replace drag cursors and menu titles with colorful, animated alternatives. Included are custom cursors, menu bar icons, and Cursor Finders (flashy animations to expose the cursor when you can't find it), and much more!

Minimum requirements: Any Mac, 4MB RAM, System 7, a hard drive.

Double click Software, Inc.

6213 ClickChange 2.0

\$30.



UnderWare

Get all the fun of a screen saver while you work! Other screen savers only run while your Mac is idle, but UnderWare runs in the background on your desktop. And these modules don't just blank out your screen, they actually interact with the icons and windows on your screen. (Like a fire-breathing dragon melting your trash can!) You get over 30 modules. After Dark modules work too.

Minimum requirements: Mac LC, 4MB RAM, System 7, Color QuickDraw.

Bit Jugglers

6931 UnderWare

\$92.

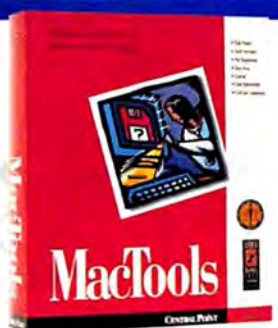
Mac Tools 3.0

With this latest version of Mac Tools, finding and fixing disk problems has never been easier. New TrashBack recovers accidentally deleted files in one step. New AutoCheck monitors your disk in the background and alerts you of small problems before they become disasters. And, new FastCopy makes quick work of floppy disk duplication. DiskFix rebuilds crashed hard disks - even checking the Desktop and System file for corruption. The Optimizer speeds data access on your hard disk. Also included is FileFix, the only utility that repairs corrupted Excel files. Plus, you'll find all the flexibility you need for backing up your hard disk. Only the MacTools utility collection offers complete anti-virus protection with full network support.

Minimum requirements: Mac II, 2MB RAM, System 6.0.7, hard drive.

Central Point

◆ 7370 Mac Tools 3.0



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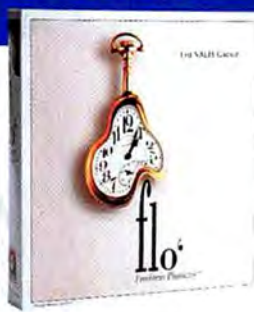


Flo'

Wouldn't it be fun to turn your boss into a "conehead?" Flo's Freeform Plasticity™ makes it easy by turning any image into a stretchable plastic-like surface. Unlike morphing, you only need one image – or part of an image – to twist, push, pull, and turn! You can easily distort any PICT file and export it to numbered PICTs, TIFF, PICS, and QuickTime without degrading the original image quality. Graphic design professionals will appreciate the many features and beginners will love the ease-of-use. Flo' creates fluid animation sequences and provides unlimited key frames, automatic in-betweening, and ease-in/ease-out animation control – making it a great tool for QuickTime movie makers.

Minimum requirements: Mac II, 5MB RAM, System 6.0.5, math coprocessor; color monitor recommended.

The Valls Group
7354 Flo'



\$32.

Edmark

Thinkin' Things develops thinking skills essential for learning success. Kids play with Oranga Banga, the Frippe Shop, and other Thinkin' Things as they build memory, creativity, critical thinking, and problem-solving skills. **KidDesk** is the first desktop utility designed to make computing easier for kids – and worry-free for parents.

Millie's Math House captures children's imaginations while teaching fundamental math skills. Fun-filled activities teach numbers, shapes, patterns, and problem-solving. No reading is required. **Bailey's Book House** encourages kids to explore essential reading concepts. Lifelike voices inspire children to learn letters, words, rhymes, and stories. Kids can create their own cards and storybooks.

Minimum requirements: KidDesk, Millie's Math House, Bailey's Book House – Mac Plus; 1MB RAM for B/W, 2MB RAM for color; System 6.0.7; hard disk; 2MB RAM for B/W, 4MB RAM for color under System 7. Thinkin' Things – Any Color Mac, 4MB RAM.

Edmark

- ◆ 6826 Thinkin' Things (for ages 4 to 8) (pictured)
- ◆ 5182 KidDesk (for ages 3 to 10)\$24.
- ◆ 6443 Bailey's Book House (for ages 2 to 6)\$28.
- ◆ 5183 Millie's Math House (for ages 2 to 6)\$28.

EDMARK



\$129.



America Remembered 1.0

This unique stock photo archive contains 500 images of the turn-of-the-century. Each image is reproduced as a 300 dpi PICT file, retaining the original colors and densities of the lithographers' art. Illustrators, graphic designers, and desktop publishers will find these easy-to-access images useful for clip art, reference, and inspiration.

Minimum requirements: 6MB RAM, System 6.0.7, 13" RGB monitor, CD-ROM drive.

Boraventures Publishing

◆ 7443 America Remembered 1.0

\$255.

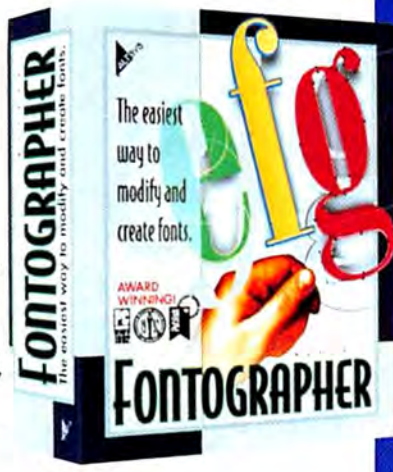
Fontographer 4.0

This is the easiest way to create and modify fonts! You get more than 200 new features with Fontographer 4.0, the latest successor to the powerful, award-winning font-editing program. Now it's easier than ever to add signatures, logos, foreign symbols, and customized characters to new or existing Type 1, Type 3, or TrueType fonts. The new multigun tool automatically draws starbursts and polygons, making accent- and logo-creation a snap. Auto Space and Auto Kern enable you to calculate each character's width and metric values automatically. The Clean Up Paths option automatically eliminates unnecessary points in your drawings for faster and smoother results. And now you can edit in Preview mode, so you'll have a better feel for how your character or graphic image will look as you modify or create fonts.

Minimum requirements: Any Mac, 4MB RAM, System 6.0.5, a hard drive.

Altsys

- ◆ 6422 Fontographer 4.0 (pictured)
- ◆ 6538 Fontographer Upgrade\$98.



\$489.

Painter 2.0 & ArtZ Tablet Bundle

Fractal Design's **Painter 2.0** is the most innovative and exciting paint and photo-design program on the market. And Wacom has long been recognized as the premiere tablet maker. The **ArtZ 6x8 ADB Tablet** is the latest in a distinguished line. Painter 2.0 is a remarkable 24-bit color paint program that simulates the tools and textures of natural media. New tools include a spatter airbrush, Cubist effect, and multiple light sources. It's also a photo-design program with photo compositing and color separation. The ArtZ tablet is an amazing graphical input device. On it you use the stylus as if it were a pen or brush on your screen. The stylus is cordless, batteryless, and detects 120 levels of pressure.

Minimum requirements: ArtZ ADB Tablet – Mac SE, System 6.0. Painter 2.0 – Mac SE/30, 2.5 MB RAM, System 6.0.5.

Wacom Technology/Fractal Design Corp.

◆ 5355/5657 Painter 2.0 & ArtZ ADB Tablet Bundle



\$60.

Random House Unabridged Dictionary

This newly revised and updated Second Edition contains over 315,000 entries with over 75,000 example sentences and phrases. You can easily look up words – even if you misspell them – or search for all definitions containing a specific word. And, you can complete anagrams. Complete updated geographical and biographical entries as well as a new, 32-page full-color World Atlas are also included. With more than 1,000 new words and meanings and 1,500 revised entries and definitions, it's no wonder *Washington Post Book World* called it "without doubt, today's unabridged dictionary of choice." You get both Windows and Macintosh versions on this disk!

Random House

◆ 6743 Random House Unabridged Dictionary



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Minimum requirements: Mac Plus, 1MB RAM, floppy drive, System 6.0.5, and a hard disk. Supports color and monochrome monitors.

Chipsoft

7226 MacInTax Final Edition (pictured)

7227 MacInTax/Quicken Bundle\$54.



\$86.

DATEBOOK PRO, TOUCHBASE PRO, and Quicken 4 Bundle

DATEBOOK PRO and TOUCHBASE PRO are now totally integrated, and with this specially priced bundle, you can organize your finances, save money, and save time. DATEBOOK PRO is a powerful calendar and time-management program. Calendars, scheduling, to-do lists, and alarms combine to keep you informed. TOUCHBASE PRO stores information about your personal and business contacts. Print Rolodex cards, address books, envelopes, and more. Move from office to home without missing a beat. File synchronization updates records automatically. And Quicken 4.0 is the latest version of the popular personal and small business finance program. Print and automatically address checks, update your check register, keep track of tax information, and print detailed reports.

Minimum requirements: Mac Plus, 1MB RAM, System 6.0.5, a hard drive or external floppy.

Aldus Consumer Division

7056 DATEBOOK PRO, TOUCHBASE PRO, and Quicken 4 Bundle



\$1348.



PrecisionColor Display/17

Quit squinting at a dirky 14" display. It's time for the most advanced 17" Trinitron color display available. The new PrecisionColor Display/17 from Radius provides solid performance, incredibly sharp focus, and bright color in all three of its available resolutions. Switch between them on the fly without having to reboot. You won't find more flawless imaging at such an affordable price anywhere.

Radius

7523 PrecisionColor Display/17

6809 Intellicolor 20"\$2848.



\$45.



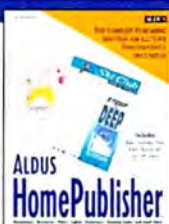
Aldus HomePublisher

This easy and complete publishing program lets you turn out professional publications - in just minutes. Aldus HomePublisher includes Aldus Personal Press for desktop publishing, full-featured word processing, image control, templates, and copy-fitting. Plus, you get 12 fonts from Bitstream, 100 ClickArt images, and a package of PaperDirect specialty paper. Perfect for home or office!

Minimum requirements: Mac Plus, 2MB RAM, System 6.0.7, hard disk.

Aldus Consumer Division

7245 Aldus HomePublisher



\$274.

WordPerfect 3.0

With WordPerfect's 125,000 word multi-language dictionary and thesaurus, you'll always be able to find that perfect word. But communicating effectively today requires more than just words.

QuickTime movies, a powerful drawing package that handles millions of colors, a new Tables feature (with up to 32,000 rows and 32 columns), and an Equation Editor allow you to say what you want, any way you want. Of course, WordPerfect makes it easy with features like Drag 'n' Drop editing. Ruler bars make style and layout formatting simple. Button bars make finding functions quick and easy, and a complete macro language allows the automation of tasks. Includes Grammatik 5 FREE.

Minimum requirements: Mac Plus, 2MB available RAM, System 6.0.7, hard drive, 4MB RAM under System 7.

WordPerfect

6681 WordPerfect 3.0 (pictured)

6874 WordPerfect 3.0 Competitive Upgrade\$78.



\$235.

Business Standard

Business Standard is much more than a complete accounting package. With a built-in employee time clock plus bar code and mailing label creation capabilities, you have all the features you need to run a small business or mail order company. (Larger organizations, such as manufacturers, distributors, and wholesalers, will love the password protection and security!) You can even track commission levels and sales by individual. Of course, Business Standard allows you to perform all standard accounting functions. You can instantly look up inventory items, and customer and purchase orders, as well as generate standard and customizable reports, invoices, work orders, and estimates. Business Standard sets the standard for complete business solutions.

Minimum requirements: Mac Plus, 1MB RAM, System 6.0.7.

CHAE

7057 Business Standard



\$214.

Arrange 1.1

This fully integrated and customizable Personal Information Manager lets you organize contacts, schedules, to-do lists, projects, files, and more. Forget about having to learn separate products to organize your life. Arrange is the one application for all of your information. Easily personalize Arrange or choose from the growing library of professional templates for one-stop custom solutions. And revolutionary features help you get organized fast. Intelligent Import, File References, and the Grabber make it easy to gather information from any other application! Automatic Linking allows you to link a person in your contact list to a meeting, to-do item, or their company. And, File Merge keeps your PowerBook and desktop Mac in perfect agreement.

Minimum requirements: Mac II, 2MB RAM, System 6.0.7, hard drive.

Common Knowledge

7215 Arrange 1.1



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Lights Out Sports Fans

Every sports fan should have this screen saver to prevent screen burn-in. Choose either the **Baseball** or **Hockey** version. Both contain ten modules and you can control aspects of each. With either version, you can watch a game played out using actual statistics. You pick which teams play. In Baseball, watch a carnivorous blimp prowl the sky devouring official team logos. With the Hockey version, you'll see a predatory Home Team Zamboni dissolve the logos of divisional rivals. These are the only sport screen savers licensed by the NHL and Major League Baseball.

Minimum requirements: Mac with 68020 processor, System 6.0.5, 3MB hard drive space.

Quadrangle

- 6929 Lights Out Sports Fans: Baseball (pictured)
- 6930 Lights Out Sports Fans: Baseball for Windows
- 7365 Lights Out Sports Fans: Hockey
- 7444 Lights Out Sports Fans: Hockey for Windows

\$54.

How Computers Work - CD-ROM

Have fun while you learn in this interactive look at the past, present, and future of the desktop miracle. How Computers Work features narrated slide shows on input, output, memory, programming, and applications. QuickTime animation takes you inside every device from the mouse to the memory cells of a CPU. It also includes tutorials for the most popular programs on the market today including Word, Excel, QuarkXPress, FileMaker Pro, Audioshop, and SuperPaint. And your children can easily learn the basics of programming using the included Logo programming tutorial, designed expressly for children.

Minimum requirements: Mac LC, System 6.0.7, 4MB RAM, 13" color monitor, and a Mac-compatible CD-ROM drive.

Time Warner Interactive Group

5987 How Computers Work



\$37.

Gus Goes to Cybertown

Join Gus, the hippest, most lovable dog ever in this multimedia learning experience. Search Cybertown for the elusive Cyberbuds, three intriguing friends your kids will love. This CD-ROM is completely interactive and has original songs, full-motion video, and captivating graphics and animation. Kids eight and under learn about counting, the alphabet, history, and more.

Minimum requirements: Any Mac supporting 256 colors, 4MB RAM, System 6.0.7, a CD-ROM drive.

Modern Media

7014 Gus Goes to Cybertown CD-ROM



\$38.

Pathways Into Darkness

Think fast! You'll have to if you're going to keep up with continuous-motion, 3D, texture-mapped graphics, and defeat an alien demon. Separated from your secret special forces team, you travel over 4 million square feet alone to save the world. Beautifully rendered graphics and active panning stereo sound combine to make Pathways Into Darkness the closest thing to virtual reality without a helmet. And, the smooth-scrolling, first-person interface works well with any 256-color Mac. If you need a little help on your mission, the **Official Pathways Into Darkness Hint Book** guides you through Pathways' levels, monsters, and strategies. Plus, you get maps, tips, and a level-by-level walk-through.

Minimum requirements: Any 256 or 8-bit color Mac, 1MB RAM, System 6.0.5, 5MB hard disk space.

Bungle Software

- 6639 Pathways Into Darkness (pictured)
- 7189 Official Pathways Into Darkness Hint Book \$11.



\$41.

ReadySetGrow!

ATTENTION PARENTS! This fun, interactive guide combines animation, illustrations, sound effects, and text to cover parenthood from prebirth to age 5. Explore Family Profile to help "predict" your child's looks or determine potential risks. Medical Records with electronic growth charts, "Biological Clock," Pregnancy Timetable, and much more make this the most comprehensive parents' program available.

Minimum requirements: Any Mac with 1MB RAM, System 6.0.5, a hard drive.

Atlantis

- 6991 ReadySetGrow! (pictured)
- 6992 ReadySetGrow! Windows \$41.



How to Order

- Call 1-800-270-0009 anywhere in the USA or Canada. Call 1-406-758-8000 for international orders.
- Fax your order to 1-800-881-3090. International fax orders: 1-406-758-8080.
- For electronic orders, use Compuserve (76635.660), GEnie (MACSPICE), or America Online (Mac's Place).
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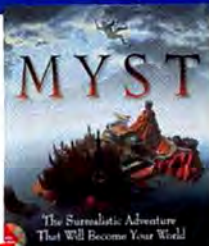
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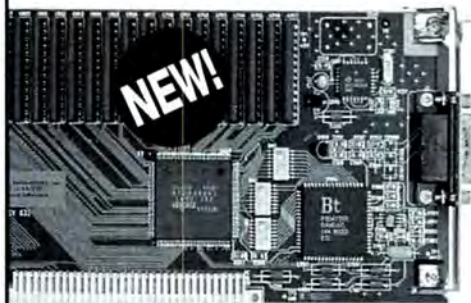
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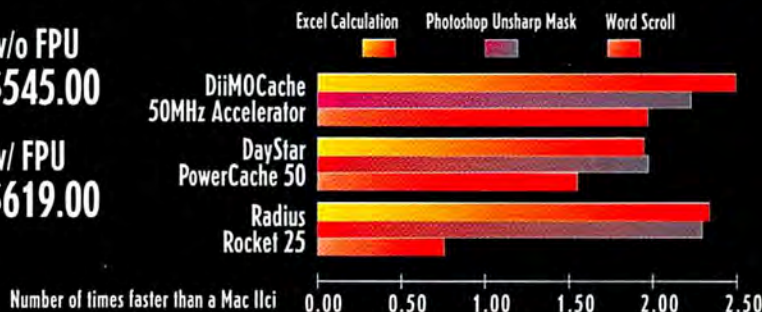
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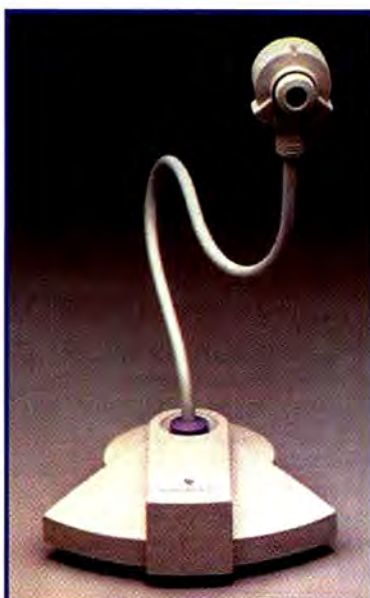
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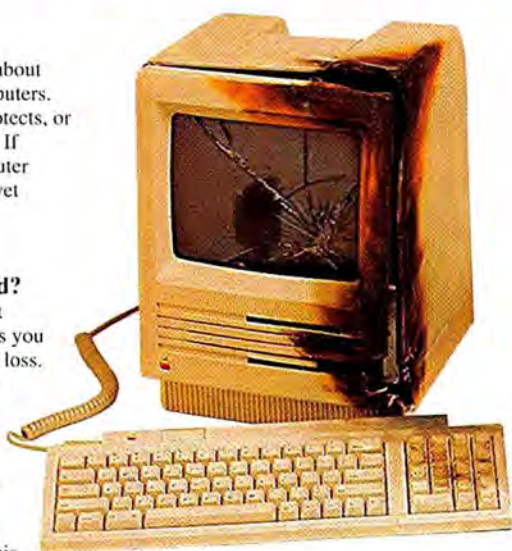
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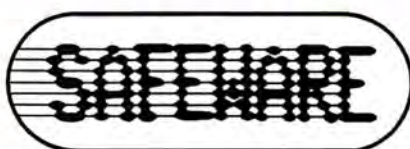
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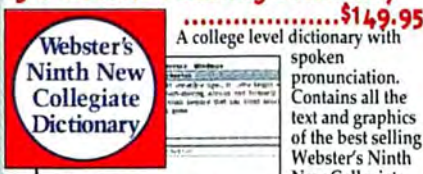
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WISE GUY

BY GUY KAWASAKI

After the Buyout

What happens when the honeymoon's over

THREE MONTHS AGO, IN MY column in the December issue, I explained how a couple of unknowns started, built up, and sold a software company despite common industry wisdom that it was too late for two guys in a garage to be successful. That article was meant to inspire entrepreneurs. In this month's column, I have a different purpose—that is, to explain what happens after a company buys out a start-up.

The Perfect World versus the Real World

In a perfect world, the acquiring company adds scads of resources, such as testers dedicated to the product; first-class documentation; international distribution; and highly qualified salespeople. Entrepreneurs don't have to worry about the niggling details that used to occupy their day. Now they can concentrate on what they do best: creating innovative products.

Wake up and smell the ragweed. The relationship between entrepreneurs and acquiring companies is closer to spousal abuse than marital bliss. The company says that something died in the entrepreneur the moment the check was cashed. Now all he or she wants to do is jet ski. The entrepreneur says that once the deal was done, the executives—the ones who bought all those dinners, promised to listen, and extolled the virtues of autonomous decision making—pay no attention.

Things are worse in lower levels of the company. For example, the entrepreneur thought his or her product would (finally) get enough tech-support staff. Instead the firm's tech-support people are already too busy, they don't know a thing about the product, and they haven't used a Macintosh before. The entrepreneur thought the acquiring company had great marketing. Instead, its marketers know less than the entrepreneur, and worse, they are too proud to ask for input.

Advice for Acquirers

This kind of situation is lousy for everyone, but it's especially bad for customers

who had the courage and insight to buy a new product from a start-up, only to get the rug pulled out from under them when the product is acquired and stagnates. Here are some ways for companies to minimize a potentially bad situation.

First, set realistic expectations. No entrepreneur in the history of Silicon Valley has lasted for more than three months after an acquisition. True, some have stayed longer than three months, but their hearts were somewhere else. If both the company and the entrepreneur acknowledge this, then game playing and resentment can be avoided. The realistic perspective is: "Give us your best shot for 90 days and then leave. Take some time off and enjoy your money. If you start another company, talk to us. Maybe we can do this again."



Second, pump the entrepreneurs for everything possible—for example, knowledge of the competition, desirable enhancements to the product, and effective sales and marketing ideas. Because entrepreneurs have long-term employment contracts and noncompetition agreements, companies think they "own" the entrepreneurs and delay using them. I have never heard an entrepreneur complain about being overutilized by a company after an acquisition. Entrepreneurs want their products to kick butt—even

after the acquisition—so they want to be used, not ignored.

Third, dedicate personnel to the newly acquired product in areas such as tech support, sales, documentation, and development. The temptation is to shoe-horn newly acquired products into the existing system, because a company has an infrastructure that already accommodates many products. A newly acquired product is an only child, and now the company wants it to fit into a school system. For six months, the product needs nannies.

Advice for the Entrepreneur: Do It Again

Entrepreneurs, get what you can up front, expect to hate working within a large company, and move on with your life. Give up your emotional attachment to

your company: it's now someone else's to make better or to trash. Your responsibility is to ensure that the transition goes smoothly. Period. Then, walk away and take a rest.

So there you are: rich, rested, and full of ideas. You've established a solid reputation by starting a company with no resources, proving everyone wrong, and cashing out. As Robert Redford said after he was elected in *The Candidate*, "What do we do now?"

Do it again. Create a product you love, take 20 percent of what you've made, and roll the dice again. Don't

do this because you want to show the company that bought you out how stupid it was. Don't do this for the money. Do this for the love of product and thrill of entrepreneurship. **m**

GUY KAWASAKI's views are his own and only sporadically represent those of *Macworld*. His current book, *Hindsights*, was published by Beyond Words Publishing in January. He has investments in Bit Jugglers, Global Village Communication, Bookmaker Corporation, and others. He can be reached at Kawasaki@radiomail.net.



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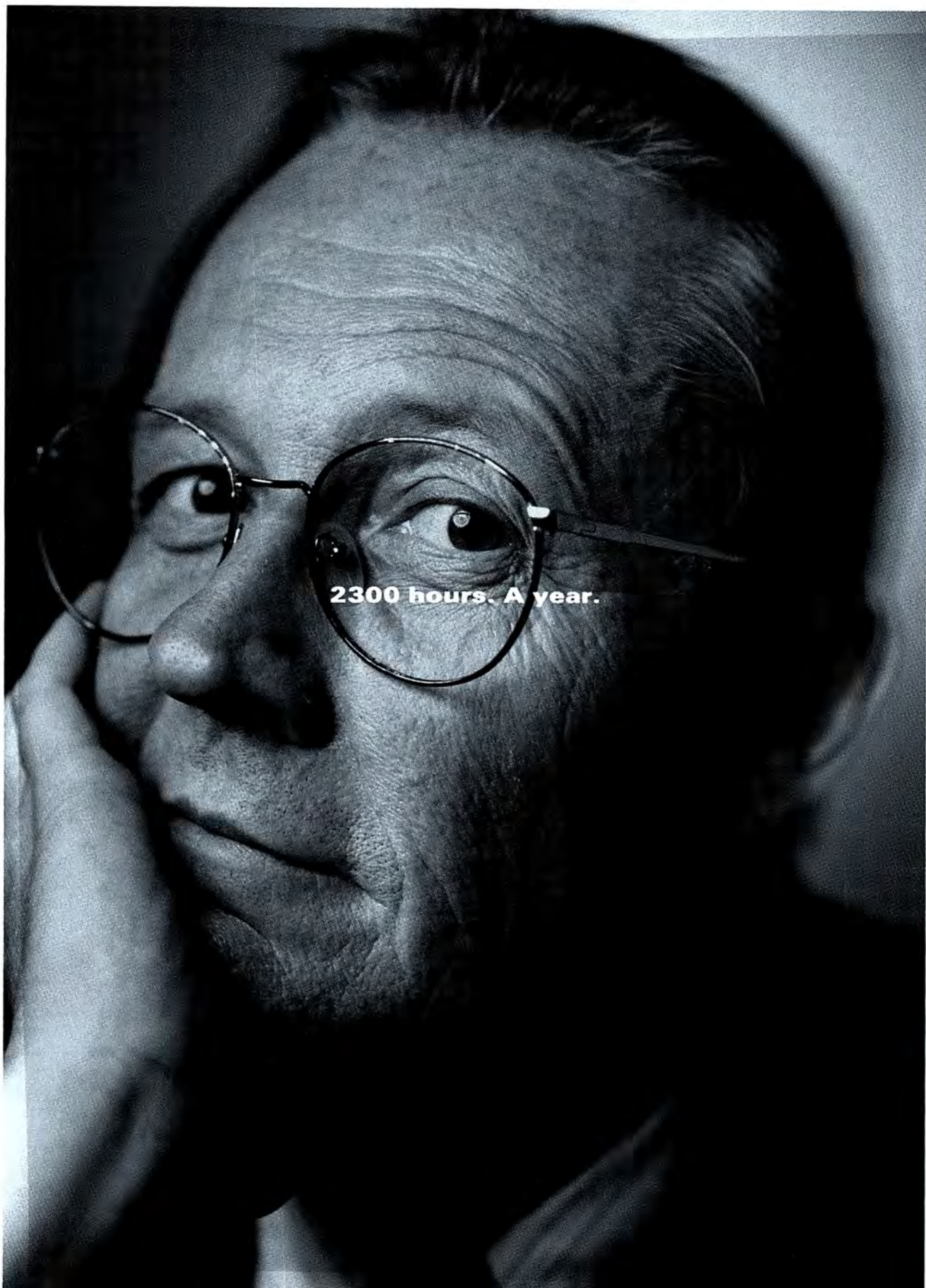
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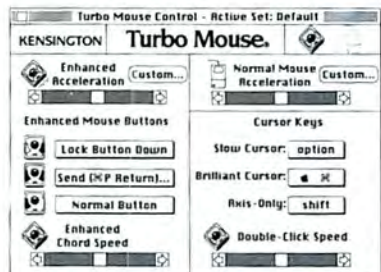
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